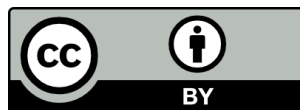




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Essays on wage inequality and mobility in Mexico

Claudia Tello de la Torre



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Essays on wage inequality and mobility in Mexico

Tesis para optar por el grado de
Doctor en Economía

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A mis padres, Víctor y Dolores

A mis hermanos, Liliana, Óscar y Víctor

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Chapter 1

Introduction and objectives

1.1. Motivation

The labour structure of Mexico has suffered different political, economic and demographic changes. After a critical period of economic adjustment characterized by the debt crisis in the 1980's, Mexico enjoyed a period of economic growth. In the mid-1980s, Mexico was in an initial stage to implement new trade liberalization policies and export promotion that was expected to increase the country's productivity and competitiveness. During that period, trade barriers were reduced through the various rounds of negotiations under the GATT and WTO, and Mexico also experienced a radical reduction in the size of the public sector, in the strength of the unions, but also a massive increase in the rate of underemployment and in workers in the informal sector (Gong *et al.*, 2004; Meza, 2005). From 1989 to 1994, average GDP growth was about 3.9% t per year,¹ but growth ended abruptly in 1995, when GDP fell by 6.2% in the aftermath of the so-called "Peso Crisis". After the crisis of 1995, the GDP contracted by around 8%, the economy quickly recovered but not with significant levels of growth, i.e. from 1996 to 2000 Mexico's per capita GDP grew at a rate of 4% per year and between 2001 and 2006 the growth grew at only 1% per year.

Under this macroeconomic framework, there is overwhelming evidence that since the mid-1980s Mexico has faced increasing inequality not only in economic but also in social terms, although it seems to have decreased from 2000 onwards.

The inequality increase observed during the 1990s was a common feature of several OECD industrialized countries². In fact, a large empirical literature has studied the evolution of wage inequality and changes in the wage structure since the early 1980s (Bound and Johnson, 1992; Katz and Murphy, 1992; Murphy and Welch, 1992; Juhn, Murphy and Pierce, 1993) and has found that

¹ World Bank (1997).

² There is evidence that inequality measures are sensitive to the sample of workers examined and the earnings measure used as stated by Handcock, *et al.* (2000), and Lemieux (2002, 2006).

wage differentials by education, by occupation, and by age and experience groups all rose substantially. Similar conclusions have been found by other authors focusing in differences in wage returns (Blau and Lawrence, 1996; Galbraith, 2009).

Only a few studies have analysed the causes behind changing trends in inequality in developing countries in contrast to developed ones. It is worth mentioning the studies by Autor *et al.* (2005, 2008); Arellano *et al.* (2001); Acemoglu (2003); Morley (2000); Bandeira and García (2002); Ferreira, *et al.* (2008) and Cornia (2010)³.

Taking this into account, the objective of this thesis is to provide a systematic analysis of inequality in Mexico trying, first, to update the available evidence using more recent data, and second, trying to identify the factors and the consequences of the previously mentioned changing trends.

As a first step to achieve this objective, in this chapter I will, first, provide a brief summary of previous studies and, next, move to a descriptive analysis of inequality trends in Mexico over the past 20 years. From a methodological point of view, I will use different descriptive measures of wage inequality and next, provide evidence on the factors behind its evolution using quantile regressions. In order to carry out the empirical analysis, I will use data from the National Survey of Labour and Employment (ENOE) and from the National Urban Employment Survey (ENEU), carried out by the National Institute of Statistics and Geography of Mexico (INEGI), from 1987 to 2008.

1.2. State-of-the-art

As previously mentioned, the wage structure in Mexico changed considerably during the 1980s and 1990s. Using different datasets, the available literature (Hanson, 2007a) has shown that wage inequality and the returns to skill increased markedly. However, there is still no consensus about their determinants. Although these changes have been probably related to the Mexican policies on massive privatization and trade liberalization programs (La Porta and Lopez-de-Silanes, 1999; Hanson, 2007b), labour market institutions and union power were also curbed (Fairris, 2003), and increases in the minimum wage did not keep pace with the rate of price and wage inflation (see, for

³ These contrasts with the slight increases or even declines in other countries such as the Netherlands, Sweden or Belgium, US, UK, Germany, Canada and some countries in Latin America.

example, Fairris, *et al.*, 2008). These changes happened in a moment where wage inequality was increasing in most industrialized countries (Katz and Autor, 1999) and at a time of rising international migration to the United States that affected the domestic supply of labour (Chiquiar and Hanson, 2005; Mishra, 2007), and with a changing trend in the effects of minimum wages on inequality (Lee, 1999; Bosch and Manacorda, 2010).

Most of the existing research on the determinants of change in the wage structure in Mexico has focused on the role of international trade and foreign direct investment (FDI)⁴. In many ways research on the inequality in Mexico and their evolution has focused on the impact of the trade policies adopted during two decades under the GATT and the implementation of the North American Free Trade Agreement (NAFTA)⁵. As a consequence of these negotiations Mexico experienced changes in the tariff structure and price movements. Earlier papers in this literature found a rising wage inequality after Mexico joined the GATT but began to fall after joining NAFTA. More recent papers have also pointed out that the relative price of skill-intensive goods rose following entrance to the GATT, but, after NAFTA, the relative price of skill-intensive goods fell (Roberson, 2000, 2004; Slaughter, 2000; Feenstra and Hanson, 1997; Hanson and Harrison, 1999; Revenga, 1997; Cragg and Epelbaum, 1996 and Goldberg and Pavcnik, 2007).⁶ In particular, after a period of rising inequality, between 1997 and 2008, Mexico's Gini coefficient in urban areas fell from 0.43 to 0.41. Moreover, Mexico experienced a period of slow pro-poor growth even though the decline in inequality coincided with the implementation of the NAFTA it also coincided with a shift in government spending patterns, public spending on education, health and nutrition has become more progressive⁷.

⁴ Due to its proximity to, and increasing economic integration with, the United States, Mexico has typically been considered as an ideal testing ground for theories of the effect of international trade on the structure of wages.

⁵The North American Free Trade Agreement (NAFTA), ratified in 1992 and implemented in 1994, culminated several years of trade liberalization efforts begun in 1986. NAFTA's goal is the creation of a market of 360 million consumers with \$6 trillion in annual output. Tariffs on most industrial and agricultural goods are to be eliminated or phased out within 15 years. NAFTA trading benefits are only given to goods produced wholly or principally in NAFTA countries. NAFTA eliminates trade barriers and investment restrictions on participating countries' autos, trucks, buses and auto parts within 10 years. NAFTA proposed to safeguard domestic agricultural production of the dairy, egg, poultry, and sugar sectors. NAFTA opens up foreign investment possibilities in the Mexican energy sector. NAFTA has provisions for the textiles and services sectors, banking, investment, and intellectual property rights. Labor and environmental impacts are also addressed. Mexico established free trade agreements with Venezuela and Colombia as a member of the Group of Three, and with several other Central American nations. Mexico signed a free trade agreement with Chile in 1991.

⁶They analyse on the one hand if the changes in relative prices can explain changes in relative wages, using the Stolper-Samuelson theorem and if the changes in tariffs and trade policy explain movements in relative prices. On the other hand, it is the evaluation of the link between tariff changes and wages directly. They find that Mexico protected less-skill-intensive industries before entering the GATT and tariff reductions were larger for less-skill-intensive industries, but they do not find significant evidence of a link between changes in output prices and wages. As a result of the scarce evidence in support of an effect of trade on the wage structure in the United States, researchers have turned to analysing changes in the wage structure in Mexico.

⁷ In 1997 the Mexican government launched the conditional cash transfer program *Progres*a (later called *Oportunidades*), a large-scale anti-poverty program which reached around five million poor households – around 14.8% of households in

In the recent literature there has also been a resurgence of interest in issues relating to equity, inequality, and growth. Numerous models propose an income-distribution growth linkage. Since the pioneering contribution by Kuznets (1955), suggesting a non-linear relationship between inequality and growth, there has been a growing interest in analysing the relationship between both variables. However, theoretical papers as well as empirical applications have produced controversial results (Piketty, 1999; Tanzi and Chu, 1998; Lundberg and Squire, 1999; Ackerman and Alstott, 1999; Kanbur and Lustig, 1999; Inter-American Development Bank, 1998). In this context, and in the light of the increase in wage inequality, a deep concern has emerged for those individuals located at the bottom end of the earnings distribution who have been most strongly affected, in terms of social exclusion and poverty, by changing economic conditions. In particular, the low paid, the low skilled, and less protected groups generally, such as women, young workers, and older men, appear to have borne most of the burden, in terms both of lower earnings and of the higher incidence of unemployment (OECD, 1996).

In summary, considerable attention has been devoted in recent years to the evolution of earnings inequality and to the analysis of the competing explanations for the observed phenomena. In addition, however, the existence and persistence of substantial structural differences over the time and across regions in the level of wage inequality and the incidence can shed light on further dimensions of the patterns of inequality.

1.3. The evolution of wage inequality in Mexico

1.3.1. Measuring inequality

A substantial and growing literature has developed different measures or indexes of economic inequality. Some authors use the Gini coefficient or other measures or relationships drawn from Lorenz curves; while others authors prefer different indicators of dispersion, such as an entropy index or axiomatic derivations of inequality indexes; and still others advocate the use of normative measures derived from social welfare functions⁸.

2006. These changes made the post-fiscal income distribution (after taxes and transfers, including in-kind transfers) less unequal than before, re-enforcing the trend followed by income inequality shown above. In-kind transfers mainly include government spending on education and health delivered to the population in the form of free or quasi-free transfers. See Esquivel and Rodríguez-López (2003).

⁸ See Cowell and Jenkins (1995), Cowell (2000) and Lambert (2001) for an excellent survey.

Despite the extent of writing on inequality measurement, little has been said about how inequality should be measured depending on the objective of the analysis. Yet the proper index of inequality for a given use should presumptively depend on the reasons for measuring it⁹. Many indices have been used to summarize inequality in terms of a single number. We first describe the most commonly used ones and their properties in order to identify differences among indices.

In descriptive statistics, the variance (or its square root, the standard deviation) is often used to summarize dispersion. One problem with the variance for inequality measurement is that, if every income is increased equiproportionately, inequality increases: the variance is not ‘scale invariant’¹⁰. A scale invariant counterpart to the variance is the coefficient of variation (CV), which is the standard deviation divided by the mean. A different way of imposing scale invariance would be to take a logarithmic transformation of every income before computing the variance, thus generating the ‘variance of the logs’ inequality index.

Other commonly-used scale invariant indices include those based on percentile ratios, such as the ratio of the 90th percentile to the 10th percentile (P90-P10 ratio) or, to compare dispersion at the top of the distribution with dispersion at the bottom, the P90-P50 and P50-P10 ratios.¹¹

Inequality indices can also be derived directly from the Lorenz curve. Because the Lorenz curve plots income shares, it is scale invariant, and so measures derived from the Lorenz curve inherit this property¹². One index is the Pietra ratio, also known as the Ricci-Schutz index, the Robin Hood index, or half the relative mean deviation. It is defined as the largest difference between the Lorenz curve and the perfect equality line, and is also equal to the proportion of total income that would have to be redistributed from those above the mean to those below the mean in order to achieve perfect equality (Jenkins and Van Kerm, 2008).

⁹ Obviously, the reasons for measuring inequality (and poverty, progressivity, or redistribution) bear on how these other matters should be addressed, but problems regarding whether income is a good proxy for welfare, units of measurement (individual versus family versus household), the choice of a present or lifetime perspective, and the like will be set aside in order to focus on more basic questions (see Kaplow, 2005).

¹⁰ The variance is unchanged by equal absolute additions to each income (translation invariant). For a discussion of this property and absolute, intermediate, and relative inequality indices, see Cowell (2000).

¹¹ One often cited advantage of the P90-P10 ratio is that it avoids problems of ‘top-coding’ in survey data. However, by their nature, percentile ratio measures ignore information about incomes other than the percentiles selected. See Burkhauser *et al.* (2007).

¹² The Lorenz ordering, a concept that refers to whole classes of indices is only partial. Unambiguous conclusions cannot be drawn when Lorenz curves intersect unless further restrictions are placed on the inequality measure. For example, if two Lorenz curves cross only once, and if (i) the Lorenz curve for A crosses the Lorenz curve for B from above and (ii) $CV(A) \leq CV(B)$, then inequality is lower in A for any transfer sensitive inequality measure (Dardanoni and Lambert, 1988, Davies and Hoy, 1995, Shorrocks and Foster, 1987). Thus comparisons of CVs may result in unambiguous inequality orderings according to a broad class of inequality indices.

However, the most commonly-used inequality index is the Gini coefficient (G), which ranges from 0 (perfect equality) to 1 (perfect inequality). It is the ratio of the area enclosed by the Lorenz curve (L) and the perfect equality line to the total area below that line, the Gini coefficient is twice the area defined between p and $\theta(p)$, where $\theta(p)$ is the Lorenz curve and shows the income value (Y) below a fraction $0 \leq p \leq 1$:¹³

$$G(Y) = 1 - 2 \int_0^1 L(p; Y) dp \quad (1.1)$$

A family of inequality indices derive from quite different considerations (Cowell and Kuga, 1981), is the Generalized Entropy class (E_α), of which prominent members are the Theil index¹⁴. This index considers a region's population of individuals $i \in \{1, 2, \dots, N\}$ where each person is associated with a unique value of the measured income.

Given an appropriate normalization using the standard population principle (Dalton, 1920) this approach then found the expression as:¹⁵

$$E_1(Y) = \int \frac{y_i}{\mu Y} \log \left(\frac{y_i}{\mu Y} \right) f(y_i) dy, \quad (1.2)$$

where y_i is income share that is individual i 's total income share as a proportion of total income for the entire regional population and μY is the mean income.

And also the following which has since become more widely known as the *mean logarithmic deviation* (MLD):¹⁶

$$E_0(Y) = E_0(Y) \int \log \left(\frac{\mu Y}{y_i} \right) f(y_i) dy, \quad (1.3)$$

¹³Yitzhaki (1998) reviews other alternative formulae.

¹⁴The most commonly used values of α are 0, 1 and 2. A value of $\alpha = 0$ gives more weight to distances between wages in the lower tail, $\alpha = 1$ applies equal weights across the distribution, while a value of $\alpha = 2$ gives proportionately more weight to gaps in the upper tail (see, Litchfield, 2003).

¹⁵Using an analogy with the entropy concept in information theory, Theil (1967) opened up and explored a new area to inequality measurement and for the axiomatic approach to inequality measurement. The entropy concept is the expected information in the distribution. Theil's application of this to income distribution replaced the concept of event probabilities by income share.

¹⁶This inequality index is an example of the concept of conditional entropy that allows the comparison distribution and has been applied to the measurement of distributional change (see Cowell, 1980).

and half the squared coefficient of variation,

$$E_2(Y) = \frac{cv(Y)^2}{2} \quad (1.4)$$

It has become common practice to see (1.2) and (1.3) as two important special cases of a more flexible general class; in terms of the Theil analogy this is achieved by taking a more general evaluation function for income shares.

Then, the general formula for Generalized Entropy indices can be expressed as:

$$E_\alpha(Y) = \frac{1}{\alpha^2 - \alpha} \int \left(\left(\frac{y_i}{\mu Y} \right)^\alpha - 1 \right) f(y_i) dy \quad (1.5)$$

for $\alpha \neq 0, 1$ ¹⁷. A useful feature of the Generalized Entropy class is that every member is additively decomposable by population subgroup and it is closely related to Atkinson measures.

Following the work of Jenkins and Van Kerm (2008), it has been suggested to review four properties of the different indexes in order to choose the most appropriate one for the desired study. First, the scale invariance property and replication invariance: it corroborates if a simple replication of the population of individuals and their incomes does not change aggregate inequality. Second, the symmetry (or anonymity) axiom says that the index depends only on the income values used to construct it and not additional information such as who the person is with a particular income. Third, the importance of equivalence: if incomes were not adjusted to take account for differences among characteristics of the individuals or composition, then these characteristics would be relevant for inequality assessments. And fourth, the Principle of Transfers (Pigou-Dalton or progressive transfer), is the assumption that if a small transfer is made between two persons of unequal income, inequality rises (falls) in a proportion as the recipient is richer (poorer) than the donor¹⁸. The Principle of Transfers reduces to the condition $dI < 0$, where

¹⁷ Different values of α correspond to differences in the sensitivity of the inequality index to differences in income shares in different parts of the income distribution. The more negative that α is, the more sensitive is the index to differences in income shares among the poorest incomes; the more positive that α is, the more sensitive is the index to differences in income shares among the rich.

¹⁸ Consider some distribution A from which a person (labelled i) is arbitrarily chosen. Now form a new distribution B by transferring a small amount of income from person i to a poorer person j, though keeping i richer overall. Most people would agree that inequality falls in going from A to B, though they may disagree about how much. An inequality measure I satisfying $I(A) > I(B)$ is said to satisfy the Principle of Transfers (Jenkins and Van Kerm, 2008).

$$dI = \left(\frac{\partial I}{\partial y_j}\right) dy_j + \left(\frac{\partial I}{\partial y_i}\right) dy_i = dy \left[\frac{\partial I}{\partial y_j} - \frac{\partial I}{\partial y_i}\right], \quad (1.6)$$

and the change in inequality, dI , is the total differential of I and, by construction, the transfer $dy_i = -dy_j$.¹⁹ Views about the precise size of the inequality reduction from the transfer dy are likely to depend on the income level of the recipient²⁰. It can be shown that the Principle of Transfers is satisfied by the Gini, Generalized Entropy and Atkinson indices, but not by percentile ratio indices, the variance of logs, or the Pietra ratio. All Atkinson indices are transfer-sensitive but the CV, for instance, is not. Nor are Generalized Gini indices because of their dependence on ranks rather than income.

In addition, there is a connection between the transfer principle and the scale invariance with the ordering of distribution using the Lorenz curves in which the transformation of the cumulative distribution function gives a graphical representation of inequality in the distribution function. Consequently, the Lorenz curve preserves information about inequality²¹.

Of course, the concept of inequality, as noted earlier, is multidimensional. Therefore, it is necessary to apply several measures in order to characterize various aspects of inequality in a distribution of income.

1.3.2. Data sources

The data used for the thesis come from the National Survey of Labour and Employment (ENOE) and the National Urban Employment Survey (ENEU), carried out by the National Institute of Statistics and Geography of Mexico (INEGI), from 1987 to 2008. According to INEGI's methodology document on the ENEU and the ENOE, the data are representative of the 32 largest urban areas in Mexico, covering the 62% of the population in urban areas with at least 2,500

¹⁹ Jenkins (1991) evaluates the expressions for various indices and provides more extensive discussion.

²⁰ Taking two pairs of individuals the same income distance apart, where one pair is relatively rich and the other relatively poor, many would argue that a given transfer from richer to poorer should reduce inequality more for the second pair than the first. Inequality measures satisfying this property are known as *transfer sensitive* (Shorrocks and Foster, 1987).

²¹ A key result is that if the Lorenz curves of two distributions do not cross, i.e. $L(p_i, A) \leq L(p_i, B)$ for any cumulative population share p (and the two Lorenz curves are not identical), then one can conclude unambiguously that inequality is higher in distribution A than in distribution B according to any inequality index that respects the properties of scale invariance, replication invariance, symmetry, and the Principle of Transfers (Foster, 1985). Distribution B is said to Lorenz-dominate distribution A . With non-intersecting Lorenz curves, it does not matter whether one chooses Generalized Entropy measures, Atkinson indices, or generalized Gini coefficients to compare inequality between A and B , in every case, inequality would be higher for distribution A .

inhabitants and the 93% of the population living in metropolitan areas with 100,000 or more inhabitants.

The ENEU was an integral part of the national housing surveys since 1972²². Over the years, the survey phased in different changes related to the geographical coverage. In the first stage, it only considered three metropolitan areas of Mexico: Mexico City, Guadalajara and Monterrey. From 1985 to 2003 the survey included more metropolitan areas²³.

During the eighties of the last century, the ENEU was consolidated as an employment survey and kept on the same structure in which the units of analysis were persons and its units of selection were private dwellings either in rural or urban areas, in consequence, economic activities cover both agricultural and non-agricultural ones²⁴. From 2005 onwards the ENEU was substituted by the ENOE. Both of them have been the main source that provides the greatest information for analysing employment in Mexico. They cover social and demographic information about: age, gender, family relations, education, place of birth, marital status, number of live-born children, residence status, migration and work force characteristics. In general, the main variables to analyse economically active population (working and unemployed population are: status in employment, main occupation, branch of economic activity, type of business, number of employees in the economic unit, economic sector, type of contract, hours of work, form of payment, income, job benefits, other job(s) held, regularity of work, additional employment (employment status, main occupation, branch of economic activity), seeking another job, type of job sought, duration of unemployment, work experience, reasons for unemployment, position held in last job, occupation in last job, sector of activity in last job and so forth.

²² The Ministry of Labor (STyPS) and the INEGI started a specific project to build the National Employment Survey. They created an independent module of employment named the Continuous Labor Force Survey (ECMO) that was later replaced by the Continuous Survey on Occupation (ECOS). After that, the new conceptual frame is built around the guidelines of ILO, OECD, SNA rev. 93, Delhi Group recommendations and Paris Group recommendations.

²³ In 1985, the ENEU counted in 16 urban areas: Mexico City, Guadalajara, Monterrey, Puebla, León, San Luis Potosí, Tampico, Torreón, Chihuahua, Orizaba, Veracruz, Mérida, Ciudad Juárez, Tijuana, Nuevo Laredo, and Matamoros. In after years, the survey included: Aguascalientes, Acapulco, Campeche, Coatzacoalcos, Cuernavaca, Culiacán, Durango, Hermosillo, Morelia, Oaxaca, Saltillo, Tepic, Toluca, Tuxtla Gutiérrez, Villahermosa, Zacatecas, Colima, and Manzanillo, Monclova, Querétaro, Celaya, Irapuato, Tlaxcala, Cancún, La Paz, Ciudad del Carmen, Pachuca, Mexicali, Salamanca. The last cities added at the survey were Reynosa, Ciudad Victoria and Tuxpan. In 2000 there were even 48 cities there. Nowadays, the geographical coverage of the ENOE is conducted every quarter throughout the country. Its coverage is nationwide, and can be broken down into federative entities (states), community sizes, and an urban aggregate of 32 metropolitan areas.

²⁴ The surveys follow international practices with respects to the classification of types of occupation (ISCO), and with respects to the classification of industries or branch of activities - NAICS (North American Industry Classification System), which is used by Canada, the US, and Mexico under the framework of NAFTA (North America Free Trade Agreement).

The ENEU and the ENOE surveys operate on the basis of a rotating sample and micro-level data set collected by INEGI. Both of them contain quarterly wage and employment data. Each quarter, one fifth of the total sample will have received five times (one visit per quarter) and after this last visit, it is replaced with another fifth that from now on is subject of a new cycle of five visits²⁵. The statistical construction allowed us to analyse the evolution of the labour market, to make comparisons among different years and to apply dynamic analysis building panels. However, we need to consider that the structure of the surveys only allow us to build a panel data set covering short time periods and following the same household throughout five quarters.

One of the limitations of the ENEU is that until the year 2004 it does not consider variables that allow us to know the labour experience of the workers, the received training and the mobility or labour migration. The ENOE incorporates important changes, without losing the structure of the previous ones. The ENEU and ENOE are the Mexican official labour market surveys and are the only household surveys continuously available since the late 1980s that collect detailed labour market information and a large array of socioeconomic characteristics²⁶.

In order to describe the evolution of earnings inequality in Mexico, in the rest of the analysis, we use micro data from the ENEU-ENOE over the period 1987-2008. The size of the sample is 1,391,438 observations in urban aggregate of 32 metropolitan areas. Our basic sample consists of workers between 15 and 65 years that working regularly full-time and the hours are measured using usual hours worked in the principal job. We chose not to incorporate the self-employed and seasonal or unpaid workers in order to focus on the formal or mainstream labour market and to avoid problems with dealing with retained earnings.

Wage and employment data are collected for the week before the survey date. The data contain a monthly earnings variable from which we calculate logarithmic hourly wages as the ratio of monthly earnings to $4.3 * \text{weekly-hours}$ ²⁷. For individuals who report their wages as a multiple of

²⁵ This implies that the other four fifths of the sample were present the previous quarter (one of those four fifths is visited for the second time, another for the third, the other for the fourth and the last one for the fifth and final occasion). On a monthly basis, and with one third of the total sample, the survey is representative of the nation as a whole, and for the aggregate of urban areas.

²⁶ The ENEU and the ENOE have been widely used for studies of the Mexican labour market, including several prominent studies documenting and analysing changes in the wage distribution (e.g., Hanson and Harrison, 2003; Hanson, 2004 and Verhoogen, 2008).

²⁷ The definition of earnings in the publicly available version of the surveys refers to monthly "equivalent" earnings from the main job after taxes and Social Security contributions, including overtime premia and bonuses. For those paid by weeks the survey transforms weekly earnings into monthly. Similar adjustments are used for workers paid by days or every two weeks.

the minimum wage, we assign as their wage the mean of the interval²⁸. Wages were deflated by the national consumer price index (NCPI) to the second quarter with 2002 as the base year. The NCPI disaggregates indexes in six geographical regions that include 46 cities classified by locality size (small, medium and big). This structure allow for at least one representative city in each state²⁹.

I use these surveys to analyse different dimensions of the wage inequality in urban areas in Mexico. In each chapter of the thesis I will give different treatment to the data taking into account the model, variables and conceptual frameworks used in the analysis.

1.3.3. The evolution of wage inequality in Mexico

The degree of inequality in the distribution of wages can be described in several ways. The topic in this chapter includes the personal distribution of wages, aggregate indices and Theil decomposition in the urban areas in Mexico during 1987-2008. Several studies indicate that Mexico has experienced different trends in the structure of wage. Our attention turns away from the analysis of specific wages and towards an examination of the distribution of personal wages, that is, the distribution is the urban national pattern of the shares of individual wages earnings. We review how unequal is the distribution of wages, describe the wages distribution and measure the degree of observed inequality and subsequently with this reference frame to analyse why has this distribution become more unequal over the past 20 years (see Table 1.1).

The personal distribution of annual wages is highly unequal and is skewed to the right. The histogram of wages is characterized by (1) much bunching around the mode, (2) an extended rightward tail, and (3) a mean (arithmetic average) that exceeds the median (half above, have below). The distribution of annual wages received by Mexican workers between 1987 and 2008 is shown in Figure 1.1. During the whole period, the mean exceeds the median because the average is pulled upwards by extremely high wages of the relatively few workers who have wages in the long rightward tail of each histogram. These suggest that most workers receive wages in the leftward two-thirds of the overall distribution, while some people receive extraordinarily large annual wages relative to the median and mean.

²⁸ During the period, the population that does not declare incomes is less than one percent.

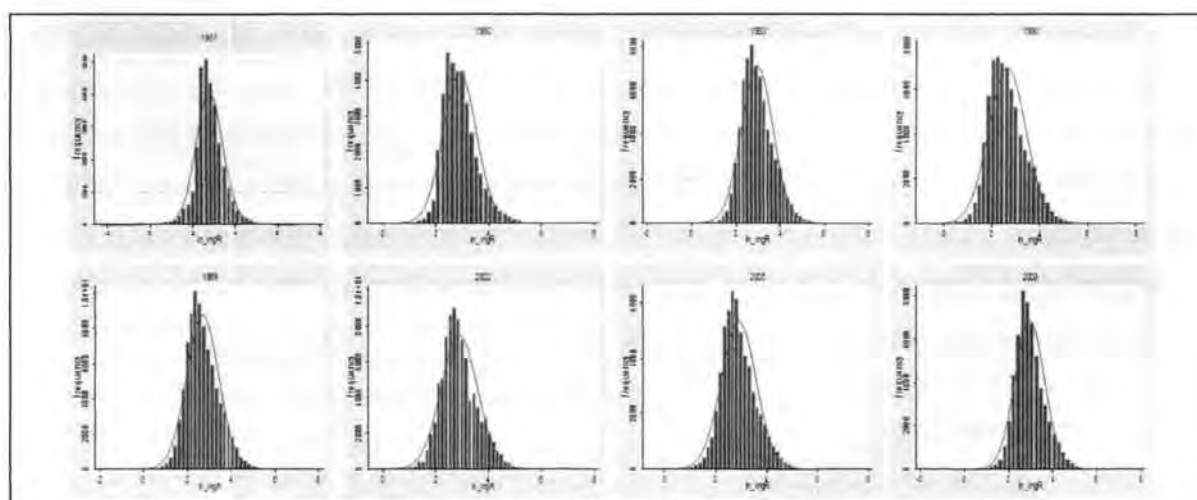
²⁹ The NCPI is calculated since 1969 and it has changed four times of base year in 1978, 1980, 1994 and 2002. In order this study we use the base to 2002 that correspond a weighting for consume of population structure in 2000. The NCPI is calculated and published on a monthly basis by the Central Bank (Bank of Mexico). The index gathers the prices of family shopping basket, prices of goods and services (<http://www.banxico.org.mx>).

Table 1.1. Summary of statistics of the log real hourly wage, (1987-2008)

Year	N	Mean	SE(mean)	Median	SD	Variance	Skewness	Kurtosis	Range	Min	Max
1987	30634	2.8	0.004	2.7	0.6	0.4	0.1	4.9	9.3	-2.3	7.0
1988	35342	2.8	0.003	2.7	0.6	0.4	0.3	5.3	10.6	-2.4	8.1
1989	35384	2.8	0.003	2.8	0.6	0.4	0.6	4.8	9.5	-2.4	7.1
1990	37221	2.9	0.003	2.8	0.6	0.4	0.8	4.4	8.1	-0.3	7.7
1991	37059	2.9	0.003	2.8	0.6	0.4	0.8	4.4	8.7	-0.7	8.0
1992	67517	2.9	0.003	2.8	0.7	0.5	0.6	4.1	9.4	-0.4	9.0
1993	69271	3.0	0.003	2.9	0.7	0.5	0.5	3.7	8.8	-1.2	7.5
1994	71609	3.0	0.003	2.9	0.7	0.5	0.6	3.5	8.0	-0.9	7.1
1995	69263	2.8	0.003	2.7	0.8	0.6	0.6	3.6	10.0	-2.2	7.8
1996	71241	2.6	0.003	2.5	0.8	0.6	0.6	3.5	9.1	-0.9	8.2
1997	72945	2.7	0.003	2.5	0.8	0.6	0.5	3.4	8.6	-1.0	7.6
1998	76609	2.7	0.003	2.6	0.8	0.6	0.5	3.4	10.0	-0.9	9.2
1999	85738	2.7	0.002	2.6	0.7	0.5	0.5	3.5	9.2	-1.1	8.1
2000	93311	2.8	0.002	2.7	0.7	0.5	0.5	3.5	9.3	-1.7	7.6
2001	91219	2.9	0.002	2.8	0.7	0.5	0.5	3.7	9.8	-2.2	7.6
2002	87727	2.9	0.002	2.8	0.7	0.5	0.5	3.6	7.2	-0.3	6.9
2003	78096	2.9	0.002	2.8	0.7	0.5	0.5	3.6	7.9	-1.1	6.8
2004	53581	2.9	0.003	2.8	0.7	0.5	0.5	3.7	7.3	-0.8	6.4
2005	57141	2.9	0.003	2.8	0.7	0.5	0.5	3.9	7.5	-0.6	6.9
2006	57201	3.0	0.003	2.9	0.7	0.5	0.5	3.9	8.3	-1.3	7.0
2007	57008	3.0	0.003	2.9	0.7	0.5	0.5	4.1	9.3	-0.9	8.4
2008	56321	3.0	0.003	2.9	0.7	0.5	0.5	4.2	9.6	-1.8	7.9
Total	1391438	2.8		2.8	0.7	0.5	0.5	3.7	11.6	-2.4	9.2

Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

Figure 1.1. Distribution of annual log real hourly wage, 1987-2008



Source: Based on data panel ENEU-ENOE surveys from 1987 to 2008.

To get a better sense of what this means, we compare the percentage difference between various tenths and the median log wage across the two decades. From 1987 to 1993 the first tenth was 29.5% below the median log wage this percentage decrease among middle tenths while in the top tenth was 17 % above the median log wage. In the period from 1994 to 2000 the wages suffer a substantially percentage change the first tenth was 40.3% below the median wage and the top tenth was 21.4% above the median. And in the next period (2001-2008) the log wage kept on the similar proportion (see Table 1.2). In terms of relative wages, the top deciles mostly gained during the first decade of our data, 1987-1997, while in the bottom was the reverse effect. This meant that real wages mostly declined for the lower wage groups leading to an increase in overall wage inequality.

From 1987 to 2008 the wage of the richest 20% is more than the income of all those on below-average wages (i.e. the bottom eight tenths) combined, the bottom and the middle 80% of the population represented about 71% and 73% of the total and the richest 20% represented 27% and 29%, the rest of the wage distribution changed little over the last decade.

Table 1.2. Percentage difference of the log real hourly wage in respect of the median wage, by deciles (1987-2008)

Year	I	II	III	IV	V	VI	VII	VIII	IX
1987	28.6	16.1	9.6	4.6	2.7	-5.2	-9.9	-15.7	-23.5
1988	26.2	16.4	11.1	5.5	2.7	-5.6	-10.6	-16.7	-24.2
1989	25.5	17.4	11.3	5.3	2.8	-5.5	-10.4	-16.6	-24.4
1990	28.3	18.6	12.0	5.6	2.8	-5.1	-10.2	-16.4	-24.7
1991	29.2	19.7	12.0	5.7	2.8	-5.7	-10.9	-17.2	-25.6
1992	33.3	21.4	12.7	6.8	2.8	-5.3	-11.3	-17.9	-26.4
1993	35.2	21.5	12.9	6.3	2.9	-5.9	-11.7	-18.6	-27.1
1994	33.8	21.4	12.9	6.3	2.9	-6.2	-12.2	-19.5	-27.9
1995	39.4	24.5	14.5	7.2	2.7	-6.6	-13.2	-21.3	-30.3
1996	43.5	27.0	16.5	8.1	2.5	-7.3	-14.5	-22.6	-31.9
1997	44.3	27.6	16.0	7.2	2.5	-7.6	-15.1	-23.3	-32.4
1998	43.1	25.7	15.6	7.5	2.6	-7.2	-14.2	-22.0	-30.9
1999	40.0	23.9	14.1	7.0	2.6	-6.5	-14.0	-21.3	-30.2
2000	38.3	22.6	13.4	6.3	2.7	-6.2	-12.9	-20.1	-29.1
2001	35.4	20.8	12.5	5.7	2.8	-6.1	-12.0	-19.1	-27.9
2002	33.0	20.0	11.5	5.2	2.8	-5.4	-11.0	-18.0	-26.6
2003	33.3	19.3	11.4	5.2	2.8	-5.3	-11.3	-18.4	-26.6
2004	32.1	19.3	11.4	5.6	2.8	-5.3	-11.3	-18.2	-26.6
2005	31.2	19.0	11.5	5.2	2.8	-5.4	-11.0	-17.8	-26.4
2006	31.7	19.1	11.2	5.5	2.9	-5.3	-11.1	-17.8	-26.2
2007	30.2	18.4	10.7	5.1	2.9	-5.2	-10.8	-17.4	-25.7
2008	29.9	18.1	11.2	5.1	2.9	-5.0	-10.9	-17.1	-25.5
1987-1993	29.5	18.7	11.7	5.7	2.8	-5.5	-10.7	-17.0	-25.1
1994-2000	40.3	24.7	14.7	7.1	2.7	-6.8	-13.7	-21.4	-30.4
2001-2008	32.1	19.3	11.4	5.3	2.8	-5.4	-11.2	-18.0	-26.4

Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

The bottom tenth of the population now have, between them, i.e. 6.3% of the country's total wage and the second poorest tenth have 7.8%. In contrast, the richest and the second tenth have 27.1%. The income of the richest tenth is more than the income of all those on below-average incomes (i.e. the bottom five tenths) combined, as shown in Table 1.3. Over the last decade, the bottom tenth of the population have, on average, seen a fall their wages are, on average, slightly lower than a decade ago.

Table 1.3. Group wage share in percentage, (1987-2008)

Year	Population Share		Total
	Bottom and middle 80 %	Top 20 %	
1987	73.5	26.5	100
1988	73.4	26.6	100
1989	73.5	26.5	100
1990	73.3	26.7	100
1991	73.1	26.9	100
1992	72.8	27.2	100
1993	72.7	27.3	100
1994	72.5	27.5	100
1995	71.7	28.3	100
1996	71.1	28.9	100
1997	71.0	29.0	100
1998	71.4	28.6	100
1999	71.8	28.3	100
2000	72.0	28.0	100
2001	72.5	27.5	100
2002	72.9	27.1	100
2003	72.9	27.1	100
2004	72.9	27.1	100
2005	73.0	27.0	100
2006	73.0	27.0	100
2007	73.1	26.9	100
2008	73.1	26.9	100
1987-1993	73.0	27.0	100
1994-2000	71.6	24.7	100
2001-2008	72.9	23.9	100

Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

The main results of the average growth rate of the wage distribution are shown in Table 1.4, which indicates a sizable deterioration in wage distribution by deciles during the period under review. And in years of the crisis (1995-1996) the rate was negative in overall points of the distribution. We observed the most negative impact on wage in the bottom part of the distribution. Whilst the above

evidence is far from providing any conclusive assessment of the complex interaction that exist between low and high wages in Mexico, this reflects the existence of wider dispersion in the bottom part of the wages distribution also have a larger share of low-paid individuals.

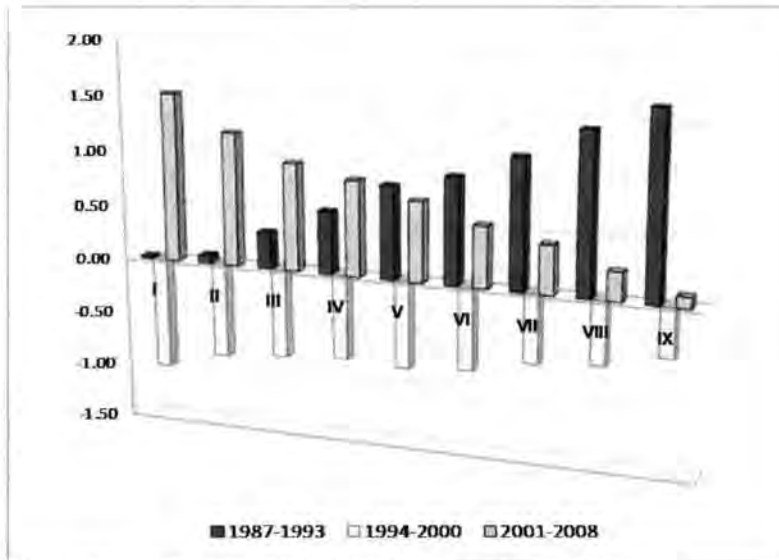
Table 1.4 shows the annual rate of change of log real hourly wages by deciles over two decades, the important fell is observed between 1995 and 1996 this represented the 6.38% approximately coinciding with the period of the peso crisis. However in the next years the real wage had a little recovered somewhat, rising from 1997 to 2002. The data for three seven-yearly periods are shown in Figure 1.2. A quick inspection of the changes in the pattern and the rise in the real wage dispersion over the period suggest that heterogeneity prevails of the labour force in Mexico. The small positive value for the rate of growth in the 1987-93 and 2001-08 periods for the simple average, coming after negative values for the three earlier periods, ought to be interpreted with caution.

Table 1.4. Average annual growth of log hourly wage in Mexico, by deciles, (1987-2008)

Year	I	II	III	IV	V	VI	VII	VIII	IX
1988	0.5	-1.7	-2.9	-2.3	-1.5	-1.0	-0.7	-0.3	-0.6
1989	2.8	1.3	2.1	2.3	2.2	2.1	2.0	2.2	2.5
1990	-0.5	0.9	1.2	1.5	1.8	1.4	1.6	1.5	2.2
1991	-1.4	-1.7	-0.8	-0.8	-0.7	0.0	0.0	0.3	0.5
1992	-1.4	0.4	1.2	0.8	1.8	1.4	2.2	2.7	2.9
1993	0.0	1.3	1.2	1.9	1.4	2.0	1.9	2.3	2.3
1994	1.4	0.4	0.4	0.4	0.3	0.7	0.9	1.4	1.5
1995	-10.6	-9.2	-8.2	-7.7	-6.9	-6.5	-5.8	-4.7	-3.7
1996	-8.3	-7.4	-7.2	-6.4	-5.6	-4.9	-4.2	-4.1	-3.4
1997	-0.6	-0.5	0.5	0.9	0.0	0.4	0.7	0.9	0.8
1998	2.8	3.5	2.3	1.7	2.0	1.5	1.0	0.3	-0.3
1999	2.2	1.5	1.3	0.4	0.0	-0.7	-0.3	-0.9	-1.1
2000	5.9	5.7	5.3	5.4	4.6	4.3	3.3	3.0	3.0
2001	5.1	4.5	3.8	3.5	3.0	2.8	1.9	1.8	1.3
2002	2.9	1.7	2.0	1.5	1.1	0.3	0.0	-0.3	-0.8
2003	0.5	1.3	0.8	0.7	0.7	0.7	0.9	1.2	0.8
2004	0.9	0.0	0.0	-0.4	0.0	0.0	0.0	-0.3	0.0
2005	0.0	-0.4	-0.8	-0.4	-0.7	-0.7	-0.9	-1.2	-1.0
2006	1.4	1.7	2.0	1.5	1.8	1.7	1.9	1.7	1.6
2007	1.8	1.2	1.2	1.1	0.7	0.7	0.3	0.3	0.0
2008	-0.5	-0.4	-1.1	-0.7	-0.7	-1.0	-0.6	-1.1	-1.0
1987-1993	0.0	0.1	0.3	0.6	0.8	1.0	1.2	1.4	1.7
1994-2000	-1.0	-0.9	-0.8	-0.8	-0.8	-0.8	-0.6	-0.6	-0.5
2001-2008	1.5	1.2	1.0	0.9	0.7	0.6	0.4	0.3	0.1

Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

Figure 1.2. Average growth rate by deciles, 1987-2008



Source: Based on data panel ENEU-ENOE surveys from 1987 to 2008.

From 1987 to 1996 the Mexican economy was marked by a series of regressive income transfers from the entire spectrum of the population to the richest stratum. Accordingly the most commonly used inequality index points to a worsening in income inequality over this span of time. The Gini coefficient, which is especially sensitive to change in the middle of distribution rose from 0.473 in 1984 to 0.515 in 1996. The Theil T index, which is extremely sensitive to changes in the upper and the lower tails rose from 0.411 in 1984 to 0.524 in 1996.

The trends in wage inequality by ratios are shown in Table 1.5. A useful measure of wage inequality is the ratio of wages at different parts of the wage distribution. For example, a commonly used differential is the 90-10 ratio, which is the wage at the 90th percentile divided by the wage at the 10th percentile. Figure 1.3 shows the ratio of the hourly wage for wage of workers from 1987 to 2008. In the period 1990-1999 the 90-10 ratio was 3.24 approximately. This indicates that workers at the 90th percentile earned 3.24 times as much as workers at the 10th percentile³⁰. During the period of crisis the ratio rose to 8.04%, 5.29%, 1.14% in 1995, 1996 and 1997 respectively indicating that inequality increased (See Table 1.5). The rate of increase, however, was not steady over this period. The trend changed and decreased in 3.2% roughly between 1998 and 2002 and 2%

³⁰ Many articles and hypothesis focus on the timing of changes in the 90-50 and 50-10 ratios, we aggregate the 90-10, 75-25, 75-50, and 25-50, considering that Mexico is a country where the proportion of low-paid workers is higher (see OECD, 1997).

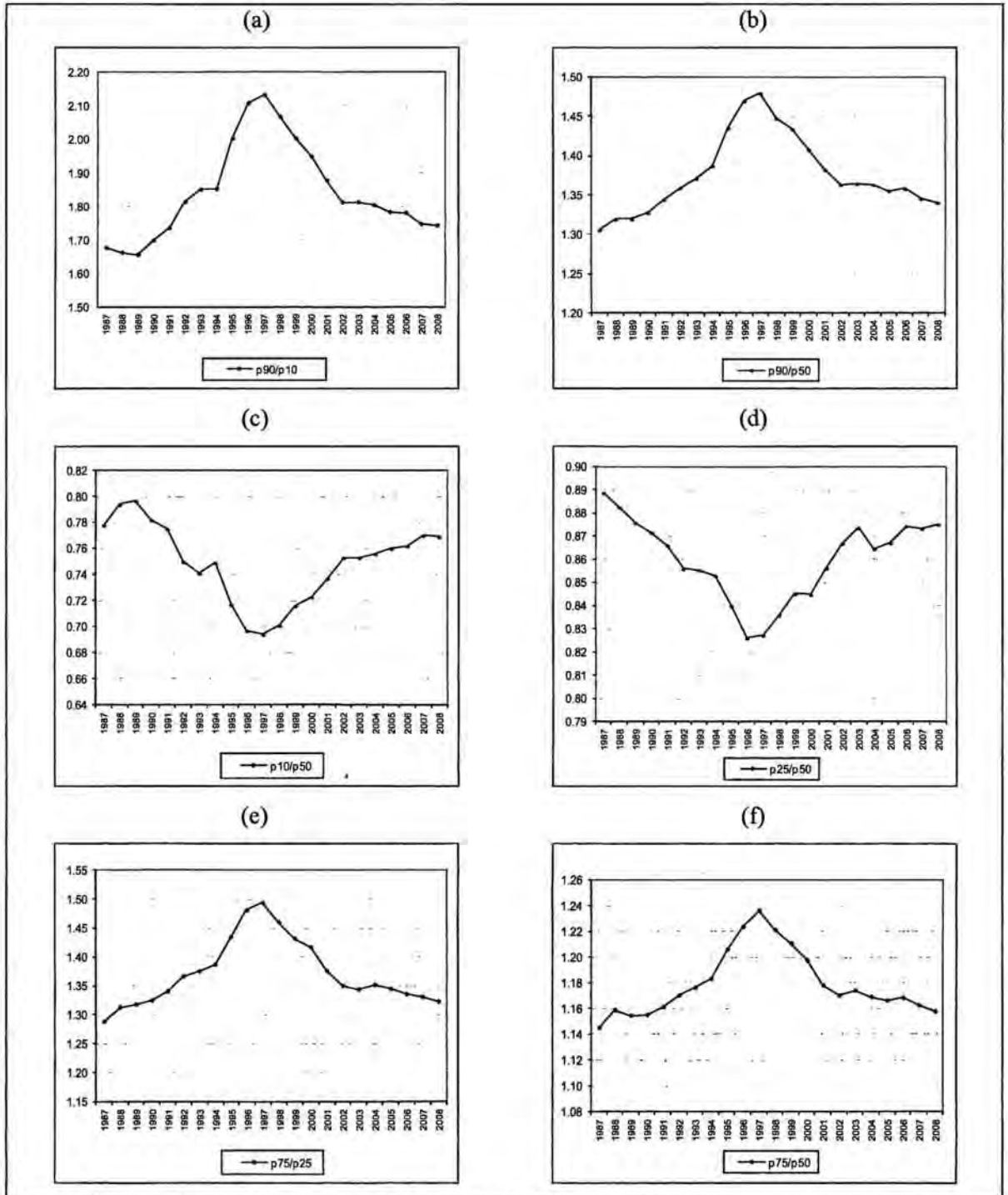
from 2003-2008. A further breakdown of the distribution of wages indicates that the recent relative stability in inequality probably is due to offsetting factors that we try to explain in next chapters.

Table 1.5. Differential by percentile (log real hourly wage), 1987-2008

Year	p90/p10	p90/p50	p10/p50	p75/p25	p75/p50	p25/p50
1987	1.68	1.31	0.78	1.29	1.14	0.89
1988	1.66	1.32	0.79	1.31	1.16	0.88
1989	1.66	1.32	0.80	1.32	1.15	0.88
1990	1.70	1.33	0.78	1.33	1.16	0.87
1991	1.74	1.35	0.78	1.34	1.16	0.87
1992	1.81	1.36	0.75	1.37	1.17	0.86
1993	1.85	1.37	0.74	1.38	1.18	0.86
1994	1.85	1.39	0.75	1.39	1.18	0.85
1995	2.00	1.44	0.72	1.44	1.21	0.84
1996	2.11	1.47	0.70	1.48	1.22	0.83
1997	2.13	1.48	0.69	1.49	1.24	0.83
1998	2.07	1.45	0.70	1.46	1.22	0.84
1999	2.00	1.43	0.72	1.43	1.21	0.85
2000	1.95	1.41	0.72	1.42	1.20	0.84
2001	1.88	1.38	0.74	1.38	1.18	0.86
2002	1.81	1.36	0.75	1.35	1.17	0.87
2003	1.81	1.37	0.75	1.34	1.17	0.87
2004	1.80	1.36	0.76	1.35	1.17	0.86
2005	1.78	1.36	0.76	1.35	1.17	0.87
2006	1.78	1.36	0.76	1.34	1.17	0.87
2007	1.75	1.35	0.77	1.33	1.16	0.87
2008	1.74	1.34	0.77	1.32	1.16	0.88

Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008

Figure 1.3. Wage inequality by ratio (log real hourly wage)



Source: Based on data panel ENEU-ENOE surveys from 1987 to 2008.

A well-established way of analysing the degree of inequality among percentiles is through the three ratios 90-50, 75-25 and 75-50 which are broadly similar to the trend of 90-10 ratio. In particular, contrary to these trends in the 10-50 and 25-50 ratios the inequality wage decline between 1990 and 1998³¹. While the 50-10 and 50-25 ratios decreased slowly and steadily from 1988 to 1997, the 90-10, 90-50, 75-25 and 75-50 ratios showed a sharp jump in 1988-1997. The sharp concentration of the increase in the 90-10, 90-50, 75-25 and 75-50 ratios in the 1988-1997 this interval provides strong circumstantial evidence for “peso crisis”, the new structure of the labour market and the trade liberalization policy. On the one hand, the wages for workers at the low end of the wage distribution have risen relative to those in the middle, which has tended to reduce inequality. On the other hand, the wages of workers near the top of the wage distribution have continued to rise relative to those in the middle, which has tended to increase inequality³².

Consequently, Table 1.6 shows a summary of absolute and relative measures of inequality. The most commonly used inequality index points an enlargement in wage inequality over this span of time. The Gini coefficient which is especially sensitive to changes in the middle of the distribution rose from 41.6 in 1987 to 42.1 in 1993, between 1994 and 2000 was around the 43% and from 2001 to 2008 decline one percentage point. The Theil T index, which is extremely sensitive to changes in the upper and lower tails, during the three periods were 37.7%, 38.15%, 37.8%, respectively. If we review the change of both indices between 1995 and 1996 while the Gini increases the Theil index suffers a small decrease³³. Moreover, the data reveal that between 1989 and 1997 the variance of log wage in this period rose from 0.385 to 0.405, or by roughly 5.23 %. The stress result it is observed between 1995 and 1996 where the rose of this measure was have the 23.7 % and 21.6% respectively. The table also displays other measures of inequality, we can observed that the MD shows the proportion that would need to be transfer from those above mean wage to those below mean wage to achieve equality is 0.56 from 1987 to 2008. The CV varies 25% with the level of the mean and this measure is more affected with the high wages.

³¹Similarly, López (2004), using ENIHG data, finds that income distribution improved between 1994 and 1996, an interval of time in which the Mexican economy experiences a severe financial crisis. Usually one would expect inequality to rise during times of recession, because the rich have more ways of protecting their assets than the poor. This is especially true of labour, which is basically the only asset of the poor (the labour-hoarding hypothesis). Nevertheless, during this time the richest 10% experienced relative losses (their income share dropped 1.6 percentage points), and inequality declined.

³² Some evidence explained above related the steady rise of the 50-10 and 50-25 ratios from 1997 to 2008, to the effects of trade, the labour market institutions, the increase of the demand for skilled workers, changes in the industrial structure, the existence of regulations on wage, import competitions and the decline of unionism, demographic changes and so on.

³³ It could be argued that the richest experienced severe capital losses that affect their total wage more than the poor.

Table 1.6. Measures of absolute and relative dispersion (or inequality), 1987-2008

Year	Gini index	Std. Err	Theil index	Std. Err	Var Logs	Std. Err	MD	AD	MDF	CV	CD	SEM
1987	0.124	0.000	0.027	0.000	0.070	0.002	0.47	0.47	0.69	0.229	0.172	0.004
1988	0.124	0.001	0.026	0.000	0.067	0.002	0.48	0.47	0.68	0.229	0.176	0.003
1989	0.118	0.000	0.023	0.000	0.047	0.001	0.47	0.47	0.67	0.215	0.170	0.003
1990	0.120	0.000	0.023	0.000	0.047	0.001	0.49	0.49	0.70	0.220	0.174	0.003
1991	0.124	0.000	0.025	0.000	0.051	0.001	0.51	0.50	0.71	0.226	0.180	0.003
1992	0.131	0.000	0.028	0.000	0.058	0.001	0.54	0.54	0.76	0.237	0.189	0.003
1993	0.134	0.000	0.029	0.000	0.061	0.001	0.56	0.56	0.79	0.242	0.194	0.003
1994	0.136	0.000	0.029	0.000	0.062	0.001	0.58	0.57	0.81	0.244	0.198	0.003
1995	0.151	0.000	0.036	0.000	0.076	0.001	0.60	0.59	0.84	0.271	0.221	0.003
1996	0.162	0.000	0.042	0.000	0.093	0.002	0.61	0.61	0.86	0.292	0.239	0.003
1997	0.165	0.000	0.043	0.000	0.096	0.001	0.62	0.62	0.87	0.295	0.243	0.003
1998	0.157	0.000	0.039	0.000	0.087	0.001	0.60	0.60	0.85	0.282	0.231	0.003
1999	0.151	0.001	0.036	0.000	0.080	0.001	0.58	0.57	0.81	0.272	0.221	0.003
2000	0.146	0.000	0.034	0.000	0.074	0.001	0.58	0.57	0.82	0.262	0.211	0.002
2001	0.137	0.000	0.030	0.000	0.066	0.001	0.56	0.55	0.79	0.247	0.197	0.002
2002	0.132	0.000	0.028	0.000	0.062	0.001	0.54	0.53	0.76	0.237	0.188	0.002
2003	0.130	0.000	0.027	0.000	0.058	0.000	0.54	0.53	0.76	0.235	0.188	0.003
2004	0.131	0.000	0.027	0.000	0.061	0.002	0.54	0.53	0.76	0.236	0.187	0.003
2005	0.130	0.000	0.027	0.000	0.060	0.001	0.53	0.52	0.75	0.235	0.185	0.003
2006	0.127	0.000	0.026	0.000	0.060	0.002	0.53	0.52	0.75	0.231	0.183	0.003
2007	0.125	0.000	0.026	0.000	0.056	0.001	0.52	0.52	0.75	0.227	0.180	0.003
2008	0.125	0.000	0.025	0.000	0.056	0.001	0.52	0.51	0.74	0.227	0.179	0.003

Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008

Notes: (Std. Err) Standard Error; (MD) Mean deviation about the mean; (AD) Mean deviation about the median; (MDF) Mean difference; (CV) Coefficient of Variation; (CD) Coefficient of Dispersion; (SEM) Standard error mean.

Table 1.7 displays the growth rate of the Gini coefficient and Theil index (see Figures 1.4a and 1.4b) and the decomposition by different subgroups of the population, for example review wage average variation from region to region, inequality “between groups.” Moreover, wages vary inside each group, adding a “within group” component to total inequality. Generally, our results such as these are related to other factors: First, the importance of the wage source in total wage (for larger wage sources, a given percentage increase will have a larger effect on overall inequality) and, second, the distribution of that wage source (if it is more unequal than overall wage, an increase in that source will lead to an increase in overall inequality).

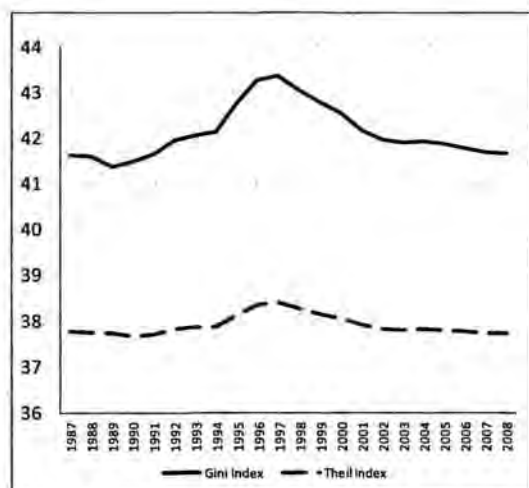
Table 1.7. Gini and Theil indices (log real hourly wage), 1987-2008

Year	Gini %	Δ Gini	Theil %	Δ Theil	Urban areas (%)		Education level (%)		Gender (%)	
					(W)	(B)	(W)	(B)	(W)	(B)
1987	41.61		37.79		92.84	7.16	79.89	20.15	99.29	0.71
1988	41.60	-0.033	37.76	-0.06	94.15	5.89	76.83	23.13	99.39	0.65
1989	41.36	-0.569	37.63	-0.36	93.69	6.31	75.66	24.30	99.29	0.71
1990	41.48	0.290	37.66	0.09	94.43	5.65	75.60	24.40	99.27	0.81
1991	41.64	0.374	37.71	0.14	95.96	4.04	73.86	26.14	99.56	0.48
1992	41.94	0.730	37.82	0.28	96.45	3.52	72.32	27.64	99.71	0.25
1993	42.07	0.295	37.86	0.12	96.91	3.09	70.16	29.84	99.76	0.24
1994	42.13	0.153	37.88	0.04	97.26	2.77	67.42	32.58	99.86	0.17
1995	42.75	1.476	38.13	0.67	96.52	3.48	67.18	32.82	99.86	0.14
1996	43.26	1.186	38.36	0.59	95.69	4.33	67.13	32.87	99.88	0.12
1997	43.35	0.215	38.40	0.11	96.25	3.75	66.60	33.38	99.84	0.14
1998	43.04	-0.731	38.26	-0.37	96.20	3.80	66.99	33.01	99.82	0.18
1999	42.78	-0.595	38.15	-0.28	95.82	4.21	67.87	32.13	99.84	0.16
2000	42.55	-0.531	38.06	-0.25	95.69	4.28	68.45	31.52	99.68	0.32
2001	42.18	-0.876	37.91	-0.39	96.07	3.93	69.14	30.86	99.53	0.47
2002	41.96	-0.527	37.83	-0.21	95.96	4.04	68.66	31.34	99.68	0.32
2003	41.90	-0.142	37.80	-0.07	96.29	3.75	70.15	29.85	99.82	0.22
2004	41.91	0.033	37.81	0.03	97.09	2.95	70.74	29.26	99.85	0.18
2005	41.87	-0.098	37.81	-0.01	97.33	2.71	73.31	26.69	99.96	0.07
2006	41.78	-0.222	37.77	-0.10	97.27	2.77	74.60	25.40	99.96	0.08
2007	41.69	-0.220	37.74	-0.09	97.65	2.35	75.02	24.98	99.88	0.12
2008	41.67	-0.043	37.74	-0.01	97.52	2.52	74.14	25.86	99.96	0.08

Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

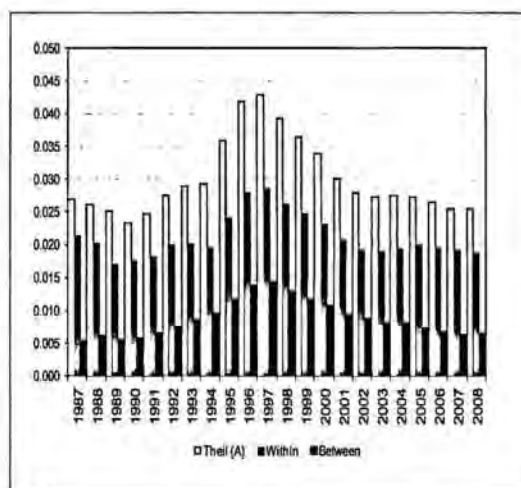
Notes: Theil index by group (W) within and (B) between.

Figure 1.4a. Wage inequality, Gini and Theil index, 1987-2008



Source: Based on data panel ENEU-ENOE surveys from 1987 to 2008.

Figure 1.4b. Decomposition of Theil index, 1987-2008



Household and personal characteristics, such as education, gender and regional location represent an important element in the analysis of wage differences. Table 1.7 sets out this decomposition and shows at least part of the value of any given inequality measure must reflect the fact that people have different educational levels, genders, regional location, or any other attribute. This inequality is the “between-group” component. And for any such partition of the population, some inequality will also exist among those people within the same subgroup; this is the “within-group” component³⁴.

Using Theil’s T, the table also shows that during the whole period about 4% of the total inequality is attributable to between-group inequality - i.e. to the difference in levels between metropolitan areas. The remaining 96% of inequality is due to the inequality in expenditure per capita that occurs within each region. However, between 1987 and 1994 this proportion was larger than in the next years. By gender, we find more differences within groups. In contrast to this, when we gauged the decomposition among levels of education³⁵ the proportion is very different. From 1987 to 1993 the average was 74.9%, that is, the percentage explained by differences of between groups while the within Theil is 25.1% roughly. Between 1994 and 2002 this proportion increased representing the 32.3% and decreased to 27% from 2003 to 2008. These results coincide with the overview of the changes in the demand or supply of skills and in the labour market and education in different points of time.

1.4. Structure of thesis

The rest of the thesis will be divided into three essays. In Chapter 2, I will review the wage structure, considering the return of education level and the decomposition of differences in different points of the distribution between 1987 and 2008. The second essay in Chapter 3 will address the mobility and inequality decomposition wages from a dynamic standpoint, using three data panels from 1987 to 2008. In Chapter 4 I will analyse the nexus of inequality and economic growth as the linkage between inequality and growth is far from being well understood, especially at a regional level. Last, Chapter 5 will sum up with some general conclusions.

³⁴ The Generalized Entropy class of indicators, including the Theil indexes, can be decomposed across these partitions in an additive way, but the Gini index cannot.

³⁵ Schooling was aggregate in five categories: no schooling or incomplete primary; complete primary; lower secondary; upper secondary and higher or tertiary.

In particular, Chapter 2 will deal with wage structure and the decomposition of differences in distribution using quantile regression in Mexico between 1987 and 2008. First, I will review the inequality and returns of education in different points of distribution. In this chapter, it is my interest to determine the root causes of high level of inequality in overall period and decomposition using the approach adopted by Melly (2005). The contribution made by this chapter is a systematic analysis in urban areas of Mexico trying to answer *Why the inequality start more equitable? What is the relevance to study of distributional structure of wage? What characteristics of individuals have been most important to explain inequality?* And finally, *What do wage differentials tell us about Mexican urban labour market?*

The second essay in Chapter 3 will address the issues of mobility and inequality decomposition from a dynamic standpoint. This chapter will examine the mobility of individuals through the wage distribution and the relationship to the decomposition of inequality wage in the short- term (three periods of time between 1987 and 2008). I will review the mobility and which changes in wage inequality over time are related to the pattern of wage growth across the wage range and the reshuffling of individuals ordering in the wage pecking order. I will use this framework first to analyse how wage mobility may help understand why people's wage follow different trajectories and, second, to gauge mobility measures with transition matrices. Next, I will show the decomposition of the change in inequality into components, summarizing mobility in the form of reranking, and progressivity in wage growth (Jenkins and Van Kerm, 2006). The research questions in this chapter are to determine *What happens if the rising or decreasing wage inequality is accompanied by some degree of mobility in the short-term? More mobility among individual wages contributed to reduce the inequality in Mexico? If the changes in annual income inequalities may not be of serious concern when does one economy, group, or time period exhibit more income variation than others? Has wage mobility (movement) take place in a given economy in the short-term, and if so, how much?* The existence of wage mobility may mitigate concerns about growing inequalities, especially if wage mobility has increased. However, the results show us the persistence of high levels of inequality in Mexico and rising mobility can be equivocal, and its extent is not enough to offset the growth of cross-sectional inequality.

The third essay in Chapter 4 will address the issue of inequality and economic growth. The linkage between inequality and growth is far from being well understood, especially at a regional level. When looking at the effects of income and educational inequality on regional economic growth, I will be primarily interested in the ways in which distribution can affect aggregate output and growth

through its impact on different channels. The impact of inequality on growth remains controversial and decades of economic, sociological, and political studies offer evidence that the inequality-growth relationship is, indeed, complex. In this sense, the main interest of my research is to analyse the relation among income, educational and social inequality and regional growth in Mexico (1993-2008). First, I will analyse the inequality-growth relationship at a regional level in Mexico and second, I will examine how regional changes in income and educational distribution in the 32 Federal entities in Mexico have affected the evolution of regional economic growth. I will also try to give some intuitions from a policy perspective. Research on these topics for Mexico has hitherto been at the best scarce. It represents however an opportunity since the systematic and rigorous analysis of such issues may shed some light on the best way to tackle the scourges (i.e. inequality, low-paid and poverty) threatening the workers in Mexico, or to take advantage of resources and data made available to analyse the structure of the Mexican labour market. To summarize, I expect that the results from this analysis will permit me to provide robust evidence on the determinants of inequality and the sign of the impact of inequality on growth at the regional level for the Mexican case.

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Changes in wage structure in Mexico going beyond the mean: An analysis of differences in distribution, 1987-2008

2.1. Introduction

In this chapter, I examine the changes in the wage structure in urban Mexico across the entire wage distribution over the past two decades (1987-2008). I use quantile regressions to check whether the entire wages distribution is affected uniformly by human capital variables, demographic and labour characteristics.

The Mexican case emerges as an interesting outlier in the relation between changes in wage inequality and schooling premia in the international context. For this reason, I also focus my attention on changes in returns to various characteristics over the analysed period.

The chapter is structured in two different parts: First, using the National Survey of Labour and Employment (ENOE) and the National Urban Employment Survey (ENEU), both carried out by the National Institute of Statistics and Geography of Mexico (INEGI), for the period 1987-2008, I identify which forces have played a role for variations in schooling returns and wage inequality. Second, I apply the quantile decomposition methodology developed by Melly (2005) that will permits me to decompose the changes of the wage distribution into changes in covariates, coefficients, and residual components. These results are based on the estimation of a standard mincerian wage equation, where levels of education, experience, gender, marital status, occupation, activity sector, firm size, economic sector and urban areas are included as covariates to explain individuals wage differences. One advantage of this procedure is that it provides a way of separating the between- and within-group components, as in a variance decomposition. This plays an important role in the inequality literature, since Juhn, Murphy and Pierce (1993) concluded that most part of the inequality growth from the 1980s to the 2000s was linked to the residual inequality component. In fact, quantile regression analysis reveals whether the effects of many covariates are constant or not across the wage distribution. My results show that increases in returns to covariates

across the entire distribution were the driving forces behind the wage changes in the considered period. Further, the decomposition method proposed in Melly (2005) allows me to evaluate the role of changing labour force composition (in terms of workers characteristics) and changing labour market in overall changes in the wage distribution between 1987 and 2008. I do not pretend to establish causality between the structural changes that happened during that periods and the evolution of wage inequality, but this analysis will help to identify the direction of change throughout the two decades across the entire wage distribution. For instance, the obtained results show that changes in the composition of the work force in urban Mexico contributed positively to wage growth during 1987-1994, but negatively during 1995-2000.

As I will describe below in more detail, important changes took place over the analysed period. In particular, the Mexican economy underwent numerous reforms—domestic financial market reforms, capital account liberalization, tax reforms, privatization of state-owned enterprises and labour reforms (Lustig, 1998, 2001). Two key events often discussed in the literature are the signing of GATT (General Agreement on Tariffs and Trade) in 1986 and NAFTA (North American Free Trade Agreement) in 1994. First, in the mid 1980s, Mexico started an important opening up process in which it adopted an aggressive policy of trade liberalization and other reforms related to privatization and deregulation, but this process was particularly intense in 1987 and 1988. After that, Mexico cross the stabilization period (Hanson and Harrison, 1999) and the corporate tax policy in Mexico was reformed in order to lower distortions on investment. Second, most studies analysing the second half of the 1990s have argued the relevance of the peso devaluation in December 1994 and the 1995 crisis, the most severe economic crisis that Mexico has witnessed since the 1930s. Yet, later that year a recovery, which solidified in 1996 and 1997, was already under way, Mexico's government implemented different anti-poverty policies. After that, in 1998, Mexico was hit by several external shocks that pushed the economy³⁶ into lower than expected growth and higher than expected inflation³⁷. Capital inflows were reduced and the price of oil dropped sharply in international markets. This situation negatively affected Mexico's public finances and the budget deficit target, announced at the beginning of the year, was 1.25% of GDP. Moreover, the portfolio investments received by Mexico in 1998 decreased relative to the previous two years. The final outcome of this situation is that for the period 1987-2008, income and wage inequality followed an inverted-U shape pattern (López-Calva and Lustig, 2010; Esquivel, *et al.*, 2010).

³⁶ In 1998, the Mexican authorities responded with the proper fiscal and monetary policies to contain the adverse effects of these developments.

³⁷ Regarding inflation, Mexico finished the year with a rate of 18.6 % when the target was of 12 %. Other prices as the interest rates (Cetes rate and the average interbank interest rate -TIIP-) were higher in 1998 than in 1997. Many factors contributed to the exchange rate evolution and the volatility exhibited by this indicator for most of 1998.

Taking into account these previous studies, in order to carry out our study, we will break the two decades into three distinct periods. The first period, 1987–94 was marked by structural reforms and trade and financial liberalization in the economy, raising the relative demand for skilled labour and also rising inequality. The second period, 1994–2001, was one of growth and relative stability and an increasing supply of skilled workers and, a decrease in inequality. Moreover, in this period the levels of education clearly increased. In the third period, 2001-2008, other reforms were subsequently introduced. These reforms entailed changes in labour force composition, in terms of education and experience (López-Acevedo, 2006), in terms of supply and demand of labour (Campos-Vazquez, 2010), effects of trade (Robertson, 2007), expansion of government monetary transfers target to the poor, rise on the share of remittances and the fall in the skill premium among skilled and unskilled workers. Besides in the late 1990s urban informal labour was a relevant part of employment, many studies reported levels of the urban informal rate oscillated between 20 and 40 %. Later on the OECD (2007) reports levels of 62% considering agricultural non-agricultural employment. Finally, from 2005 to 2009, Mexico has experienced small rates of growth real GDP³⁸ and the recession in the United States felt most immediately in the country.

To explain the changes in wage structure standard economic theory focuses on the average wage dynamics rather than on the changes across the entire wage distribution, ignoring the differences at the bottom or at the top of the wage distribution. With regards to Mexico, changes of wage structure display interesting patterns in the level of wage at different portions of the wage distribution between 1987 and 2008.³⁹ Furthermore, average wages may miss important features of the wage structure, and it is important to go beyond averages to present a complete picture for three reasons. First, because recent work for other countries using quantile regression techniques have shown that attributes have different effect on wages of the individuals at the top of the wage distribution when compared to individuals at the bottom of the wage distribution.⁴⁰ Second, because Mexico is a heterogeneous society and, for this reason, the effects of reforms can be heterogeneous as well. Third, because there is growing evidence from other countries (e.g., the US) that suggests that, far from being ubiquitous, the growth in wage inequality is increasingly concentrated in the top end of the wage distribution (Lemieux, 2008).

³⁸ Since 2006 the rate reduced from 4.7 to 2.0 in 2008, see United Nations (2009).

³⁹ For additional details about the ratio of real hourly wage see the chapter 1 and for the evidence related to other periods of time: Robertson (2000); Lustig (2001); López-Acevedo (2006) and Campos-Vazquez (2010).

⁴⁰ The evidence for this comes from a number of different countries such as the USA (Buchinsky, 1994), Germany (Fitzenberger and Kurz, 2003), Uruguay (González and Miles, 2001), Zambia (Nielsen and Rosholm, 2001), in Chile (Beyer, *et al.*, 1999), in Morocco (Currie and Harrison, 1997), in Costa Rica (Robbins and Gindling, 1999). In India Kijima (2006) decompose the changes in the 90th-10th, 90th-50th, and 50th-10th percentile of log wage differential and Portugal (Machado and Mata, 2001).

Taking all this into account, this chapter will contribute to the existing literature in the following ways. First, I will estimate earning functions across the entire wage distribution using quantile regression, and quantify the contribution over time of changes in the individual covariates of worker living in the urban areas of Mexico. Second, I will decompose the change in wages in the past two decades into a part that is attributable to changes in prices (coefficient effect), changes in characteristics (covariate effect) and residual components across the entire wage distribution. The Melly (2005) decomposition is well-suited to depict heterogeneous characteristics, coefficients such as *between effects* and residuals *within effects* across the entire wage distribution. The idea is to perform simulations between periods and an aggregate decomposition analysis using a conditional procedure. The comparison of the effects for the different quantiles show that differences in characteristics are much more important at the bottom (10th centile) than at the top (90th centile) of the wage distribution. Indeed, some significant wage structure effects emerge at the 90th percentile. Third, I will extend the period of analysis of previous literature through 2008 by incorporating new data.

The rest of the chapter is structured as follows. Section 2.2 will review the previous literature. Section 2.3 will introduce the empirical strategy and the data used for our analysis. Section 2.4 will examine, first, the results for wage inequality over time using quantile regression technique and, second, the results of the decomposition results. Section 2.5 will conclude.

2.2. Literature review

In the last two decades there is an extensive literature related to the determinants of wage distribution, earnings inequality and a broad range of applications (Card, 1999 and 2001; Katz and Autor, 2000). The distribution of human capital is one of the most important determinants in this analysis, especially after the steep increase of wage inequality and schooling premia (e.g. in United States since the early 1980s, - Bound and Johnson, 1992; Katz and Murphy, 1992). In fact, increases of the educational wage premia and wage inequality are also documented for many other OECD countries (Gottschalk and Smeeding, 1997). Different economic theories provide explanations for the observed patterns in schooling premium and earnings inequality, among these, the supply-demand technology paradigm.

In sum, demand and supply, interacting within a context of economic modernization and globalization, generate the trend toward greater wage disparity. However, none of these explanations deals explicitly with changes in the distribution of education or with the interaction between the educational policies that induced them and the workings of the labour market.

In order to address the relationship between and earnings inequality, several studies review the distribution of education itself, the evolution of educational attainment and the way the labour market rewards educational attainment (see e.g. Schultz, 1988; Londoño, 1996; Elías, 1992; Almeida dos Reis and Barros, 1991). On the one hand they reflect a pre-existing social stratification that already entails some inequality due to reasons other than the workings of the labour market itself on the other hand the degree to which this pre-existing inequality grows into earnings inequality due to the performance of the labour market (that is, demand behaviour).⁴¹

Popli (2011) also points out, that the impact of human capital can be measured in three dimensions: changes in the average levels of human capital, changes in the distribution, and changes in returns. He examines the changes in human capital and wage inequality in Mexico and uses a decomposition methods proposed by Fields (2002) and Yun (2006). Popli finds that the impact of human capital in Mexico can be observed in the average levels of education increase, the distribution of human capital has become more equal, and the returns to education have become more unequal. Another finding of crucial importance is that the unobservable factors account for most of the inequality in any given year; among the observable factors, human capital emerges as the most important variable explaining the level of inequality in any given year, and, further, it is the changes in human capital, specifically the returns to education, that are mainly responsible for the observed changes in inequality.

The focus of the analysis of earnings inequality has been usually linked to three main issues: 1) increased openness of the economy, 2) institutional changes in the labour market, and 3) skill-biased technological change. In the case of Mexico, earnings inequality has been the subject of considerable research in recent years: Hanson and Harrison (1995); Burfisher *et al.* (1993); Hanson (1997); Feenstra and Hanson (1996); De Ferranti *et al.* (2003); Hernández-Laos, *et al.* (2000); Cragg and Epelbaum (1996); Meza (1999); Tan and Batra (1997); Johnson (1997); De Ferranti *et*

⁴¹ The levels of educational attainment have increased rapidly in most developing countries since the 1950s. Although Mexico also benefited from that development, there was a significant lag in its educational indicators. For example, points to an “education deficit,” according to which Latin American countries in general, and Mexico in particular, have approximately two years less education than would be expected for their level of development.

al. (2003) and World Bank (2006). The literature on Mexico has typically attributed rising wage inequality to an increase in the relative demand for skilled labour which has led to an increase in the returns to education (Feenstra and Hanson, 1997; Harrison and Hanson, 1999); but also to the declining power of unions (Fairris, 2002); and the falling real value of the minimum wage (Cortez, 2001; Fairris *et al.*, 2008).

Similar factors have been explored to explain rising inequality in the USA, in other OECD countries⁴² and in the Latin American region (Katz and Autor, 2000; López-Calva and Lustig, 2009). However, in this last group of countries, it seems that both the level and persistence of inequality are extremely high when compared to the first group of countries.⁴³ However, as shown in chapter 1, the change in inequality in Mexico is particularly interesting as it is the only country of the region that has witnessed a significant increase and decrease in wage inequality in different points of the distribution during the last two decades.

Considering the connections between education and inequality, the evidence points out that in Mexico rising educational wage differential have been important aspects of rising wage inequalities. Research has taken variety of directions to capture the patterns of change in wage inequalities examining education acquisition and inequality; the labour market returns to education and the contributions of increased education demand and supply.⁴⁴ And under certain circumstances education reinforces already existent inequalities and results in increased inequality. In other

⁴² For instance, using data from different sources Martins and Pereira (2004) analyse the impact of education upon wage inequality in fifteen European countries during the period from 1980 to 1995. They estimate quantile mincerian regressions studying the differences in educational wage premia along the wage distribution and over time. Four different patterns emerge: 1) a positive increasing contribution of education on within wage inequality in Portugal; 2) a positive and stable effect of education on inequality in Austria, Finland, France, Spain, Sweden, Ireland; 3) a neutral role in Denmark and Italy; and 4) a negative impact in Greece. Analogously, Barth and Lucifora (2006) provide a comparative study on the relationship between wage inequality, market forces and institutions for 12 European countries for the period 1984-2003. They show that the increase of educational levels closely matched the shifts of the relative demand for skilled workers driven by technological change, and this should explain why in some countries the wage premia for education rose moderately. In particular, they do not find evidence that the expansion of higher education have led to an erosion of graduate wages, nor evidence of increasing over-education in Europe. Further, they claim that labour market institutions have played a key role in compressing wage structure, even though at different point of the wage distribution. Finally, a recent paper by Dustmann *et al.* (2009) challenge the view that SBTC is not a pervasive phenomenon in European countries, showing that job polarization is one the main explanations for the increase in wage inequality in the upper tail of the distribution in Germany, similarly to the US and UK cases.

⁴³ In 1967, Carnoy analysed the returns of education in three urban areas of Mexico. After that a number of subsequent studies have examined the returns of education and earnings related to macroeconomic cycle e.g. Bracho and Zamudio (1994), Pscharopoulos, *et al.* (1997), Singh and Santiago (1997), Rojas, *et al.* (2000), Barceinas (2002 and 2003), Taylor and Yunez-Naude (2000). Other papers that review the interaction between education and inequality earnings in Mexico are Esquivel and Rodríguez-López (2003), Fairris (2002), Feliciano (2001), Hanson (2003), Meza (2005) and Robertson (2004).

⁴⁴ See Meza (1999), Cortez (2001), Airola and Juhn (2005); Bouillon *et al.* (2003).

circumstances education provides the route out of disadvantage by enabling people from poorer backgrounds to escape poverty.⁴⁵

In the 1990s, Mexico experienced educational achievements and the distribution across the labour force changed substantially; in addition, the gap between wages of more educated workers and workers with little education fell systematically and the changes in the returns to education accounted for a significant share of the rise in household per capita income inequality. In contrast with this in the 2000s declines in labour earnings inequality appear to be associated with less steeper returns to education functions, which reduced earnings per worker inequality and much less so –or not at all- to changes in employment patterns. However, an examination of the changes in the composition of the labour force by education and experience and the corresponding relative wages suggests that supply-side factors must have been important as well the demand (Duryea and Székely, 1998; Legovini *et al.*, 2005; López-Acevedo, 2006; Campos-Vazquez, 2010; Esquivel, 2009; Esquivel *et al.*, 2010).

Other avenues have measured the interaction between educational endowments and earnings inequality in Mexico (see e.g. Legovini *et al.*, 2005; De Hoyos, 2007; Campos-Vazquez, 2010 and Esquivel *et al.*, 2010). Legovini *et al.* (2005) looked only at the period of rising inequality, 1984–94; they found that changes in the levels of and returns to education account for about two-fifths of the increase in inequality. De Hoyos's (2007) paper looks only at the level of inequality in any given year and one of his findings attribute about 20% of the inequality in household income to uneven distribution of endowments. The focus of the De Hoyos and Legovini *et al.* papers are household and household per capita income, rather than individual earnings. López-Acevedo (2006) covers a longer time horizon, and examines individual earnings; the author found changes in relative earnings among education groups to be the key explanation for changes in inequality in the urban areas of Mexico. Campos-Vazquez (2010) analyses the change in inequality over time; the paper attributes the decrease in wage inequality to lower returns to education, while Esquivel *et al.* (2010) attribute the decrease in income inequality to a decline in skill premiums, which in turn are associated with a fall in the share of unskilled workers in the labour force.

However, from my point of view, and in order to understand the relationship between human capital accumulation and changes in the wage structures, it is necessary to go further the conventional

⁴⁵ See López-Calva and Lustig, 2009 and Esquivel, *et al.*, 2010.

approach based on the analysis of average wages and its determinants using least square methods. In particular, first, it is necessary to analyse the impact of human capital variables on the entire wage distribution, and not only for average data; and, second, it is necessary to decompose the changes of the wage distribution into the effects due to different components.

The most influential studies of income decomposition through Mincer equations are Oaxaca (1973) and Blinder (1973) and after them Juhn, Murphy and Pierce (1993)⁴⁶. Fortin *et al.* (2011) sum up an interesting overview of decomposition methods that have been developed since the seminal work of Oaxaca and Blinder in the early 1970s. They also discuss the assumptions required for identifying the different elements of the decomposition, as well as alternative methods proposed in the literature. For instance, Fields (2002) uses the earnings equations to find out how much of the difference in earnings inequality is attributable to individual factors and argues that the relative contribution of a factor to overall inequality is invariant to the choice of inequality measure under the axioms proposed by Shorrocks (1982). Yun (2006) used a combination of two decomposition methodologies, those of Juhn *et al.* (1993) and Fields (2002). However, these methods cannot analyse the changes in wages inequality directly related to individuals. Two different directions have been adopted in order to avoid this problem: The first direction extends over the influence of population subgroups, such as those defined by age, sex, race, and so on. The second direction focuses on the analysis of the components of total income⁴⁷.

For the particular analysis of human capital, Mincer (1997) decomposed the log-variance of earnings into four components: the variance due to schooling wage differentials; the residual variance (differentials within schooling groups); the variance component due to differences in returns and the contribution of between experience and group wage differentials. A number of other decompositions have appeared in the literature based on linear income-generating functions. Both the standard ANOVA model and the regression-based alternative proposed by Behrman *et al.* (1983) give the proportion of the log-variance of earnings explained by each independent variable.

⁴⁶ The Juhn, Murphy and Pierce method is similar to Oaxaca type decomposition analysis of wage differentials, since Oaxaca type decomposition analysis also decomposes wage differentials into a coefficients effect (usually labelled as discrimination), a characteristics effect, and a residuals effect. However, unlike Oaxaca type decomposition analysis of wage differentials, the JMP method provides coefficients and characteristics effects only at an aggregate level. As shown above, the JMP method provides coefficients and characteristics effects only at the aggregate level, while the Fields method provides contributions of individual factors to the differences in earnings inequality without decomposing them into coefficients and characteristics effects. Both methods try to investigate the changes in inequality based on the earnings equation but provide only a partial picture of the changes in earnings inequality. It is not hard envisioning synthesizing them into a unified method since the two methods complement each other.

⁴⁷ A number of studies have considered the disaggregation of income into different factor components and proposed methods for decomposing the overall inequality value into the corresponding component contributions Rao (1980), Fei *et al.* (1978), Fields (1979), Layard and Zabalza (1979) and Pyatt *et al.* (1980).

However, in neither method are the shares due to each factor derived axiomatically, as Shorrocks (1982). Juhn, Murphy, and Pierce (1991, 1993) and followers (e.g., Blau and Kahn, 1996; Robbins and Gindling, 1999) used an earnings function framework and have decomposed the change over time in quantile differentials into components due to changes in observed quantities, components due to changes in observed prices, and a residual.

Later on, Fields (2002) pointed out that the term 'decomposition' has been used in this sense in many types of income distribution studies including the literature on inequality decomposition by factor components (e.g., Fei, Ranis, and Kuo, 1978; Pyatt, *et al.*, 1980; and Shorrocks, 1982) and the literature decomposing differences in mean incomes between groups (Oaxaca, 1973; Blinder, 1973; Oaxaca and Ransom, 1994). Another regression-based approach is also found in two papers by Bourguignon and co-authors (Bourguignon and Martinez, 1997; Bourguignon *et al.*, 1998). The essence of their procedure is to run two regressions for a base year 1 and a final year 2 and then to decompose the changes in price, quantity, and residual effects.⁴⁸ Machado and Mata (2005), Melly (2005) and Autor *et al.* (2005), derive counterfactual wage distributions, using alternative set of covariates, coefficients, and residuals. In such a way, the changes over time of the wage distribution are decomposed into price (coefficients), quantity (covariates), and residual (within) effects. These methods are based on conditional quantiles and keep to the strong assumptions that are necessary to economic interpretations⁴⁹.

In line with the latter approach, I will investigate the relationship between employment structure and wage inequality in Mexico, arguing that the changes in the trend observed for wage inequality in the last two decades is actually the result of countervailing effects, which are related to changes in covariates (employment structure), coefficients (educational wage premia and other characteristics), and residuals.

In recent decades, a number of industrialized countries have experience significant changes in the distribution of earnings. Various factors, economic and institutional, have contributed to reshaping the structure of wage differentials across different groups of workers. The international evidence

⁴⁸ A different school of thought abandons entirely the regression framework and examines between-group and within-group inequality (see Cowell and Jenkins, 1995). A quite different type of decomposition comes from the factor components literature. Fei, *et al.* (1978) and Pyatt, *et al.* (1980) decomposed total inequality into terms attributable to each factor component (e.g., labour income, capital income, land income). Fei, Ranis, and Kuo showed that the Gini coefficient of total income can be decomposed into a weighted sum of *pseudo-Ginis*, the weights being given by the corresponding factor shares.

⁴⁹ The most relevant assumptions are *additive linearity* and *conditional rank preservation*. For more details, see Fortin, *et al.*, (2011).

shows that the large shifts in labour force composition have the potential to contribute to the divergent behaviour of upper and lower tail inequality. For example, the real minimum wages, declining unionization, and monotonically rising demand for skill do not generally predict steadily increasing upper-tail inequality paired with fluctuating lower tail inequality.

Consequently, this lead to suppose that the earnings follow new trajectories may tend to fan out become more dispersed and the changes in the distribution of education or experience of labour force may give rise to changes in earnings dispersion. Autor *et al.* (2008) find that changes in labour force composition in USA do not contribute to an explanation for the diverging path of upper and lower tail inequality in the past two decades. The composition hypothesis fails for two reasons: First, we show that the impact of changes in labour force composition on wage dispersion occurs almost entirely below the median of the earnings distribution (i.e., in the lower tail). This in turn implies that the steady growth of upper-tail inequality during the 1980s and 1990s is due to changing labour market prices, not mechanical effects of composition.

Apart from during the 1980s, increasing lower tail inequality appears explained by changing labour market prices, augmented slightly by shifts in composition. In the 1990s, by contrast, changing market prices generated considerable compression in lower tail inequality, but these price effects were in substantial part offset by compositional shifts (which would otherwise have caused lower tail inequality to increase). The source of the asymmetric rise in earnings inequality with a steady rise in upper-tail wage inequality and some evidence of flat or declining lower-tail wage inequality suggests a “polarization” of the labour market with a particularly strong market for workers in the top part of the skill distribution, deterioration in market conditions for workers in the middle, and reasonably steady market conditions for those near the bottom.⁵⁰ Goos and Manning (2007) also conclude that the hypothesis of skill biased technical change (SBTC) is only a partial truth and cannot explain all of the important changes in the labour market, in other words SBTC hypothesis seems best able to explain what is happening in the top half of the wage distribution but not its bottom half. They emphasize that new technologies are substitute to routine tasks, located in the middle of the wage distribution, and are complementary to non-routine cognitive and manual tasks, located respectively at the top and at the bottom of the job quality distribution.⁵¹ These

⁵⁰ Goos and Manning (2007) call such a process the “polarization of work,” and argue that it may have contributed to a similar hollowing out of the wage distribution in the United Kingdom during 1975 to 2000.

⁵¹ Hence, the technological change favours the employment growth for cognitive tasks in high paid jobs as well as for manual tasks in low paid jobs, while it decreases the employment in middling jobs where routine tasks are used. In this framework, the new technologies would be responsible for the increase in the upper tail wage inequality (the 90/50 index) and for the decrease of the lower tail inequality (the 50/10), observed for instance in the US case.

interpretations have not been easily extended to Mexico, where different degrees of adoption of new technologies and labour market institutions have produced a different wage dynamics with respect to Anglo-Saxon countries (Gottshalk and Smeeding, 1997).

Nowadays, the empirical evidence concerning the analysis of the wage inequality using quantile regressions and decomposition techniques in Mexico is limited. López-Acevedo (2006) uses the Labour Force Survey from 1988 to 2002. She reviews the relation between education and inequality and examines the evolution and structure of the rates of returns to education by means of ordinary least squares and quantile regressions without decomposition. López-Acevedo finds that in the early 1990s the trends in the distribution of earnings in Mexico differ from the trends in the distribution of current income in two ways. First, the gains are not limited to the richest 10%, as those in the seven-, eight-, and nineteenth of the distribution improved their relative earnings. Second, the distribution of earnings clearly worsened in the 1990s until 1996, although the inequality associated with total current income was moderately stable in the 1990s, displaying an improvement after 1996.

Differences in the behaviour of total current income and labour earnings inequalities from 1994 to 1996 support the idea that the poor, who rely the most on labour as a source of income, are the least able to protect themselves during a recession. Moreover, she concludes that the education is a key variable for our understanding of income and earnings inequality in Mexico. Education is by far the variable that accounts for the largest share of earnings inequality in Mexico, in terms of both its gross and its marginal contribution. The marginal contribution of education to the explanation of inequality in Mexico is almost equal to the joint contribution of other relevant variables such as age, economic sector, labour market status and hours worked. It is worth pointing out that the difference between the gross and marginal contributions has been increasing over time, indicating that, as the economy progresses, education becomes even more important in determining the choices of sectors and occupations. Campos-Vazquez (2010) reviews the sources of the fall in wage inequality and job polarization in the period post-NAFTA using the Mata and Machado (2005) and Bound and Johnson decompositions (1992) with quantile regressions. Campos-Vazquez found that the main reasons to explain why inequality has fallen are related to supply and demand forces; the slower demand growth and the increase in supply of college workers was not matched by an increased in top qualified jobs.⁵²

⁵² Arias *et al.* (2001) review the returns to education and quantile regressions using instrumental variables and treatment effects concentrate their research in the effect of the education on the whole conditional distribution earnings.

The results of the decomposition show that the returns to education and labour experience are the most important factor explaining the decrease in wage inequality. The decline in returns is explained by a substantial increase in college graduates in the last 10 years, but it is also due to slower growth in labour demand, especially for the top paid jobs. These results confirm that changes in relative supply are the main determinant behind the decrease in wage inequality. Sámano (2010) analyses the income inequality in Mexico using the hierarchical approach (Atkinson, 2008) and the decomposition method proposed by Machado and Mata. She reviews groups of workers with high levels of education and occupations that are related with the new technologies. She found relevant differences among deciles, in particular in the bottom deciles.

2.3. Data and methodology

2.3.1. Data and descriptive statistics

As mentioned in chapter 1, the empirical analysis is based on the National Survey of Labour and Employment (ENOE) and the National Urban Employment Survey (ENEU) carried out by the National Institute of Statistics and Geography of Mexico (INEGI). In this chapter, I analyse the wage structure and the decomposition analysis from 1987 to 2008. The analysis was carried out for 38 urban areas (localities with at least 2.500 inhabitants), although information was collected for 48 different regions. However, as they were changing in different points of time hence I have only considered 38 time invariant regions for the sake of comparability. The sample consists of employees aged 15-65. We focus on employees with permanent jobs that working regularly full-time and the hours are measured using usual hours worked in the principal job. I refer to the real hourly wage in logarithms, obtained by dividing the monthly wage from employment (earnings from the main job after taxes and Social Security contributions, including overtime premia and bonuses) and deflating by regional consumer price indexes (base year 2002). For those paid per week, the survey transforms weekly earnings into monthly ones. Similar adjustments are used for workers paid by the day or every two weeks.

Table 2.1 provides the mean of log real hourly wage, schooling years, age and potential experience for workers in our sample. The table reveals two important findings. First, the real wages increased throughout the wage distribution during 1987-1994; from 1995 to 1996 (the period of peso crisis) decrease. And, the next years the real wage showed a slight upward trend in different points of the

wage distribution. Second, from 1987 to 2008 there was a substantial increase in education level⁵³. In particular, my sample considers the urban areas in Mexico most of which contain a larger proportion of people with higher level of education. The acceleration in schooling was the product of concerted efforts to increase the coverage of primary and secondary education⁵⁴. Average years of schooling have increased from 8.76 years to 10.87 years it increased more than two years over the period. Meanwhile, the potential experience for the workforce increased from 16.38 years in 1987 to 18.31 years in 2008 and age of the labour force over the period is 32.62 years on average. Cragg and Epelbaum (1996), for example showed that between 1987 and 1993 the wages of Mexican workers with more experience and more education grew faster than those of workers with lower levels of experience or education. Figures 2.1 and 2.2 provide an alternative way of describing the clear trend from 1987 to 2008 in schooling years but a different picture for real wage.

Table 2.1. Mean of the covariates, 1987-2008

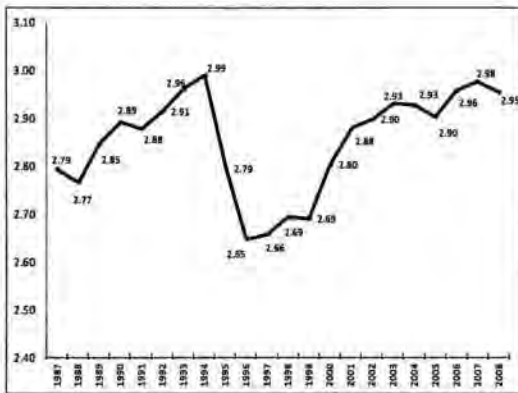
Variable	Log real hourly wage	Years of education	Age	Experience	Experience squared
1987	2.79	8.76	31.15	16.38	430.98
1988	2.77	8.95	31.11	16.17	421.63
1989	2.85	9.11	31.12	16.01	414.34
1990	2.89	9.19	31.05	15.86	408.11
1991	2.88	9.33	31.10	15.77	405.53
1992	2.91	9.52	31.37	15.85	406.62
1993	2.96	9.73	31.49	15.76	400.16
1994	2.99	9.82	31.68	15.85	398.28
1995	2.79	9.96	31.97	16.01	404.07
1996	2.65	10.00	32.12	16.12	407.02
1997	2.66	10.17	32.17	16.00	402.22
1998	2.69	10.08	32.26	16.19	406.77
1999	2.69	10.09	32.42	16.33	411.78
2000	2.80	10.19	32.73	16.55	421.51
2001	2.88	10.31	33.11	16.80	429.96
2002	2.90	10.43	33.55	17.12	441.36
2003	2.93	10.52	33.82	17.30	450.04
2004	2.93	10.63	33.95	17.32	451.69
2005	2.90	10.54	34.64	18.09	485.16
2006	2.96	10.61	34.73	18.12	488.12
2007	2.98	10.79	35.02	18.22	494.04
2008	2.95	10.87	35.19	18.31	498.77

Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

⁵³ See De Hoyos, *et. al* (2009).

⁵⁴ The Mexican education system consists of 6 years of primary education and secondary education of 3 years of junior high. Primary education is free and mandatory. In 1992, 3 years of junior high were also made compulsory.

Figure 2.1. Real hourly wage (log) in Mexico, 1987-2008



Source: Own elaboration from ENEU-ENOE 1987-2008.

Figure 2.2. Years of education in Mexico, 1987-2008



Source: Own elaboration from ENEU-ENOE 1987-2008.

Not surprisingly, the increase in educational attainment since 1990s. It is also worth noting that the heterogeneity of labour market and an unequal distribution of human capital in Mexico would have a substantial impact on wage distribution. In Chapter 1 I showed the trends of the differential of the real hourly wage by percentiles, the different measures of dispersion, aggregate indices of inequality and the Theil decomposition (see Tables 1.5-1.7 on Chapter 1). I calculated the Theil index divided into 5 subgroups levels of education and we I found that the differences of within groups among levels of education from 1987 to 1993 was 74.9%, during 1994-2001 represented 67.6% and in the third period 72.4% in average, while the percentage explained by the differences between groups was 25.1%, 32.4% and 27.6% respectively.

In order to make meaningful comparisons between estimates of inequality of different distributions, Table 2.2 examines income shares in each subgroup (human capital accumulation is analysed by levels of education, consisting in five categories: no schooling or primary incomplete; primary complete; secondary; upper secondary and higher or tertiary). According to this criterion, it appears that the inequality rise from 1990 to 1997 in several cases also affected to workers with no schooling or primary incomplete and primary complete, which these groups suffered the largest drop in its income share and the contrary to workers with upper secondary and higher or tertiary levels of education. However, between 1998 and 2008 it appears also that the gains affected it favourably although, on average, less than the unskilled groups and workers with secondary, upper secondary and higher or tertiary levels of education were the main beneficiary of the recent inequality decline (see Table 2.2 and Figure 2.3). In a simple way, this evidence support the

relationship between inequality and educational wage differentials of the last twenty years represent a break from the pattern of educational attainment was associated with great technological dynamism, rapid economic growth, and declining or stable wage inequality and educational differentials.

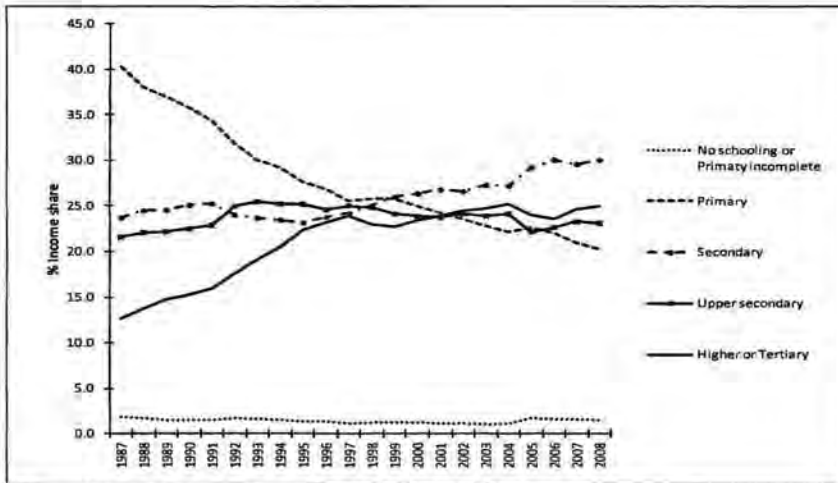
Table 2.2. Changes in the income share of education level in Mexico, 1987-2008

Year	Δ Income share					Δ Gmi	Δ Theil
	No schooling or Primary Incomplete	Primary*	Secondary	Upper Secondary	Higher or Tertiary		
1987							
1988	-7.35	-5.45	3.31	2.29	8.27	-0.03	-0.06
1989	-9.61	-2.91	0.25	0.42	8.11	-0.57	-0.36
1990	-3.99	-3.09	2.17	1.34	2.50	0.29	0.09
1991	1.80	-3.80	0.79	1.73	4.92	0.37	0.14
1992	15.57	-7.78	-4.98	9.16	10.14	0.73	0.28
1993	-7.12	-5.41	-1.29	2.11	9.25	0.30	0.12
1994	-5.38	-2.78	-0.91	-0.95	7.18	0.15	0.04
1995	-7.10	-4.97	-1.26	-0.08	9.13	1.48	0.67
1996	-2.23	-3.13	2.79	-2.40	3.83	1.19	0.59
1997	-14.22	-5.05	1.82	1.76	2.93	0.22	0.11
1998	5.93	1.27	3.47	-0.86	-4.26	-0.73	-0.37
1999	-1.05	-0.11	3.50	-2.65	-0.79	-0.60	-0.28
2000	-0.66	-3.06	1.51	-1.15	3.00	-0.53	-0.25
2001	-7.43	-2.88	1.62	-0.45	2.08	-0.88	-0.39
2002	0.45	-3.16	-0.77	1.57	2.49	-0.53	-0.21
2003	-7.99	-2.80	2.69	-0.90	1.02	-0.14	-0.07
2004	7.14	-2.88	-0.27	0.96	1.73	0.03	0.03
2005	57.16	2.06	7.33	-8.14	-4.45	-0.10	-0.01
2006	-8.99	-3.01	2.87	2.10	-1.93	-0.22	-0.10
2007	-2.83	-4.78	-1.62	2.76	4.06	-0.22	-0.09
2008	-3.43	-3.20	1.56	-0.75	1.78	-0.04	-0.01

Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

Note: (*) Base category

Figure 2.3. Trends in income share of education level in Mexico, 1987-2008

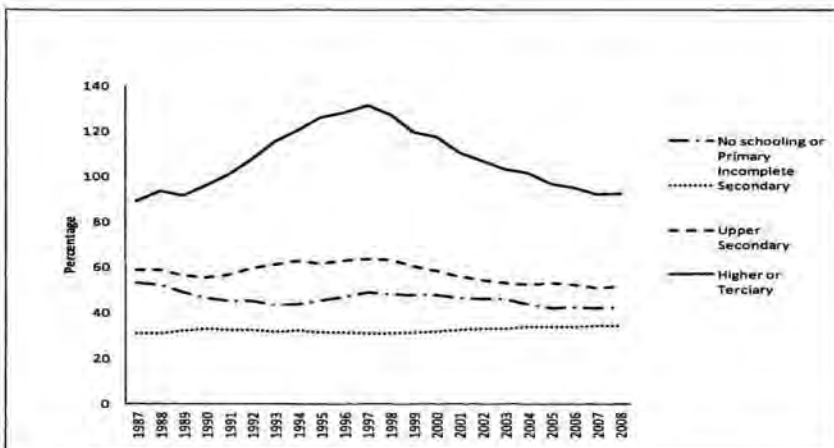


Source: Own elaboration from ENEU-ENOE 1987-2008.

Table 2.3 and Figure 2.4 show evidence on educational wage differentials that accrue to workers with higher or tertiary, upper secondary and secondary levels relative to primary complete level and the contrary effect to workers with no schooling or primary incomplete over the period.

According to these wage differentials, acquisition of more education leads to significantly higher wages. The wage gap between levels of education arises and reflects the big differences among levels of education and how from 1997 onwards the high levels of education (upper secondary and tertiary levels) reduce the wage gap.¹

Figure 2.4. Wage gap between level of education Base: Primary complete



Source: Own elaboration from ENEU-ENOE 1987-2008.

Table 2.3. Wage gap between levels of education in percentage, 1987-2008

Year	No schooling or Primary Incomplete	Secondary	Upper Secondary	Higher or Tertiary
1987	52.9	30.9	58.7	89.2
1988	52.0	30.9	58.9	93.6
1989	49.0	32.3	56.5	91.4
1990	46.5	32.8	55.5	96.2
1991	45.3	32.7	56.8	101.1
1992	45.1	32.4	59.5	107.6
1993	43.6	31.8	61.2	115.2
1994	43.4	32.2	62.7	120.5
1995	45.1	31.5	61.5	125.9
1996	46.8	31.1	62.8	128.1
1997	49.0	30.7	63.6	131.5
1998	47.9	30.7	63.1	127.2
1999	47.6	31.3	60.4	119.5
2000	47.9	31.9	58.2	117.5
2001	46.5	32.3	55.8	110.6
2002	46.1	32.8	54.4	106.7
2003	46.2	33.0	53.1	103.2
2004	43.7	33.7	52.2	101.6
2005	41.8	33.6	53.0	96.6
2006	42.5	33.6	52.3	95.0
2007	42.0	34.0	51.1	92.0
2008	42.2	34.0	51.2	92.5

Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

Note: to the wage gap uses log of real hourly wage and base category is Primary complete.

To investigate the dynamics of inequality trend in all sample I also analyse the changes in the different tails of the wage distribution. In particular, I investigate the lower, middle and upper points of the wage distribution analysing the 90/10, 50/10, 90/50, 75/25, 75/50, 50/25 ratios (see Chapter 1). It is possible to notice the different trends in each point of the distribution. In order to identify what are the forces that have played a role in explaining inequality trends in urban Mexico I carry out a decomposition analysis.

2.3.2. Quantile regression

In this section, I disentangle the contribution of labour force characteristics and labour market prices to the dynamics of the Mexican wage structure. This literature goes back to the seminal

contributions in 1973 by Oaxaca and Blinder, and it has seen great developments over the last three decades or in the non-parametric decomposition suggested by DiNardo *et al.* (1996). The most recent contribution in this literature is to consider a quantile regression setting, which explores the dynamics of the whole wage distribution. We I make use of a methodology that has been recently developed by Melly (2005)⁵⁵, paper that uses the same general idea as Machado-Mata (2005) and slightly different techniques in the implementation.

This methodology takes as starting point the quantile estimations from 1987 and 2008, using a mincerian (Mincer, 1958 and 1974) standard specification:

$$\ln w_i^t = \alpha_i + X_i^t \beta^t(\theta) + u_i^t \quad i = 1, \dots, N \quad \text{and} \quad t = 1987-2008 \quad (2.1)$$

Where $\ln w_i^t$ is the natural logarithm of the salary of the worker i , in the year t . X_i^t is the vector of exogenous variables more the constant α_i ; β^t is a vector of parameters, θ is the quantile being analysed and u_i^t is an idiosyncratic error term. The vector X_i^t includes the characteristics of the individuals to: levels of education, variable that separates in five levels (no schooling or primary incomplete; primary complete; secondary; upper secondary and higher or tertiary); potential experience⁵⁶ and potential experience squared; gender (female and male*); marital status (married*, single and other); occupational controls (professionals and technicians, agricultural workers, senior directors and supervisors, operators and transport workers, salespersons and personal service workers and salary earners*); sectors of activity (Agriculture, Forestry, Fishing and Mining Sector, Industry and Manufacturing Sector* including Electricity, Gas Steam, Air conditioning and Water Supply; Construction, Trade; Transport, Storage and Communications Sector; Services sector including financial services)⁵⁷; firm size (micro *, small medium and large)⁵⁸ and geographical

⁵⁵ As stressed by Autor *et al.* (2005), the Machado-Mata method for calculating counterfactual densities is closely related to the kernel reweighting approach proposed by DiNardo, Fortin and Lemieux (1996) and improved by Lemieux (2002a, 2006). Further, the Machado-Mata approach can be easily extended to provide a uniform and consistent treatment of both overall inequality and residual inequality. On the contrary, alternative approaches apply a hybridized set of methods (OLS regressions, parametric probability models, and kernel reweighting) to separately derive counterfactuals for overall and residual inequality.

⁵⁶ There is no information on actual working experience and, thus, in line with many studies we calculate potential experience as 'age minus years in education minus 6' and in some models it is replaced by age as an explanatory variable.

⁵⁷ In November 1993, INEGI joined to the works that the United States and Canada were developing to construct a new classification of economic activities, based on the concept of the production function: the North American Industrial Classification System (NAICS). The new classification is used by Mexico, the United States and Canada for all the production and analysis of economic statistics, in substitution of the classifications previously used in the three countries. The *North American Industrial Classification System Mexico, 2002 Manual* contains the classification's background, principles and criteria; the explanation of its structure; titles and descriptions of the categories; correspondence tables with SCIAN (in Spanish). SCIAN Mexico 2002 is available in INEGI's website. The structure can be compared with

controls for each of the 38 urban areas (Mexico City*, Guadalajara, Monterrey, Puebla, León, Torreón, San Luis Potosi, Merida, Chihuahua, Tampico, Orizaba, Veracruz, Ciudad Juárez, Tijuana, Matamoros, Nuevo León, Acapulco, Aguascalientes, Morelia, Toluca, Saltillo, Villahermosa, Tuxtla Gutiérrez, Ciudad Juárez, Tijuana Matamoros, Nuevo Laredo, Culiacán, Hermosillo, Durango, Tepic, Campeche, Cuernavaca, Coatzacoalcos, Oaxaca, Zacatecas, Colima, Manzanillo, Monclova, Querétaro, Celaya, and Irapuato); last, time dummies are included taking 1987 is the base year.⁵⁹

Following Koenker and Bassett (1978) and Koenker and Hallock (2001), I use quantile regressions to analyse the wage structure and the decomposition of inequality. This type of model assumes the existence of a linear relation between quantiles of the dependent variable ($\ln w$) and the independent variables (X) in the same way as it is done in the method of ordinary least squares (OLS). Estimating the model for each quantile using more complex techniques instead of OLS has the benefit of giving a parsimonious description of the entire conditional wage distribution, whatever the shape of it. Then, it can be used to examine the dynamics of wage inequality under a new light. Quantile regression⁶⁰ estimates can be used to see the effect of a covariate on within-group wage inequality, as well as seeing the effects of different skill attributes in each quantile.⁶¹

2.3.3. *Decomposition of changes in the wages*

In this subsection, I explain the strategy used to analyse the effects of covariates on wage inequality using the Melly (2005) decomposition. This decomposition analyses whether changes in wage inequality are driven mainly by changes in characteristics, composition effect of the workforce and the variance of residuals.

Taking as a starting point the results from quantile regressions, the implementation is straightforward. First, I estimate quantile regressions separately for each year for \hat{q} with $\theta = 0.10$,

International Classifications of economic activities the ISIC (International Standard Industrial Classification of all Economic Activities) and the NACE (Classification of Economic Activities in the European Community).

⁵⁸ Small and Medium-sized Enterprises (SMEs) are classified according to the number of employees (10, 50, 250 and more than 250, respectively) into micro, small, medium, and large enterprises. Economic Census, INEGI.

⁵⁹ The (*) represents the base category in each variable.

⁶⁰ For more details of quantile regressions see Annex 2.1.

⁶¹ See Buchinsky (1994), Martins and Pereira (2004) and Machado and Mata (2001) for applications.

0.25, 0.50, 0.75, 0.90. Second, I keep the coefficients for each quantile and year.⁶² Third, I calculate counterfactuals based on the endowment distribution for one year using the estimated coefficients for a different year. For example, to calculate the change in inequality in quantile θ caused by changes in quantities between two years.⁶³ Once having derived the quantile parameters $\beta(\theta)$, I estimate the marginal distribution of wages as function of both X and $\beta(\theta)$ and, next, I derive the counterfactual distribution of wages keeping the covariates at the 1987 level and coefficients at the 2008 level. Autor *et al.* (2005) and Melly (2005) define the coefficients component as a measure of between-group inequality. In particular, taking the median as a measure of the central tendency of a distribution, it is possible to derive the wage equation for each year (1987 and 2008)⁶⁴. So, equation (2.1) can be written as:

$$\ln w_i^t = \alpha_i + X_i^t \beta^t(0.5) + u_i^t \quad t = 1987-2008 \quad (2.2)$$

where $\beta^t(0.5)$ is the coefficient vector of the median regression in the year t , which represents a measure of between group inequality. To disentangle the effect of coefficients (between-group inequality) from the effect of residuals (within-group inequality) it is important to note from (2.2) that the θ th quantile of the residual distribution of u_i^t conditionally on X is consistently estimated by $\chi(\hat{\beta}^t(\theta) - \hat{\beta}^t(0.5))$.⁶⁵ Accordingly, Melly (2005) defines the within component using the following vector of coefficients: $\hat{\beta}^{m2008,r1987}(\theta_j) = (\hat{\beta}^{2008}(0.5) + \hat{\beta}^{1987}(\theta_j) - \hat{\beta}^{1987}(0.5))$, where the consistent estimate of the residual component given X , $(\hat{\beta}^{1987}(\theta) - \hat{\beta}^{1987}(0.5))$, is added to the between component, $\hat{\beta}^{2008}(0.5)$.

Using counterfactual distributions generated by applying different sets of covariates and coefficients, Melly (2005) computes how the variation over time of some quantile q of the wage distribution is attributable to covariates, coefficients, and residuals. In particular, Melly estimates

⁶² Melly explains that assuming traditional restrictions of the quantile regression model, one can prove that \hat{q} is a consistent and asymptotically normally distributed estimator of q_0 . Given the difficulty in estimating the asymptotic variance, the statistical inference will be conducted with bootstrap procedures, a formal proof and the asymptotic variance can be found in Melly (2006).

⁶³ To estimate the θ th quantile of y uses two steps procedures: 1) Estimation of the whole quantile regression process $y = x\beta(\tau)$ and 2) Estimation of the θ th quantile sample by weighting each observation by $(\tau_j - \tau_{j-1})$. The weights are not necessary if a regular grid of quantiles has been used (Melly, 2005).

⁶⁴ We also estimate the decomposition of changes in wage distribution by sub-periods. We identify three important points over time (1987-1994; 1994-2001 and 2001-2008) from which the inequality trend changes and these periods coincide with economic, social and political changes in Mexico. For the results and the analysis see Annex 2.4.

⁶⁵ Note that it is possible to apply the conditional quantile process to (2.2), deriving:
 $Q_\theta(u|X) = Q_\theta(w|X) - X\beta(0.5) = X\beta(\theta) - X\beta(0.5)$.

the residual component as the difference, at the quantile q , of the two following distributions, $\hat{q}(\hat{\beta}^{2008}, \chi^{2008})$ and $\hat{q}(\hat{\beta}^{m2008,r1987}, \chi^{2008})$, where the X and the $\beta^t(\theta)$ are constant at the 2008 level whereas the residual inequality is the only one that changes over time.⁶⁶

Similarly, the difference between $\hat{q}(\hat{\beta}^{m2008,r1987}, \chi^{2008})$ and $\hat{q}(\hat{\beta}^{1987}, \chi^{2008})$ is due to changes in coefficients as characteristics and residual are kept at the 2008 level. Finally, the difference between $\hat{q}(\hat{\beta}^{1987}, \chi^{2008})$ and $\hat{q}(\hat{\beta}^{1987}, \chi^{1987})$ is due to changes in covariates.

To sum up, adding and subtracting $q(\hat{\beta}^{1987}, \chi^{2008})$ and $q(\hat{\beta}^{m2008,r1987}, \chi^{2008})$ it is possible to decompose the variation over time of an estimated quantile of wage distribution into three components (residuals, coefficients and covariates), as follow:⁶⁷

$$\begin{aligned} \hat{q}(\hat{\beta}^{2008}, \chi^{2008}) - (\hat{\beta}^{1987}, \chi^{1987}) = & \\ & \left(\hat{q}(\hat{\beta}^{2008}, \chi^{2008}) - \hat{q}(\hat{\beta}^{m2008,r1987}, \chi^{2008}) \right) \quad \text{Residuals} \\ & + \left(\hat{q}(\hat{\beta}^{m2008,r1987}, \chi^{2008}) - \hat{q}(\hat{\beta}^{1987}, \chi^{2008}) \right) \quad \text{Coefficients} \\ & + \left(\hat{q}(\hat{\beta}^{1987}, \chi^{2008}) - \hat{q}(\hat{\beta}^{1987}, \chi^{1987}) \right) \quad \text{Covariates} \end{aligned} \quad (2.3)$$

Similarly it is also possible to decompose the variations of all the inequality indexes I am interested in, such as the ratios 90/10, 90/50 and 50/10.

⁶⁶ The difference for each quantile q between the two distribution $\hat{q}(\hat{\beta}^{2008}, \chi^{2008})$ and $\hat{q}(\hat{\beta}^{m2008,r1987}, \chi^{2008})$ can be rewritten as $\{\hat{q}(\hat{\beta}^{2008}(0.5) + \hat{\beta}^{2008}(\theta_j) - \hat{\beta}^{2008}(0.5), \chi^{2008}) - \hat{q}(\hat{\beta}^{2008}(0.5) + \hat{\beta}^{1987}(\theta_j) - \hat{\beta}^{1987}(0.5), \chi^{2008})\}$, from which it comes out clearly that the only component that changes over time is the residual one, in this way also providing an intuition for the choice of the definition of the within coefficient $\hat{\beta}^{m2008,r1987}$.

⁶⁷ Note that the sum of the three components exactly amounts to the estimated variation over time of that given quantile. This property is not shared with other methodology previously adopted. Moreover, this decomposition is less restrictive than the Juhn, Murphy and Pierce decomposition because the characteristics are allowed to influence the whole conditional distribution of Y .

2.4. Results

2.4.1. *Quantile regressions results*

There is a swiftly expanding empirical quantile regression literature in Economics that, taken as whole, makes a forceful for the value of “going beyond models for the conditional mean” in empirical economics. In my investigation, regression quantiles provide a more flexible approach to characterizing the effect of education and other characteristics on different percentiles of the conditional wage distribution.

To give a more detailed picture of the evolution of the structure of wage in urban areas in Mexico I estimate earnings functions, during the period under examination (1987-2008)⁶⁸, stress on labour market developments. Furthermore, I claim that the patterns derived in Tables 2.4 and 2.5 reinforce this interpretation. According to the Lemieux’s framework (2002a, 2006), the increase of educated workers at the bottom of the job and wage distribution is associated to an increase in the dispersion of wages, which cannot be captured only with the analysis of education and experience. In this sense, I try to identify the forces that contribute to review the changes in the structure wage apart from education variables aggregating other socio-demographic variables and characteristic of occupation, economic sector, firm size and location in urban areas of the labour force.

As a first remark, it is worth pointing out that it is possible to estimates the coefficients for education and the covariates at all quantile of the distribution. In consequence, I estimated the wage equation with OLS, quantile and interquantile models. The summary results for the whole period are analysed below in Tables 2.4 and 2.5 (in the Annex 2.2 and 2.3 show the results for each year by the three models). The information from Figure 2.5 to Figure 2.9 gives a summary the impact of each covariate upon wage inequality. In particular, I try to show the results of the returns of the covariates related to education levels, marital status, gender, potential experience, occupations, economic sector and the size firm gauged by OLS and quantile regressions at the 10th, 25th, 50th, 75th and 90th percentiles.

Table 2.4 presents the returns to different levels of education and the other controls. The intercept term represents the log wage distribution of the base group –primary educated workers belonging

⁶⁸As mentioned above, before and after the peso crisis the inequality had different trends related to the rapid changes in the structure of labour market, education, composition and location in urban areas of the labour force.

married in marital status, in salary earners occupation, employed in the industry and manufacturing sector in micro firms residing in Mexico City and 1987 as base year. As expected, wages increase with the levels of education in particular secondary, upper secondary and higher or tertiary education increases the wage by a significant amount. However, to no schooling or primary incomplete workers the returns decrease. From 1987 to 2008 the non-schooling workers were paid, at an average, approximately 14.6 % less in real terms than workers with primary level while the returns to secondary, upper secondary and higher or tertiary levels were 16.4%, 38.6% and 78.5% more in real terms than base group, respectively. The returns to different education levels are uniform across the distribution to the base group the returns to higher or tertiary education levels are larger at higher quantiles. In the results by year, I find that from 1987 to 1994 the returns clearly increased while for the following years the returns present slight differences and decreased. For instance, the contribution the returns to higher or tertiary education to within group inequality strengthened between 1996 and 1997 in the four levels of education (as returns become more heterogeneous), as shown in Table A2.2.1-6 and Figure 2.5a-2.5f.

From these figures, the following results should be highlighted: First, the level of education increased between 1988 and 1993. Higher or tertiary, upper secondary and secondary levels earn more than the worker with primary level and worker with no schooling or primary incomplete level earn less than all categories (coefficients are negative), and that this educational gap increases as we move up through the wage distribution. This effect implies that the wage distribution for lower level of education is less dispersed than that for higher or tertiary and upper secondary levels, the negative sign associated with workers with no schooling or primary incomplete therefore indicates that a larger proportion of workers in that level of education contribute towards reduced wage inequality. Second, returns for unskilled and skilled workers rose in the early 1990s. Similar to trend in overall inequality, however, returns to skilled workers have fallen since 1995-1998, as shown in Table A2.2.1-6.

The effects of demographic variables on wages: female workers, single and separated workers are paid significantly less over time and across the distribution, though the disadvantage is more at higher quantiles. In addition gender, there are few other demographic characteristics which play an important role in wage determination. The disadvantage faced by female workers decrease between 1991 and 1996 and also between 2002 and 2006. However, at the 75th and 90th quantiles, the effect is larger than the bottom part of the distribution. This goes against the perception that increased competitiveness reduces female workforce disadvantage (see Table A2.2.1-6 and Figure 2.6a-2.6f).

Coefficients on cities display interesting patterns of heterogeneity in rates of return. The demographic shifts in Mexico have both direct and indirect effects on the distribution of wage, over time. And most effects of regional dummies are statistically significant when we compared to Mexico City. To summarize the results into percentages, five points of impact (positive or negative) were chosen: from 1-5, 5.01-10, 10.01-15, 15.01-20 and 20.01 and above. I found that the returns to Chihuahua, Saltillo and Culiacán were small ranging from approximately 0.8% to 4.9% while in cities as Morelia, Colima, Monclova and Aguascalientes the impact is negative (from -1.2% to -4.3%). In Hermosillo, León, Guadalajara, Querétaro cities the percentage was in the range of 5.4 to 8.4%, whereas this percentage in Coatzacoalcos, Villahermosa, Tepic, San Luis Potosí, Tampico, Puebla, Cuernavaca, Toluca, Torreón and Celaya was negative from -5.7% to -9.9%. A broader pattern of growing in some economic sector played an important role in increasing of returns in cities as Ciudad Juárez, Monterrey and Nuevo Laredo hover between 12.9% and 14.9%, and Tijuana and Matamoros around 24.6% and 38.2%, respectively. In contrast to city areas with negative rates of return Irapuato, Veracruz and Durango were from -12.6% to -13.1%; Acapulco, Mérida and Zacatecas the percentage was in the range -15.3% to -19.4%; while Tuxtla Gutiérrez, Orizaba, Campeche and Oaxaca hover around -21% and -32%. These results match up to high levels of inequality and poverty in these cities and the substantial observed differences according to compare with Mexico City (or e.g. with Border cities) as shown in Table 1-6 of Annex 2.2.

The workers who reside in these cities are paid significantly less over time and across the distribution, though the disadvantage is more at bottom quantiles. In addition, these results suggest the heterogeneous relation between economic activity in the urban areas and the location of the labour force. For example, cities with important industrial activity as Monterrey or cities near the border as Ciudad Juárez, Tijuana, Matamoros and Nuevo Laredo show larger effects on the wage which play an important role in wage determination. These results are consistent with the findings on the studies of inequality in which the geographical variables are aggregated in regions, and how the impact of trade and financial liberalization in Mexico generated significant regional differences in relation to income inequality (see Hanson, 2003 and Popli, 2011). If I check the results across of the distribution in each year, regional variations continue to exert an upward pressure on inequality at the bottom and middle portions of the wage distribution, particularly. The changes exhibit irregular movements, with more substantial changes often concentrated in rather short lapses of time.

Some occupational categories dummies are statistically significant over time in all parts of the distribution (Table 2.4). For professional and technicians and senior directors and supervisors, there is a positive wage premium compared to the base category, while a negative wage premium is paid to sales and personal service, operators and transport and agricultural workers. From 1987 to 2008 the professional and technicians were paid at an average approximately 35 % more in real terms than salary earners, while the returns to senior directors and supervisors were 23.2%, in the 75th and 90th the returns are larger. Figure 2.7a-2.7f presents the changes in the effects of the occupations over time and by quantiles. As it can be seen from this figure, there is not much change in the returns of the professional and technicians and the trend is flatter than the others over the period.

Most of the economic sector dummies are statistically significant, but the impact is less than the other covariates. The positive wage premium compared to the industry and manufacturing sector is paid for sectors of services; transport, storage and communication; construction and agricultural, forestry, fishing and mining sectors while negative wage premium is paid by trade sector (see Table 2.4). These results are consistent with the findings of the studies countries in which industries that are capital-intensive or skill-intensive (or both) have higher wage premia (Dickens and Katz, 1987; Hasan and Chen, 2003, and López-Acevedo, 2006). The authors conclude that the industry-specific effect is small in comparison to occupation variables that explain an important part of the growth in wage dispersion over the period. So they put out that this results may not be correct, however, as occupation might be considered an endogenous variable, which is determined by education. Nevertheless, these results suggest that the economic sector increased through time (e.g. Services and Construction sectors).

Therefore, one might infer that the contribution of economic sector has become more intense. For most industries, there is no clear pattern in the industry wage premium across quantiles, but the relationship can be explained by three elements (1) Services sector and Communications sector became relatively more intensive in the use of high-skilled labour, (2) Agricultural, Forestry, Fishing and Mining; Construction; Trade sectors, were characterized by more intensive use of low-skilled labour and (3) Industry and manufacturing sector cannot be characterized as a sector that intensively uses high-skilled labour (see Table A2.2.1-6 and Figure 2.8a-2.8f).

Regarding the effects of firm size on wages, small and medium and large firms are paid significantly more over time and across the distribution to micro firms. From 1987 to 2008 the workers employed in small firms were paid at an average approximately 11.5% more in real terms

that workers employed in micro firms and the workers in medium and large firms 21.8%. Across the distribution and each year the positive effect of the returns to the small and the medium and large firms can be observed in Table A2.2.1-6 and Figure 2.9a-2.9f, the contribution to within group inequality strengthened between 1995 and 1999. Figures 2.5 to 2.9 to summarize the trends of the returns to the different characteristics by quantiles: the education level (Fig.5a-5f), marital status, gender and experience (Fig.6a-6f), occupation (Fig. 7a-7f), economic sector (Fig. 8a-8f) and firm size (Fig.9a-9f).

Table 2.5 shows the summary results of estimating interquantile regressions for 90/10, 90/50, 50/10, 75/25, 75/50 and 50/25 percentile ratios. Full results and estimations per year are shown in Annex 2.3. As we can see, from table 2.5, the returns to covariates are statistically significant in almost most cases, indicating that the covariates introduced at the model have similar effects on wage dispersion to the ones described above. In particular, the returns to education show a heterogeneous pattern across the conditional distribution of wages, a result confirmed by the magnitude of interquantile differences.⁶⁹ This result reinforces the idea that education gives an advantage to those located at the top of the distribution of wages, also enhancing the earnings potential of those located at the bottom.⁷⁰

⁶⁹To analyse the interquantile differences Buchinsky (1995) explains that the test of the interquantile differences is performed after an interquantile regression, which reestimates the model taking the difference between the coefficients across the wages distribution $\beta_{X\theta_1} - \beta_{X\theta_2} = 0$, where θ_1 and θ_2 are two distinct quantiles.

⁷⁰ That would be consistent with the existence of a negative correlation between marginal costs and marginal benefits of education across abilities.

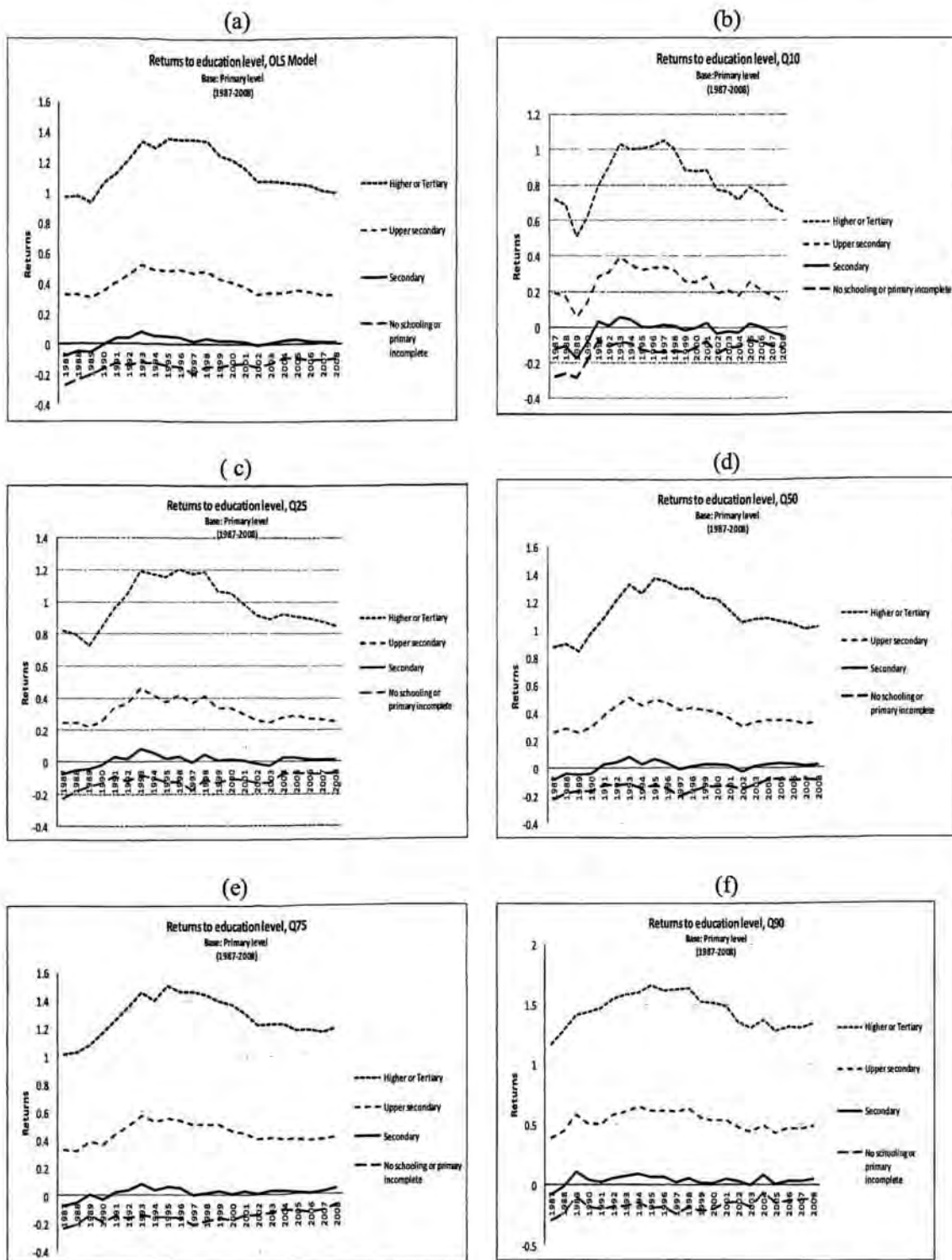
Table 2.4. OLS and Quantile regressions, México (1987-2008)

	OLS	10th quant.	25th quant.	50th quant.	75th quant.	90th quant.
Gender (base: male)	-0.0788***	-0.044***	-0.062***	-0.082***	-0.106***	-0.131***
Marital status (base: married)						
Single	-0.115***	-0.104***	-0.102***	-0.107***	-0.112***	-0.119***
Other	-0.0726***	-0.065***	-0.069***	-0.074***	-0.077***	-0.074***
	OLS	10th	25th	50th	75th	90th
Education level (base: Primary)						
No schooling or primary incomplete	-0.146***	-0.132***	-0.129***	-0.136***	-0.157***	-0.171***
Secondary	0.164***	0.119***	0.133***	0.152***	0.176***	0.208***
Upper secondary	0.386***	0.276***	0.314***	0.370***	0.434***	0.503***
Higher or Tertiary	0.785***	0.605***	0.697***	0.787***	0.870***	0.951***
	OLS	10th	25th	50th	75th	90th
Occupation (base: Salary earners)						
Professionals and technicians	0.350***	0.249***	0.299***	0.357***	0.409***	0.444***
Agricultural workers	-0.291***	-0.258***	-0.264***	-0.291***	-0.329***	-0.287***
Senior directors and Supervisors	0.232***	0.146***	0.179***	0.220***	0.274***	0.313***
Operators and transport workers	-0.003	-0.0131***	0.003	0.007**	0.004	0.013**
Salespersons and personal service workers	-0.130***	-0.186***	-0.157***	-0.131***	-0.099***	-0.064***
	OLS	10th	25th	50th	75th	90th
Potential experience	0.0236***	0.0190***	0.021***	0.023***	0.025***	0.026***
Potential experience squared	-0.0004***	-0.0003***	-0.0003***	-0.0003***	-0.0004***	-0.0003***
	OLS	10th	25th	50th	75th	90th
Economic sector (base: Industry and manufacturing Sector (1))						
Agricultural, Forestry, Fishing and Mining Sector	0.190***	0.086***	0.118***	0.173***	0.252***	0.301***
Construction	0.0915***	0.126***	0.116***	0.099***	0.082***	0.063***
Trade	-0.0289***	-0.019***	-0.021***	-0.026***	-0.031***	-0.034***
Transport, Storage and Communications Sector	0.0798***	0.003	0.039***	0.082***	0.132***	0.174***
Services Sector (2)	0.0877***	0.050***	0.079***	0.099***	0.113***	0.126***
	OLS	10th	25th	50th	75th	90th
Firm size (base: micro)						
Small	0.115***	0.137***	0.111***	0.098***	0.098***	0.107***
Medium and Large	0.218***	0.242***	0.219***	0.208***	0.199***	0.183***
Constant	2.175***	1.795***	1.989***	2.183***	2.387***	2.628***

Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

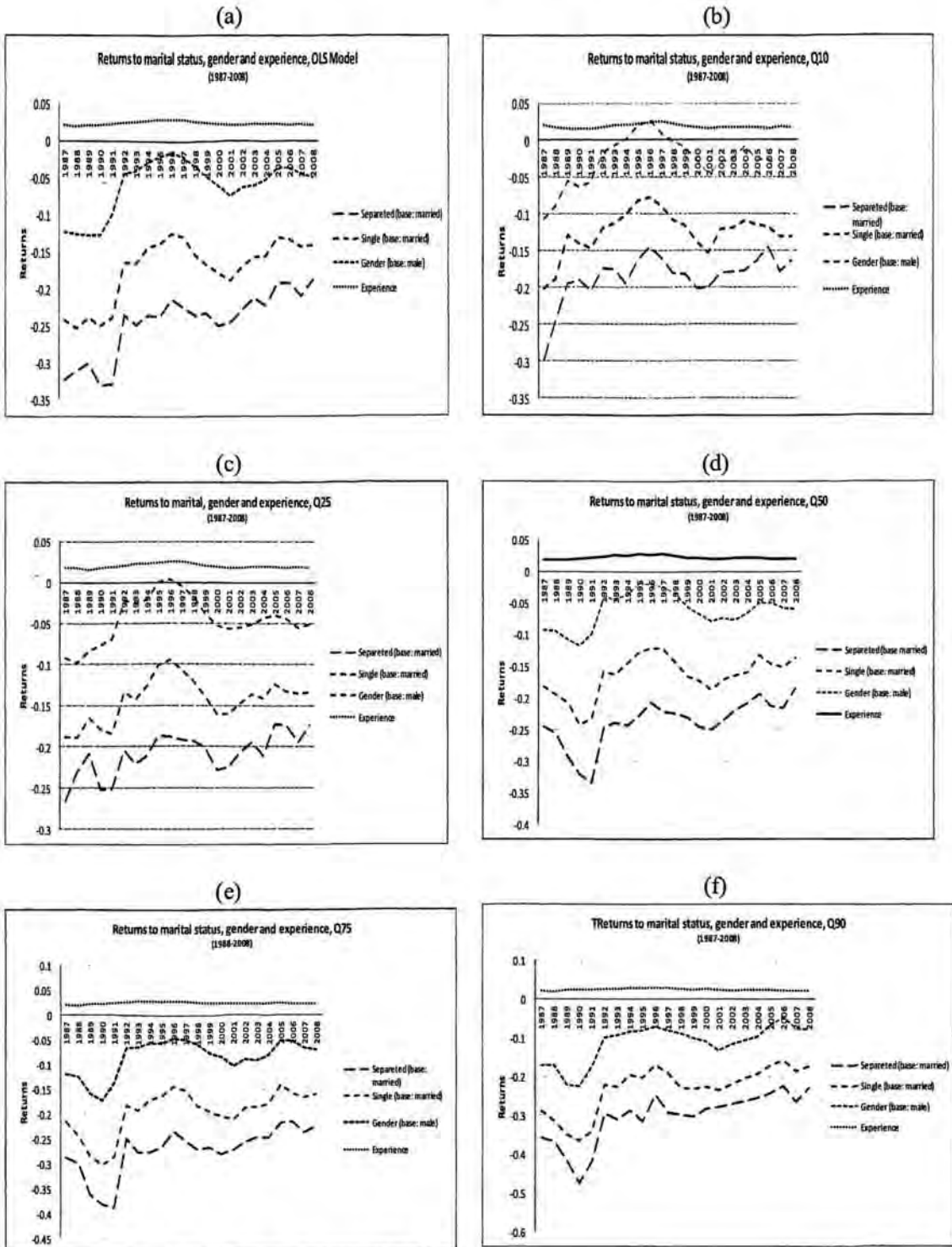
Notes: n = 1,372,978 and R-squared = 0.5 (1) Including Electricity, Gas Steam, Air conditioning and Water Supply and (2) Including Financial Services. Including regional and temporal effects. Robust standard errors in brackets *** p<0.01, ** p<0.05, * p<0.1.

Figure 2.5. OLS and quantile regression coefficients to *education level*, (1987-2008)



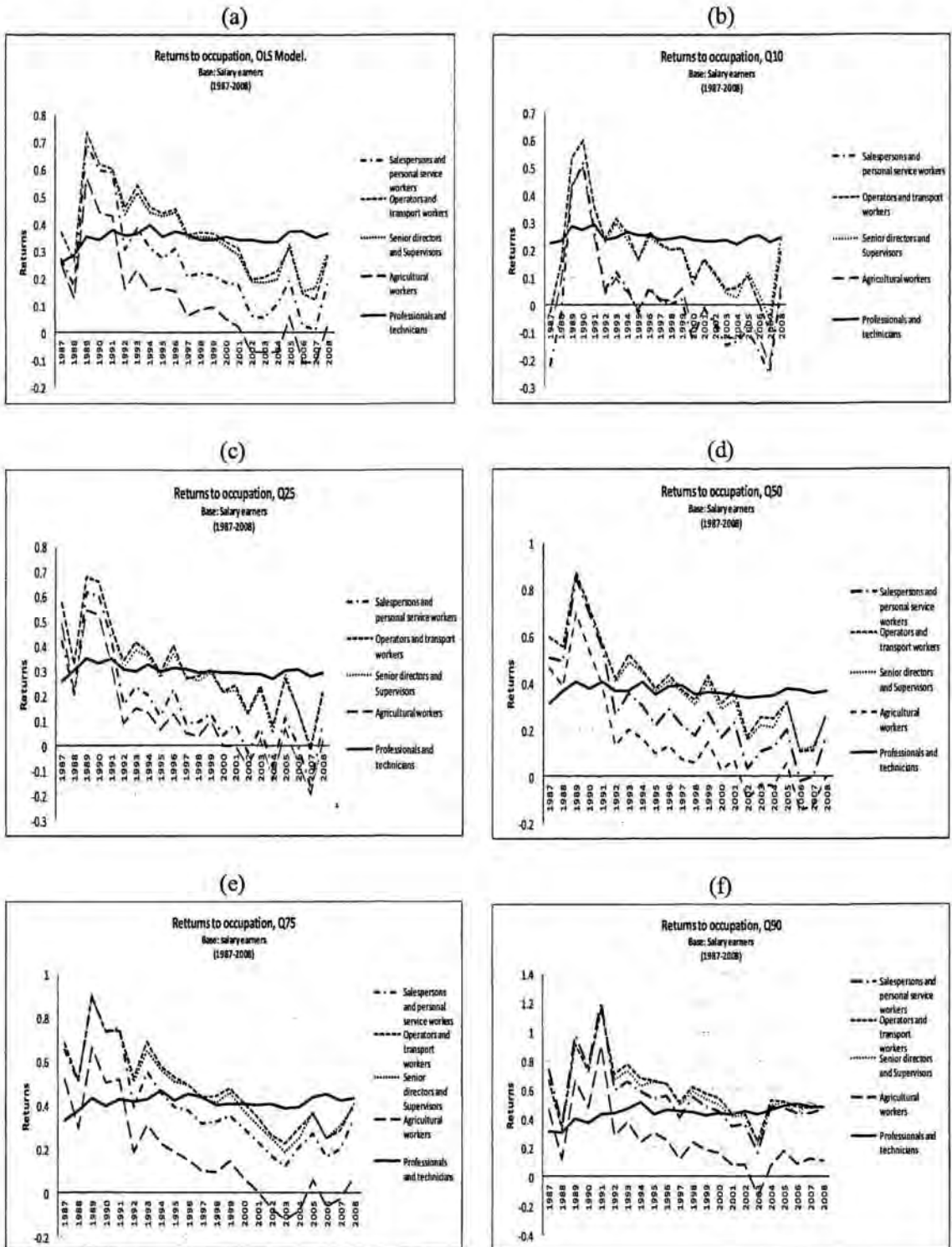
Source: Own elaboration from ENEU-ENOE 1987-2008.

Figure 2.6. OLS and quantile regression coefficients to the marital status, gender and experience, (1987-2008)



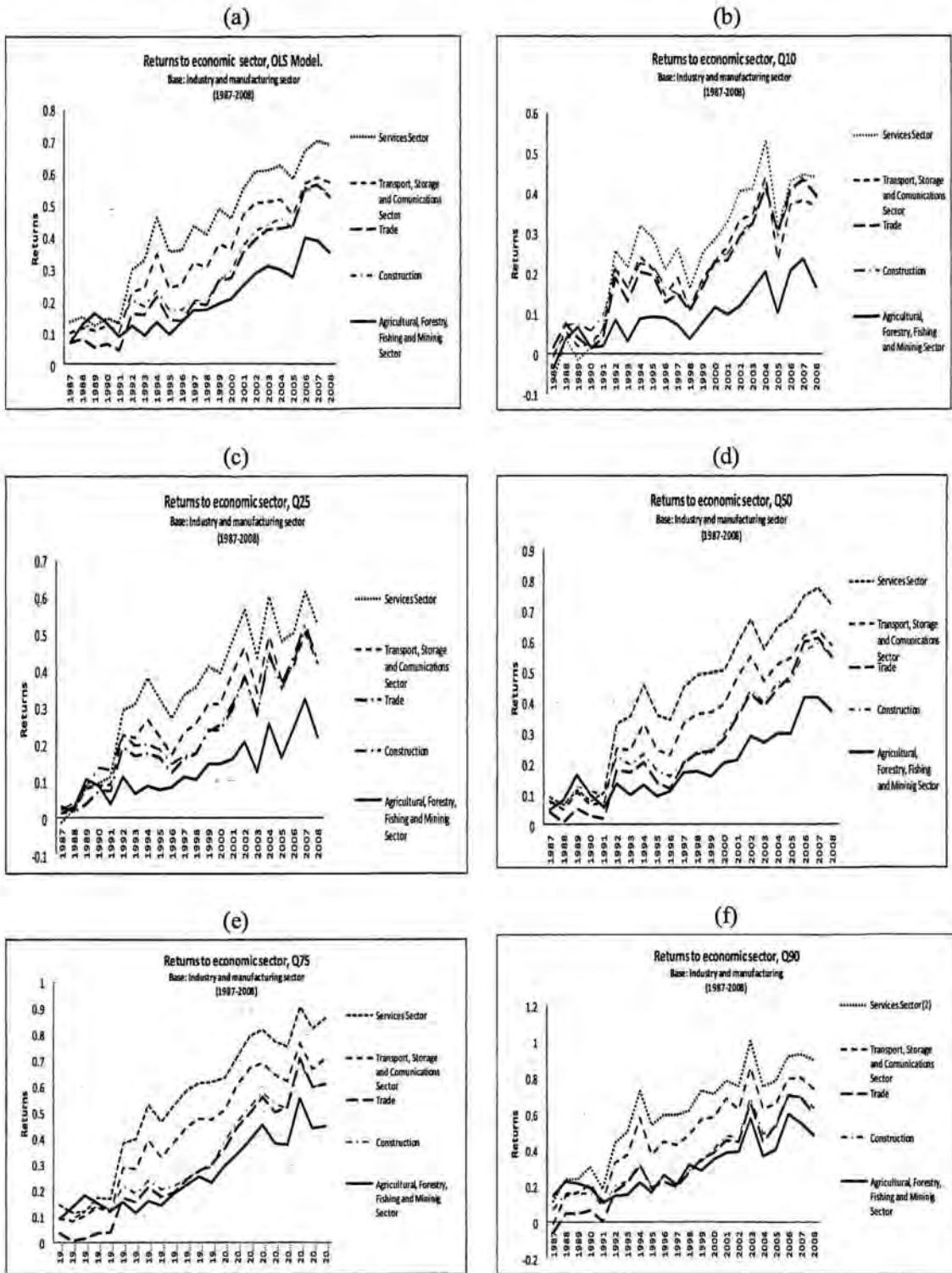
Source: Own elaboration from ENEU-ENOE 1987-2008.

Figure 2.7. OLS and quantile regression coefficients to occupation, (1987-2008)



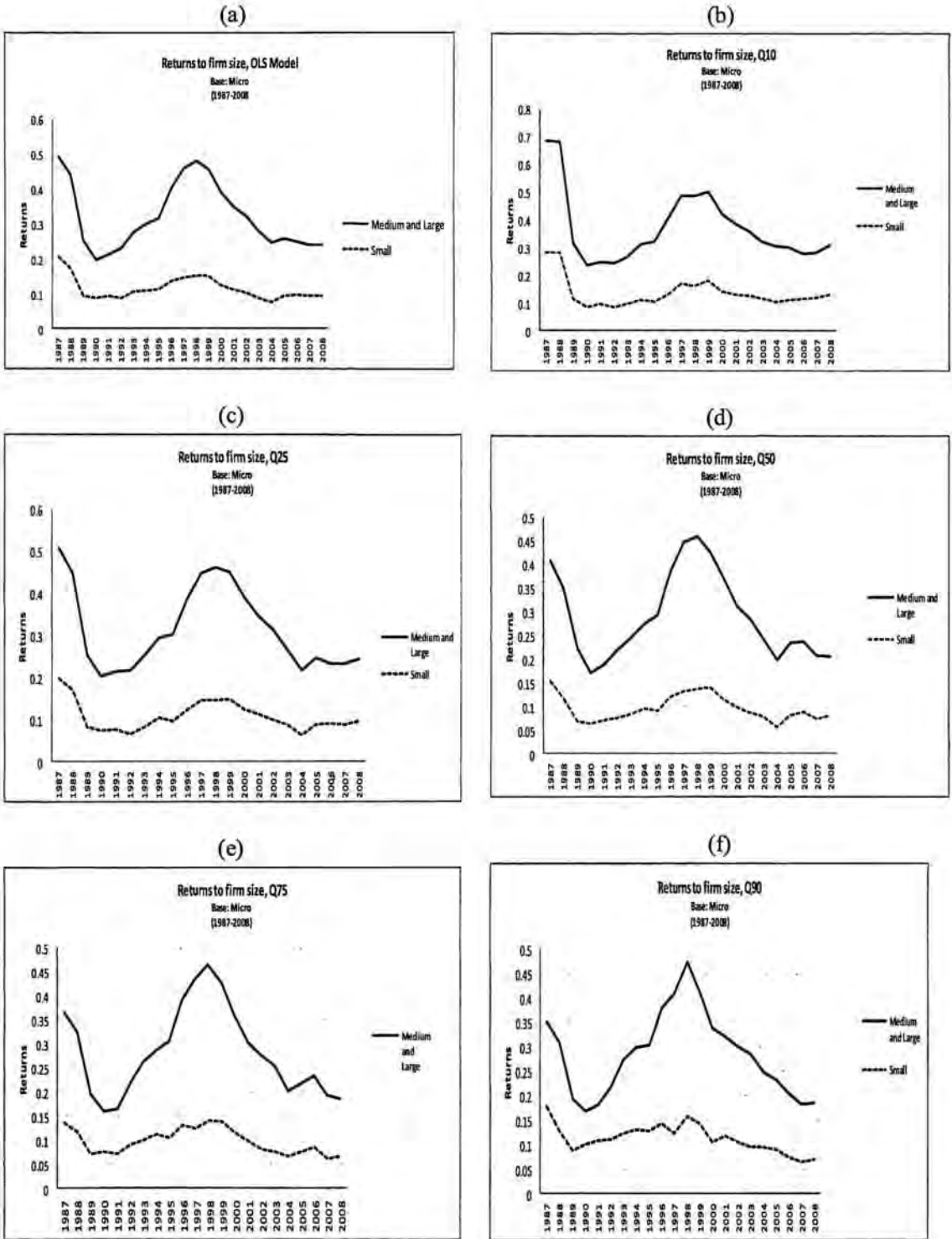
Source: Own elaboration from ENEU-ENOE 1987-2008.

Figure 2.8. OLS and quantile regression coefficients to economic sector, (1987-2008)



Source: Own elaboration from ENEU-ENOE 1987-2008.

Figure 2.9. OLS and quantile regression coefficients to *firm size*, (1987-2008)



Source: Own elaboration from ENEU-ENOE 1987-2008.

Table 2.5. Interquartile regressions, México (1987-2008)

	90/10	90/50	50/10	75/25	75/50	50/25
Gender (base: male)	-0.087***	-0.049***	-0.038***	-0.043***	-0.023***	-0.020***
Marital status (base: married)						
Single	-0.015***	-0.013***	-0.003***	-0.009***	-0.005***	-0.004***
Other	-0.009	0.0002	-0.010***	-0.009***	-0.002**	-0.006***
Education level (base: Primary)						
No schooling or primary incomplete	-0.039***	-0.034***	-0.005	-0.029***	-0.021**	-0.008
Secondary	0.089***	0.056***	0.033***	0.043***	0.024***	0.019***
Upper secondary	0.227***	0.133***	0.094***	0.119***	0.064***	0.056***
Higher or Tertiary	0.346***	0.163***	0.183***	0.173***	0.083***	0.090***
Occupation (base: Salary earners)						
Professionals and technicians	0.195***	0.087***	0.108***	0.109***	0.052***	0.058***
Agricultural workers	-0.029***	0.005	-0.033	-0.065***	-0.038***	-0.028***
Senior directors and Supervisors	0.168***	0.093***	0.074***	0.094***	0.054***	0.040***
Operators and transport workers	0.026***	0.006**	0.020**	0.001	-0.002	0.003
Salespersons and personal service workers	0.122***	0.066***	0.055***	0.058***	0.031***	0.027***
Potential experience	0.007***	0.003***	0.004***	0.004***	0.002***	0.002***
Potential experience squared	-0.000014**	0.000005**	-0.000019***	-0.000012***	-0.00001	-0.000013***
Economic sector (base: Industry and manufacturing Sector (1))						
Agricultural, Forestry, Fishing and Mining Sector	0.215***	0.128***	0.087***	0.133***	0.079***	0.055***
Construction	-0.063***	-0.036***	-0.027***	-0.034***	-0.017***	-0.017***
Trade	-0.015**	-0.009	-0.007**	-0.010***	-0.005**	-0.005***
Transport, Storage and Communications Sector	0.171***	0.092***	0.078***	0.093***	0.051***	0.043***
Services Sector (2)	0.076***	0.027***	0.049***	0.034***	0.014***	0.019***
Firm size (base: micro)						
Small	-0.030***	0.009**	-0.039***	-0.013***	-0.0002	-0.013***
Medium and Large	-0.059***	-0.026***	-0.033***	-0.020***	-0.009***	-0.011***
Constant	0.833***	0.445***	0.388***	0.397***	0.204***	0.194***

Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

Notes: n = 1,372,978 and R-squared = 0.5 (1) Including Electricity, Gas Steam, Air conditioning And Water Supply and (2) Including Financial Services. Including regional and temporal effects.

Robust standard errors in brackets *** p<0.01, ** p<0.05, * p<0.1.

2.4.2. Decomposition of changes in wage distribution

I apply the previously described procedure to decompose the changes in the wage structure between 1987 and 2008 into changes attributable to covariates (individual workers' attributes), to coefficients (remuneration of these attributes), and to a residual component. Figure 2.10 plots the decomposition results at 999 different quantiles placed on the x-axis and Figure 2.11 shows the total of residuals effect in the decomposition. Table 2.6 shows the decomposition results. In particular, I report the estimated variation over time of some selected quantiles (10, 25, 50, 75, 90), and the related decomposition into the three components.⁷¹ From the first row of Table 2.6 it can be noted that the upper tail of the distribution increases (the 75th and the 90th percentile), whereas the 10th, median and the 75th percentile decrease substantially over time.

As for the decomposition components, it emerges that the coefficients component (between) in the 75th and the 90th percentile is negative and increases in magnitude, ranging from -0.064 at 75th percentile to -0.144 at the 90th percentile. This implies that the decline in the price of human capital would have generated a shift to the left of the wage schedule, mainly concentrated in the right tail of the distribution, for constant covariates and residual components. This negative coefficients component is consistent with the dynamics of educational wage premia in Mexico. The educational wage premia decreased across the whole wage distribution over the period 1987–2008. Airola and Juhn (2005), López-Acevedo (2006), Campos-Vázquez (2010) and Popli (2011) show that educational wage premia decreased over the period 1987-1994, and across the whole wage distribution.⁷²

As for the covariates component, it is positive at the 10th and 25th percentile and decreasing in magnitude from 0.148 at 10th percentile to 0.075 at the 25th percentile, whereas the median, the 75th and the 90th percentile is negative and increases substantially over time. The negative effect of characteristics on the median indicates that if workers' attributes had been rewarded the same in 2008 as in 1987, wages should have fallen, not risen, in 2008. The residual contribution is negative at the lower tail of the distribution from the 10th percentile to the medians, and becomes decidedly relevant at the upper tail of the distribution (in particular at 90th percentile).

⁷¹ It is worth noting that the estimated variations at the selected quantiles fit well the observed variations, as well as the inequality indexes. This provides additional evidence in favour of the quantile decomposition method.

⁷² The results of Campos-Vázquez (2010) hold using two decomposition approach (Machado and Mata and Bound and Johnson decompositions), while Popli uses the Fields decomposition.

These findings on the variations of selected quantiles of the wage distribution help to understand the dynamic relationship between the human capital attainments of the workforce and wage inequality (Autor *et al.*, 2005; Melly, 2005). Actually, the standard inequality indexes (90/10, 90/50, 50/10) can easily be derived from Table 2.6, computing the related ratios both for the estimated variations and for the three components.

We observe that the upper tail (90/50) of the wage distribution increases, while a wage compression is observed in the lower tail, i.e., the 50/10 index decreases since wages of low skilled group (10th) declined less than wages of individuals around the median wage level.

Considering the impact of the decomposition components on wage inequality, from Table 2.6 we can see that the coefficients (between) effect is negative for the changes of three ratios, while 90/50 is less than 90/10 and 50/10 ratios. This negative price effect is reinforced by a relevant negative covariates component. As for within component, we observe a significant positive impact on the lower tail of the wage distribution and to a lesser extent in both the 90/10 and 90/50 inequality indexes.

The extent to which the positive residual component offset both the negative coefficients and covariates components depend on their relative magnitude across the wage distribution. In fact, the falling 50/10 ratio is mainly explained by the negative covariates and coefficients components, while the residuals inequality drives the increases in wage inequality at the top of the wage distribution. In particular, the 90/50 index increases is related to the residual component, while the stability of the 90/10 index is explained by negative coefficients and covariates effects that are counterbalanced by a positive residual component.

In order to provide an interpretation of the within component, I resort to 'skill price theory' (Juhn *et al.*, 1993; Lemieux, 2002b), which basically underlines two main effects. On the one hand, the positive (negative) changes in the coefficients component exert a positive (negative) impact on the residual component along the wage distribution, providing a measure for 'unmeasured price skills'. On the other hand, the residual component, i.e. to share of educated and experienced workers in the labour force. The results reported in Table 2.6 suggest that up to the 75th percentile these two forces cancel out one another, involving a within component close to zero, while at the 90th and 95th percentile the positive effect related to the characteristics of workers seems to prevail to the

negative effect induced by the coefficients component. In terms of wage inequality, this implies that the within inequality plays an important role in the upper tail of the distribution, as already stressed.

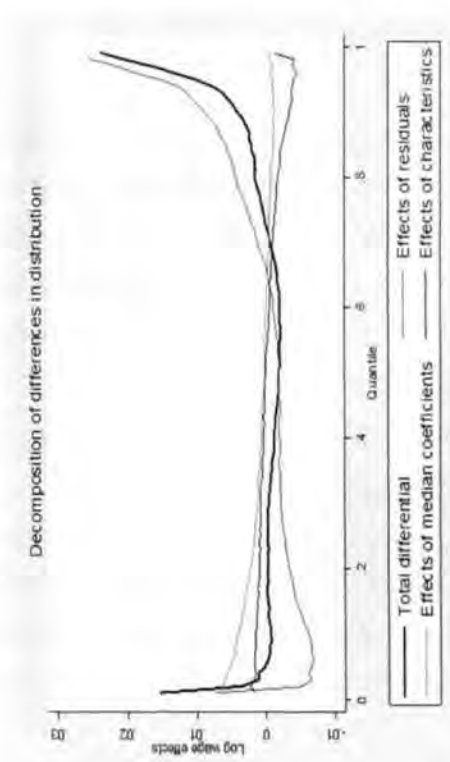
To sum up, the picture emerging from these decomposition exercises could be explained by the fact that labour demand might have increased less than the labour supply: in 2008 individuals employed in the labour market were more educated than those in 1987 but received lower wages for the same level of education. In other words, this evidence suggests that in Mexico we do not observe the standard features related to a skill-biased change, usually defined as an increase in the relative demand for skilled workers exceeding the increase in supply. This also means that in Mexico the choice of schooling could have been crowded out by the contents of the productive process.

Table 2.6. Quantile and inequality decomposition in the contributions related to covariates, coefficients (between) and residuals (within) in Mexico, 1987-2008

1987-2008	10th quant. (%)	25th quant. (%)	Median (%)	75th quant. (%)	90th quant. (%)	90/10 (%)	50/10 (%)	90/50 (%)
Total estimated variation	-0.066 (0.0065)	1.0 (0.0043)	-0.202 (0.0045)	1.0 (0.0063)	0.397 (0.0088)	0.463	-0.136	0.599
Covariates contribution	0.148 (0.0026)	-2.2 (0.0024)	-0.013 (0.0028)	0.1 (0.0041)	-6.0 (0.0053)	-0.495	-0.160	-0.335
Coefficients contribution (between)	0.411 (0.0050)	-6.2 (0.0041)	0.011 (0.0041)	-0.1 (0.0052)	-2.4 (0.0079)	-0.556	-0.401	-0.155
Residual contribution (within)	-0.625 (0.0045)	9.5 (0.0025)	-0.200 (0.0024)	1.0 (0.0036)	9.4 (0.0059)	1.514	0.425	1.089

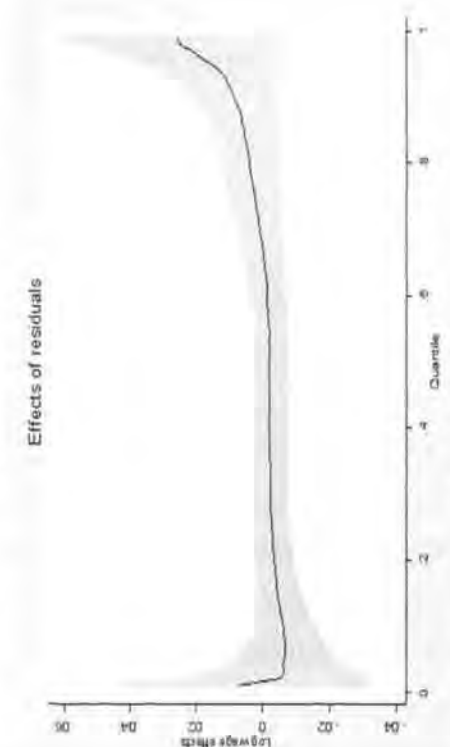
Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.
 Note: the results have been multiplied by 100. Bootstrap standard errors with 100 replications in parentheses.

Figure 2.10. Decomposition of differences in distribution using quantile regression (1987-2008)



Source: Own elaboration from ENEU-ENOE 1987-2008.

Figure 2.11. Total residual effects of decomposition in distribution using quantile regression (1987-2008)



Source: Own elaboration from ENEU-ENOE 1987-2008.

2.5. Concluding remarks

In this chapter, I have investigated the relationship between wage structure, inequality and skill-biased change for the Mexican case. Mexico is an outlier in the literature concerning the relationship between the changes over time of wage inequality and schooling premia distribution.

Moreover, I have proposed a method to decompose the changes in the wage distribution over a period of time into several factors contributing to those changes using a quantile decomposition methodology proposed by Melly (2005) in which uses a semi parametric estimator of distribution functions in the presence of covariates. The conditional wage distribution is estimated by quantile regression. Then, the conditional distribution is integrated over the range of the covariates to obtain estimates of the unconditional distribution. Counterfactual distributions can be estimated, allowing the decomposition of changes in distribution into three factors: changes in regression coefficients, changes in the distribution of covariates and residuals changes.

I have applied this methodology to Mexico urban data for the period 1987–2008, a period during which earnings inequality show different trends. As opposed to many developed countries, wage inequality in Mexico has been falling for the period after 1994 while it increased in the previous years.

The obtained estimates suggest that changes both in individuals' attributes and in the returns to these attributes contributed in different direction to the observed increase or decrease in wage inequality over time. Besides the contributions of both changes are variable in magnitude as per the different portions of the wage distribution are considered. The arguments put forward concerning the importance of that rising education leads to lesser wage inequality. My analysis indicates that, contrary to this, that in Mexico increases in educational levels do not necessarily translate into a more equal wage distribution.

Even though the levels of educational grew very rapidly and educational inequality is the variable that accounts for by far the largest share of wage inequality in Mexico, There is substantial heterogeneity among workers of each level of education.

The marginal contribution of education to the explanation of inequality in Mexico is almost equal to the joint contribution of other relevant variables such as occupation, economic sector, firm size and urban areas. It is worth pointing out that the difference between the marginal contributions has been increasing over time, indicating that, as the economy progresses, education becomes even more important in determining the choices of sectors, occupations and firm size. Besides the contribution of relevant variables to changes in inequality for different intervals of time are related to changes in the covariates, coefficients (between effect) and residuals (within effect) in urban areas.

In general way, among quantiles the returns of education are positive in workers with secondary, upper secondary and higher or tertiary levels of education and in the category at below primary school level are negative. Moreover, the education wages profile indicated by the coefficients of the education dummies, has become steeper over time. There are clear differences in the returns of education in different points of the distribution. The gap among the return to levels of education has increased, with most of the increased gap coming from a decline in the returns to lower skill groups. And third, the evidence on educational dynamics in Mexico is mixed. There was a modest reduction in the gap between the top and the bottom quintiles of workers. Average schooling improved somewhat, but the inequality of the distribution of education deteriorated, whereas the wage profile, which is related to the returns to schooling, became much steeper. This means that there was a shift in demand toward highly skilled labour that was not met by an increase in supply.

Even though, the returns to education in Mexico from 1987 to 1997 increased for higher levels of education and in the upper tail of the conditional wages distribution, there was a reversal to this trend after 1997, especially for the upper secondary and tertiary education. This offsetting the secular tendency for rising relative demand for skills (see De Ferranti *et al.*, 2004). Alternatively, it may reflect a cyclical fall in education premia in times of recession.

The results suggest that the evolution of wage inequality is not the result of changes in the distribution of education, whereas the wage profile, which is related to returns to schooling, is a leading force in the explanation of inequality in Mexico. There may be multiple reasons for this situation: the education system, the minimum wage, the demography of the firms could all play a role. In light of this evidence, I analysed the structure and evolution of the rates of returns to education and other controls that are important in the structure wage.⁷³

⁷³ Hanson and Harrison (1995) examine the impact of Mexican trade reform on the structure of wages using information at the firm level and the relation with the relative use of skilled labour, they conclude that the wage gap was associates

In sum, the evidence points up to significant differences in terms of the characteristics of workers at different points of the distribution and transient effects by years. Educational levels gender, experience, occupation, economic sector, firm size and urban areas are important factors that affected the wage distribution over time. The increase in wage inequality between 1987 and 2008, especially at the bottom of the distribution, can be explained by a declining real wage. Inequality differs not only among these different groups but also within groups of workers.

Whilst the above evidence is far from providing a total conclusive assessment of the complex elements to explain the changes inequality in Mexico, it provides additional evidence, consistent with other studies. Moreover, this analysis coincides with different changes in the political and economic structure between 1987 and 2008.

2.6. References

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with changes within industries and firms, which cannot be explained by the Stolper-Samuelson-Type effect. While López-Acevedo (2006), found the increase in wage inequality was due to other factors this is part to aggregate other controls in particular with the idea that to access to market is important for the location of industry.

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Annex 2.1. Methodological note

From equation (2.1) in section 2.3 the quantile regression model of Koenker and Bassett (1978) can be written as:

$$\ln w_i^t = \alpha_i + X_i^t \beta^t(\theta) + u_i^t \quad \text{with} \quad Q_\theta(w_i^t | X_i^t) = X_i^t \beta^t(\theta) \quad (i = 1, \dots, n) \quad (\text{A2.1})$$

where $\beta^t(\theta)$ is a vector of quantile regression (QR) coefficients. $Q_\theta(w_i^t | X_i^t)$ for $\theta \in (0, 1)$ denotes the θ th conditional quantile of the distribution of the log wage w given the vector of covariates X . Also, let $f_{ui}(\cdot | X)$ denote the density of u_i given X .⁷⁴

Any given conditional quantile, $0 < \theta < 1$, can be derived by solving the following minimization problem:

$$\min_{\beta} \frac{1}{n} \left\{ \sum_{\ln w_i \geq X_i \beta} \theta |w_i - X_i \beta| + \sum_{\ln w_i < X_i \beta} (1 - \theta) |w_i - X_i \beta| \right\} \quad (\text{A2.2})$$

The case of the median ($\theta = 1/2$) is, of course, well known, the general result which can be written as

$$\min_{\beta} \frac{1}{n} \sum_i \rho_\theta(w_i - X_i \beta_\theta) = \min_{\beta} \frac{1}{n} \sum_i \rho_\theta(u_{\theta i}), \quad (\text{A2.3})$$

where $\rho_\theta(u)$ is the check function defined as

$$\rho_\theta(u) = \begin{cases} \theta u, & u \geq 0 \\ (\theta - 1)u, & u < 0 \end{cases} \quad (\text{A2.4})$$

And β_θ is estimated separately for each θ . Asymptotically, we could estimate an infinite number of quantile regressions.⁷⁵

⁷⁴ It follows that $Q_\theta(u_i | X_i^t) = 0$. It is assumed that the distribution function of u_i given X , $F_{ui}(\cdot | X)$, is continuously differentiable with density function $f_{ui}(0 | X) > 0$.

⁷⁵ Melly (2006) derives the asymptotic distribution of the parametric estimator and use the asymptotic results to propose an analytical estimator of its variance. In this chapter the standard errors are estimated with bootstrap procedures. The

The θ 's conditional quantile of w_i given X_i is consistently estimated by $X_i \widehat{\beta}_{\theta i}$. Theoretically, it is easy to estimate the conditional distribution function by inverting the conditional quantile function. However, the estimated conditional quantile function is not necessarily monotonic and thus cannot be simply inverted. To overcome this problem Melly (2006) suggests considering the following property of the conditional distribution function:

$$F_{w(t)}(q|X_i) = \int_0^1 \mathbf{1}(F_{w(t)}^{-1}(\theta|X_i) \leq q) d\theta = \int_0^1 \mathbf{1}(X_i \beta_t(\theta) \leq q) d\theta, \quad (\text{A2.5})$$

where T is the effect of a binary treatment on an outcome w and the sample of n units indexed by i , with n_0 control units and n_1 treated units. $T_i = 0$ if unit i receives the control treatment and $T_i = 1$ if unit i receives the active treatment.

Thus, a natural estimator of the conditional distribution of $w(i)$ given X_i at q is given by:

$$\widehat{F}_{w(t)}(q|X_i) = \int_0^1 \mathbf{1}(X_i \widehat{\beta}_t(\theta) \leq q) d\theta = \sum_{j=1}^J (\theta_j - \theta_{j-1}) \mathbf{1}(X_i \widehat{\beta}_t(\theta_j) \leq q) \quad (\text{A2.6})$$

This implies that we can estimate the unconditional distribution functions simply by

$$\widehat{F}_{w(t)}(q|T = t) = \int \widehat{F}_{w(t)}(q|X) dF_X(X|T = t) = n^{-1} \sum_{i:T_i=t} \widehat{F}_{w(t)}(q|X_i) \quad (\text{A2.7})$$

Melly (2005) points out that the principal interest is in the unconditional quantile function instead of in the unconditional distribution function since the former can be more easily interpreted. So that, taking the infimum of the set, a natural estimator of the θ th quantile of the unconditional distribution of w is given by:

$$\widehat{q}_t(\theta) = \inf \left\{ q: n_t^{-1} \sum_{i:T_i=t} \widehat{F}_{w(t)}(q|X_i) \geq \theta \right\} \quad (\text{A2.8})$$

bootstrap is known to estimate the distribution of $\widehat{\beta}(\theta)$ consistently (Hahn, 1995). The observations are resampled with replacement.

This estimator allows the possibility of simulating counterfactual quantiles that can be used to decompose differences in distribution and to estimate quantile treatment effect (\widehat{q}_c). For instance,

$$\widehat{q}_c(\theta) = \inf \left\{ q: n_1^{-1} \sum_{i:T_1=1} \widehat{F}_{w(0)}(q|X_i) \geq \theta \right\} \quad (\text{A2.9})$$

is the θ th quantile of the distribution that we would observe if the treated units had not been treated. A decomposition of the difference between the θ th quantile of the unconditional distribution of treated and the untreated is given by:

$$\widehat{q}_1(\theta) - \widehat{q}_0(\theta) = [\widehat{q}_1(\theta) - \widehat{q}_c(\theta)] + [\widehat{q}_c(\theta) - \widehat{q}_0(\theta)], \quad (\text{A2.10})$$

where the first bracket represents the effect of coefficients, that is, quantile treatment effect on the treated (QTET) and the second gives us the effect of characteristics. In either case, increasing θ from 0 to 1, one can trace the whole distribution of w conditional on X . The coefficient estimates of quantile regression denote the effects of covariates on the distribution of the regressor at the corresponding quantile, thus giving the user a means to compare distributions. Tracing the whole distribution of w this way, we get a chance look beyond the conditional mean and see how the effects of covariates change in the tails and other quantiles of interest.⁷⁶ Since the objective function is not differentiable, it is not possible to use standard optimization methods. It can be solved as a linear programming model.⁷⁷

The method of quantile regression can be seen both as an alternative and a complement to the usual methods of linear regression. As it was forcefully proven by Koenker and Bassett (1978), even though the estimator $\widehat{\beta}_\theta$ lacks a bit in efficiency compared to the least squares estimator in case of a Gaussian distribution, it is much more efficient and robust for a large array of non-Gaussian situations. Especially for the cases when the conditional distribution of the dependent variable (conditional on covariates) in question has thick tails, is asymmetric, or unimodal, the meaning attributed to the linear regression estimator can be made much stronger with the help of quantile

⁷⁶ For the large sample properties of quantile regression estimators, see Koenker and Bassett (1978) and Powell (1984, 1986).

⁷⁷ Buchinsky (1998) shows that Generalized Method of Moments can also be applied for estimation. A number of software packages have quantile regression options. In this study we used Stata which is one of the two standard econometric software packages mentioned by Koenker and Hallock (2001) as having functionality for inference that is, acceptable standard errors.

regression estimators which provide better information about the distribution of the variable in question. The quantile regression estimator is robust to outliers.

Although they are derived by two somewhat analogous methods, $\widehat{\beta}_\theta$ should be interpreted in a different way than the linear regression estimator. While the latter simply shows the effect of the covariates on the regressor at the conditional mean, the former is the effect of covariates on the specified quantile of the distribution of regressor. This nice feature enables us to draw different regression lines for different quantiles and observe their shape changes as well as their scale and location as one goes along the conditional distribution of the regressor. Once having derived the quantile parameters $\beta(\theta)$, this methodology allows to estimate the marginal distribution of wages as function of both the matrixes of X and of $\beta(\theta)$. We implement quantile estimations on a regular grid, from 0 to 1 (0.10, 0.25, 0.50, 0.75, 0.90).⁷⁸

Finally, this methodology derives the marginal distribution of wages as function of covariates and coefficients, which implies the possibility to generate counterfactual densities, using different sets of $g(X)$ and $\beta(\theta)$. For instance, it would be possible to compute a counterfactual distribution keeping the covariates at the three periods that we use in the decomposition approach.

⁷⁸ When we estimate quantile and interquantile regressions, in any case, the results describe the central tendency are similar, but the standard errors are different. In general, robust regression will have smaller standard errors because it is not as sensitive to the exact placement of observations near the median. Also, some authors (Rousseeuw and Leroy, 1987) have noted that quantile regression, unlike the median, may be sensitive to even one outlier, if its leverage is high enough. Using Stata we can estimate quantile equations separately, is that independent variable seems to depend differently on the independent variables depending on the portion of the wage distribution we examine. And with the interquantile regressions, we estimate all the effects simultaneously between two points of the distribution wage. This estimation is easily interpreted in terms of change wage dispersion. In this estimation the *pseudo* $-R^2$ is calculated as:
 $Pseudo -R^2 = 1 - (\text{sum of weighted deviations about estimated quantile} / \text{sum of weighted deviation about raw quantile})$.

Table A2.2.1. OLS regressions, México (1987-2008)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2004	2006	2007	2008	
Gender (base: male)	-0.143***	-0.145***	-0.149***	-0.121***	-0.0593***	-0.0666***	-0.0646***	-0.0544***	-0.0483***	-0.0408***	-0.0300***	-0.0070***	-0.0703***	-0.0843***	-0.0874***	-0.0844***	-0.0742***	-0.0711***	-0.0771***	-0.0711***	
	[0.00655]	[0.00350]	[0.00357]	[0.00571]	[0.00451]	[0.00922]	[0.00960]	[0.00874]	[0.00875]	[0.00856]	[0.00841]	[0.00868]	[0.00746]	[0.00716]	[0.00696]	[0.00723]	[0.00886]	[0.00853]	[0.00840]	[0.00819]	
Marital status (base: married)	-0.20***	-0.126***	-0.112***	-0.141***	-0.137***	-0.120***	-0.126***	-0.119***	-0.118***	-0.108***	-0.080***	-0.121***	-0.130***	-0.118***	-0.115***	-0.107***	-0.0972***	-0.0965***	-0.0986***	-0.0926***	
	[0.00713]	[0.00731]	[0.00640]	[0.00651]	[0.00650]	[0.00657]	[0.00643]	[0.00643]	[0.00651]	[0.00648]	[0.00644]	[0.00644]	[0.00644]	[0.00644]	[0.00640]	[0.00644]	[0.00644]	[0.00640]	[0.00640]	[0.00636]	
Single	-0.081***	-0.0576***	-0.0526***	-0.0900***	-0.0717***	-0.0827***	-0.0827***	-0.0933***	-0.0997***	-0.0962***	-0.0862***	-0.0814***	-0.0651***	-0.0711***	-0.0789***	-0.0602***	-0.0529***	-0.0499***	-0.0516***	-0.0660***	-0.0470***
	[0.00146]	[0.00132]	[0.00123]	[0.00119]	[0.00121]	[0.00922]	[0.00960]	[0.00974]	[0.00975]	[0.00875]	[0.00841]	[0.00868]	[0.00746]	[0.00716]	[0.00696]	[0.00723]	[0.00886]	[0.00853]	[0.00840]	[0.00819]	
Education level (base: Primary)	-0.275***	-0.235***	-0.211***	-0.165***	-0.127***	-0.148***	-0.120***	-0.132***	-0.143***	-0.154***	-0.093***	-0.154***	-0.134***	-0.139***	-0.133***	-0.151***	-0.0958***	-0.105***	-0.106***	-0.105***	
	[0.0231]	[0.0231]	[0.0245]	[0.0109]	[0.0156]	[0.0154]	[0.0153]	[0.0157]	[0.0156]	[0.0147]	[0.0150]	[0.0145]	[0.0137]	[0.0129]	[0.0136]	[0.0139]	[0.0203]	[0.0159]	[0.0167]	[0.0165]	
No schooling or primary incomplete	0.04***	0.182***	0.135***	0.167***	0.163***	0.183***	0.203***	0.181***	0.194***	0.197***	0.207***	0.194***	0.179***	0.161***	0.151***	0.141***	0.119***	0.123***	0.133***	0.107***	
	[0.00769]	[0.00698]	[0.00661]	[0.00678]	[0.00701]	[0.00554]	[0.00590]	[0.00545]	[0.00554]	[0.00545]	[0.00495]	[0.00451]	[0.00451]	[0.00451]	[0.00446]	[0.00429]	[0.00385]	[0.00391]	[0.00390]	[0.00390]	
Upper secondary	0.402***	0.377***	0.358***	0.389***	0.389***	0.418***	0.435***	0.435***	0.450***	0.457***	0.457***	0.445***	0.412***	0.389***	0.389***	0.345***	0.320***	0.327***	0.334***	0.313***	
	[0.0103]	[0.00932]	[0.00941]	[0.00934]	[0.00921]	[0.00866]	[0.00865]	[0.00843]	[0.00873]	[0.00864]	[0.00844]	[0.00844]	[0.00844]	[0.00844]	[0.00844]	[0.00828]	[0.00753]	[0.00737]	[0.00753]	[0.00713]	
Higher or Tertiary	0.648***	0.657***	0.630***	0.719***	0.722***	0.774***	0.813***	0.813***	0.865***	0.865***	0.806***	0.863***	0.818***	0.812***	0.782***	0.747***	0.729***	0.700***	0.699***	0.682***	
	[0.0141]	[0.0128]	[0.0125]	[0.0115]	[0.0117]	[0.00962]	[0.00945]	[0.00909]	[0.00945]	[0.00933]	[0.00903]	[0.00862]	[0.00804]	[0.00771]	[0.00771]	[0.00749]	[0.0101]	[0.00899]	[0.00899]	[0.0101]	
Occupation (base: Salary earners)	0.575***	0.295***	0.353***	0.330***	0.374***	0.350***	0.365***	0.365***	0.352***	0.372***	0.261***	0.324***	0.341***	0.351***	0.347***	0.334***	0.334***	0.372***	0.359***	0.583***	
	[0.0138]	[0.0101]	[0.0115]	[0.0123]	[0.0127]	[0.0127]	[0.0123]	[0.0123]	[0.0123]	[0.0123]	[0.0123]	[0.0123]	[0.0123]	[0.0123]	[0.0123]	[0.0123]	[0.0123]	[0.0123]	[0.0123]	[0.0123]	
Professionals and technicians	-0.00475	-0.160**	0.216**	0.100	0.0513	0.193**	-0.136**	-0.136**	-0.108**	-0.226**	-0.300**	-0.236**	-0.242**	-0.300**	-0.319**	-0.418**	-0.070**	-0.113**	-0.485**	-0.139**	
	[0.0135]	[0.0115]	[0.00851]	[0.00851]	[0.00851]	[0.00851]	[0.00851]	[0.00851]	[0.00851]	[0.00851]	[0.00851]	[0.00851]	[0.00851]	[0.00851]	[0.00851]	[0.00851]	[0.00851]	[0.00851]	[0.00851]	[0.00851]	
Agricultural workers	0.114***	0.135***	0.165***	0.179***	0.179***	0.279***	0.285***	0.285***	0.292***	0.292***	0.285***	0.285***	0.285***	0.285***	0.285***	0.285***	0.285***	0.285***	0.285***	0.285***	
	[0.0084]	[0.00830]	[0.00817]	[0.00839]	[0.00841]	[0.00869]	[0.00865]	[0.00865]	[0.00869]	[0.00869]	[0.00865]	[0.00865]	[0.00865]	[0.00865]	[0.00865]	[0.00865]	[0.00865]	[0.00865]	[0.00865]	[0.00865]	
Senior directors and Supervisors	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	
	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	
Operator and transport workers	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	
	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	[0.00094]	
Subprocessors and personal service workers	-0.0953***	-0.0868**	-0.0766**	-0.0232***	-0.0128	-0.154***	-0.158***	-0.149***	-0.162***	-0.143***	-0.151***	-0.139***	-0.152***	-0.151***	-0.137***	-0.134***	-0.122***	-0.120***	-0.125***	-0.112***	
	[0.00913]	[0.00825]	[0.00791]	[0.00796]	[0.00838]	[0.00838]	[0.00826]	[0.00818]	[0.00844]	[0.00843]	[0.00833]	[0.00811]	[0.00867]	[0.00847]	[0.00847]	[0.00840]	[0.00877]	[0.00891]	[0.00899]	[0.00891]	
Experience	0.0306***	0.0194**	0.0212**	0.0209**	0.0239**	0.0259**	0.0262**	0.0262**	0.0262**	0.0262**	0.0262**	0.0262**	0.0262**	0.0262**	0.0262**	0.0262**	0.0262**	0.0262**	0.0262**	0.0262**	
	[0.000921]	[0.000821]	[0.000795]	[0.000812]	[0.000812]	[0.000812]	[0.000812]	[0.000812]	[0.000812]	[0.000812]	[0.000812]	[0.000812]	[0.000812]	[0.000812]	[0.000812]	[0.000812]	[0.000812]	[0.000812]	[0.000812]	[0.000812]	
Experience squared	-0.000305**	-0.000259**	-0.000312**	-0.000344**	-0.000344**	-0.000344**	-0.000344**	-0.000344**	-0.000344**	-0.000344**	-0.000344**	-0.000344**	-0.000344**	-0.000344**	-0.000344**	-0.000344**	-0.000344**	-0.000344**	-0.000344**	-0.000344**	
	[1.85e-05]	[1.62e-05]	[1.68e-05]	[1.56e-05]	[1.60e-05]	[1.60e-05]	[1.60e-05]	[1.60e-05]	[1.60e-05]	[1.60e-05]	[1.60e-05]	[1.60e-05]	[1.60e-05]	[1.60e-05]	[1.60e-05]	[1.60e-05]	[1.60e-05]	[1.60e-05]	[1.60e-05]	[1.60e-05]	
Economic sector (base: Industry and manufacturing, Sector (1))	0.0625***	0.124***	0.139***	0.131***	0.0875***	0.127***	0.0913***	0.135***	0.0954***	0.135***	0.170***	0.170***	0.170***	0.170***	0.170***	0.170***	0.170***	0.170***	0.170***	0.170***	
	[0.0242]	[0.0244]	[0.0238]	[0.0281]	[0.0281]	[0.0281]	[0.0281]	[0.0281]	[0.0281]	[0.0281]	[0.0281]	[0.0281]	[0.0281]	[0.0281]	[0.0281]	[0.0281]	[0.0281]	[0.0281]	[0.0281]	[0.0281]	
Agriculture, Forestry, Fishing and Mining Sector	0.016	-0.0069	-0.0246**	0.016	0.0069	0.0246**	0.0246**	0.0246**	0.0246**	0.0246**	0.0246**	0.0246**	0.0246**	0.0246**	0.0246**	0.0246**	0.0246**	0.0246**	0.0246**	0.0246**	
	[0.016]	[0.0069]	[0.0069]	[0.016]	[0.0069]	[0.0069]	[0.0069]	[0.0069]	[0.0069]	[0.0069]	[0.0069]	[0.0069]	[0.0069]	[0.0069]	[0.0069]	[0.0069]	[0.0069]	[0.0069]	[0.0069]	[0.0069]	
Construction	-0.027	-0.0353**	-0.0713***	-0.0823***	-0.0421**	-0.028***	-0.028***	-0.028***	-0.028***	-0.028***	-0.028***	-0.028***	-0.028***	-0.028***	-0.028***	-0.028***	-0.028***	-0.028***	-0.028***	-0.028***	
	[0.00975]	[0.00975]	[0.00975]	[0.00975]	[0.00975]	[0.00975]	[0.00975]	[0.00975]	[0.00975]	[0.00975]	[0.00975]	[0.00975]	[0.00975]	[0.00975]	[0.00975]	[0.00975]	[0.00975]	[0.00975]	[0.00975]	[0.00975]	
Trade	0.0289**	0.0342***	0.0543***	0.0566***	0.0566***	0.0707***	0.0853***	0.137***	0.0883***	0.114***	0.125***	0.117***	0.114***	0.0933***	0.121***	0.112***	0.0990***	0.033***	0.0325**	0.041***	
	[0.0137]	[0.0130]	[0.0130]	[0.0130]	[0.0130]	[0.0130]	[0.0130]	[0.0130]	[0.0130]	[0.0130]	[0.0130]	[0.0130]	[0.0130]	[0.0130]	[0.0130]	[0.0130]	[0.0130]	[0.0130]	[0.0130]	[0.0130]	
Transport, Storage and Communications Sector	0.034***	0.0331**	0.034***	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	
	[0.034]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	
Services Sector (2)	0.034***	0.0331**	0.034***	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	0.0331**	
	[0.034]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	[0.0331]	
Firm size (base: micro)	0.207***	0.173***	0.0944***	0.0833***	0.0934***	0.0890***	0.108***	0.110***	0.112***	0.134***	0.145***	0.153***	0.153***	0.153***	0.153***	0.153***	0.153***	0.153***	0.153***	0.153***	
	[0.00641]	[0.00651]	[0.00661]	[0.00661]	[0.00661]	[0.00661]	[0.00661]	[0.00661]	[0.00661]	[0.00661]	[0.00661]	[0.00661]	[0.00661]	[0.00661]	[0.00661]	[0.00661]	[0.00661]	[0.00661]	[0.00661]	[0.00661]	
Small	0.288***	0.268***	0.177***	0.111***	0.127***	0.137***	0.172***	0.206***	0.266***	0.302***	0.328***</										

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
Guatemala	-0.391*** (0.0171)	-0.366*** (0.0164)	-0.298*** (0.0144)	-0.278*** (0.0133)	-0.280*** (0.0136)	-0.276*** (0.0139)	-0.338*** (0.0150)	-0.329*** (0.0142)	-0.333*** (0.0156)	-0.288*** (0.0151)	-0.253*** (0.0148)	-0.274*** (0.0144)	-0.270*** (0.0141)	-0.290*** (0.0141)	-0.297*** (0.0143)	-0.300*** (0.0143)	-0.299*** (0.0143)	-0.212*** (0.0154)	-0.197*** (0.0151)	-0.197*** (0.0151)	-0.161*** (0.0155)	-0.137*** (0.0160)	-0.118*** (0.0169)
Venezuela	-0.511*** (0.0166)	-0.166*** (0.0150)	-0.0736*** (0.0153)	-0.0769*** (0.0149)	-0.107*** (0.0148)	-0.100*** (0.0143)	-0.134*** (0.0148)	-0.166*** (0.0150)	-0.176*** (0.0159)	-0.167*** (0.0159)	-0.0899*** (0.0161)	-0.123*** (0.0167)	-0.089*** (0.0161)	-0.097*** (0.0161)	-0.0820*** (0.0163)	-0.129*** (0.0163)	-0.137*** (0.0165)	-0.186*** (0.0165)	-0.186*** (0.0165)	-0.147*** (0.0167)	-0.148*** (0.0167)	-0.104*** (0.0169)	-0.104*** (0.0169)
Anapulo																							
Aguascalientes																							
Moravia																							
Toluca																							
Sahilillo																							
Villahermosa																							
Tuxtla Gutiérrez																							
Coahuila de Zaragoza																							
Chihuahua	0.229*** (0.0157)	0.103*** (0.0135)	0.226*** (0.0127)	0.207*** (0.0128)	0.172*** (0.0126)	0.177*** (0.0126)	0.123*** (0.0130)	0.123*** (0.0130)	0.123*** (0.0130)	0.123*** (0.0130)	0.123*** (0.0130)	0.123*** (0.0130)	0.123*** (0.0130)	0.123*** (0.0130)	0.123*** (0.0130)	0.123*** (0.0130)	0.123*** (0.0130)	0.123*** (0.0130)	0.123*** (0.0130)	0.123*** (0.0130)	0.123*** (0.0130)	0.123*** (0.0130)	0.123*** (0.0130)
Tijuana	0.396*** (0.0173)	0.406*** (0.0177)	0.506*** (0.0177)	0.517*** (0.0160)	0.465*** (0.0163)	0.394*** (0.0157)	0.328*** (0.0153)	0.328*** (0.0153)	0.328*** (0.0153)	0.328*** (0.0153)	0.328*** (0.0153)	0.328*** (0.0153)	0.328*** (0.0153)	0.328*** (0.0153)	0.328*** (0.0153)	0.328*** (0.0153)	0.328*** (0.0153)	0.328*** (0.0153)	0.328*** (0.0153)	0.328*** (0.0153)	0.328*** (0.0153)	0.328*** (0.0153)	0.328*** (0.0153)
Matamoros	0.318*** (0.0146)	0.176*** (0.0118)	0.270*** (0.0111)	0.315*** (0.0118)	0.294*** (0.0115)	0.278*** (0.0113)	0.239*** (0.0113)	0.172*** (0.0113)	0.168*** (0.0113)	0.168*** (0.0113)	0.168*** (0.0113)	0.168*** (0.0113)	0.168*** (0.0113)	0.168*** (0.0113)	0.168*** (0.0113)	0.168*** (0.0113)	0.168*** (0.0113)	0.168*** (0.0113)	0.168*** (0.0113)	0.168*** (0.0113)	0.168*** (0.0113)	0.168*** (0.0113)	0.168*** (0.0113)
Nuevo Laredo	0.0616*** (0.0162)	-0.0420*** (0.0143)	-0.0614*** (0.0135)	-0.0229 (0.0148)	-0.0299 (0.0157)	0.0402*** (0.0153)	0.0434*** (0.0153)	0.0789*** (0.0153)	0.0734*** (0.0153)	0.188*** (0.0156)	0.211*** (0.0156)	0.179*** (0.0156)	0.200*** (0.0156)	0.218*** (0.0156)	0.217*** (0.0156)	0.238*** (0.0156)	0.202*** (0.0156)	0.218*** (0.0156)	0.218*** (0.0156)	0.218*** (0.0156)	0.218*** (0.0156)	0.218*** (0.0156)	0.218*** (0.0156)
Culiacán																							
Hermosillo																							
Durango																							
Tepic																							
Campesche																							
Cuernavaca																							
Contreras																							
Oaxaca																							
Zacatecas																							
Colima																							
Mazatlán																							
Moravia																							
Querétaro																							
Celaya																							
Instituto																							
Constant	2.119*** (0.0154)	2.332*** (0.0140)	2.575*** (0.0131)	2.408*** (0.0139)	2.373*** (0.0141)	2.360*** (0.0119)	2.338*** (0.0119)	2.333*** (0.0121)	2.141*** (0.0129)	1.866*** (0.0126)	1.813*** (0.0134)	1.941*** (0.0134)	1.972*** (0.0134)	2.177*** (0.0134)	2.229*** (0.0134)	2.254*** (0.0134)	2.303*** (0.0134)	2.369*** (0.0134)	2.481*** (0.0134)	2.621*** (0.0134)	2.772*** (0.0134)	2.934*** (0.0134)	3.134*** (0.0134)
Observations	2850	3302	3312	3496	3432	6796	6908	7154	6974	7163	7238	7653	8565	9329	9179	8706	7870	5356	5572	5542	5540	5458	5458
R-squared	0.447	0.458	0.447	0.426	0.428	0.448	0.497	0.523	0.52	0.543	0.553	0.553	0.54	0.528	0.514	0.526	0.488	0.478	0.446	0.429	0.42	0.426	0.426

Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

Notes: (1) Including Electricity, Gas Steam, Air conditioning and Water Supply and (2) Including Financial Services. Robust standard errors in brackets *** p<0.01, ** p<0.05, * p<0.1.

Table A2.2.3. 25th Quantile regressions, Mexico (1987-2008)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
Gender (base male)	0.117***	0.098***	0.088***	0.048***	0.048***	0.048***	0.048***	0.048***	0.048***	0.048***	0.048***	0.048***	0.048***	0.048***	0.048***	0.048***	0.048***	0.048***	0.048***	0.048***	0.048***	0.048***	
Male status (base: married)	-0.091***	-0.082***	-0.103***	-0.103***	-0.117***	-0.111***	-0.111***	-0.111***	-0.102***	-0.098***	-0.102***	-0.102***	-0.102***	-0.102***	-0.104***	-0.092***	-0.097***	-0.097***	-0.083***	-0.079***	-0.079***	-0.079***	-0.081***
Female status (base: male)	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***
Other	-0.078***	-0.049***	-0.043***	-0.076***	-0.076***	-0.076***	-0.076***	-0.076***	-0.085***	-0.085***	-0.085***	-0.085***	-0.085***	-0.085***	-0.085***	-0.085***	-0.085***	-0.085***	-0.085***	-0.085***	-0.085***	-0.085***	-0.085***
Education level (base: Primary)																							
No schooling or primary incomplete	-0.231***	-0.187***	-0.150***	-0.136***	-0.091***	-0.121***	-0.121***	-0.121***	-0.128***	-0.130***	-0.130***	-0.130***	-0.130***	-0.130***	-0.117***	-0.133***	-0.133***	-0.133***	-0.133***	-0.133***	-0.133***	-0.133***	-0.133***
Secondary	0.158***	0.136***	0.106***	0.115***	0.124***	0.135***	0.135***	0.135***	0.148***	0.148***	0.148***	0.148***	0.148***	0.148***	0.124***	0.132***	0.132***	0.132***	0.132***	0.132***	0.132***	0.132***	0.132***
Upper secondary	0.319***	0.296***	0.265***	0.273***	0.308***	0.327***	0.327***	0.327***	0.352***	0.352***	0.352***	0.352***	0.352***	0.352***	0.296***	0.324***	0.324***	0.324***	0.324***	0.324***	0.324***	0.324***	0.324***
Higher or Tertiary	0.574***	0.553***	0.507***	0.509***	0.618***	0.658***	0.658***	0.658***	0.706***	0.706***	0.706***	0.706***	0.706***	0.706***	0.609***	0.669***	0.669***	0.669***	0.669***	0.669***	0.669***	0.669***	0.669***
Occupation (base: Salary earners)																							
Professionals and technicians	0.256***	0.301***	0.350***	0.339***	0.348***	0.348***	0.348***	0.348***	0.331***	0.331***	0.331***	0.331***	0.331***	0.331***	0.294***	0.325***	0.325***	0.325***	0.325***	0.325***	0.325***	0.325***	0.325***
Agricultural workers	0.229***	0.093***	0.194***	0.195***	-0.024	-0.218***	-0.218***	-0.218***	-0.192***	-0.192***	-0.192***	-0.192***	-0.192***	-0.192***	-0.147***	-0.192***	-0.192***	-0.192***	-0.192***	-0.192***	-0.192***	-0.192***	-0.192***
Senior directors and Supervisors	0.083***	0.117***	0.135***	0.132***	0.150***	0.132***	0.132***	0.132***	0.235***	0.235***	0.235***	0.235***	0.235***	0.235***	0.201***	0.235***	0.235***	0.235***	0.235***	0.235***	0.235***	0.235***	0.235***
Operators and transport workers	0.0084***	0.00833	0.00893	0.00799	0.00873	0.00846	0.00846	0.00846	0.00846	0.00846	0.00846	0.00846	0.00846	0.00846	0.00846	0.00846	0.00846	0.00846	0.00846	0.00846	0.00846	0.00846	0.00846
Self-employed and personal services workers	-0.149***	-0.119***	-0.0854***	-0.0548***	-0.0465***	-0.074***	-0.074***	-0.074***	-0.178***	-0.178***	-0.178***	-0.178***	-0.178***	-0.178***	-0.158***	-0.164***	-0.164***	-0.164***	-0.164***	-0.164***	-0.164***	-0.164***	-0.164***
Experiences	0.0186***	0.0181***	0.0166***	0.0175***	0.0193***	0.0204***	0.0204***	0.0204***	0.0246***	0.0246***	0.0246***	0.0246***	0.0246***	0.0246***	0.0186***	0.0181***	0.0181***	0.0181***	0.0181***	0.0181***	0.0181***	0.0181***	0.0181***
Experiences squared	-0.00030***	-0.00279***	-0.00259***	-0.00259***	-0.00342***	-0.00342***	-0.00342***	-0.00342***	-0.00413***	-0.00413***	-0.00413***	-0.00413***	-0.00413***	-0.00413***	-0.00342***	-0.00342***	-0.00342***	-0.00342***	-0.00342***	-0.00342***	-0.00342***	-0.00342***	-0.00342***
Economic sector (base: Industry and manufacturing Sector (1))																							
Agriculture, Forestry, Fishing and Mining Sector	0.011	0.029	0.105***	0.0625***	0.0462	0.110***	0.0665***	0.0665***	0.0635***	0.0736***	0.0626***	0.113***	0.103***	0.103***	0.140***	0.169***	0.125***	0.235***	0.166***	0.166***	0.166***	0.166***	0.166***
Construction	0.0221	0.0221	0.0215	0.0232	0.0270	0.0270	0.0296	0.0296	0.0296	0.0296	0.0296	0.0296	0.0296	0.0296	0.0296	0.0296	0.0296	0.0296	0.0296	0.0296	0.0296	0.0296	0.0296
Trade	0.0566	-0.0232***	-0.0486***	-0.0621***	-0.0566***	-0.0566***	-0.0566***	-0.0566***	-0.0566***	-0.0566***	-0.0566***	-0.0566***	-0.0566***	-0.0566***	-0.0566***	-0.0566***	-0.0566***	-0.0566***	-0.0566***	-0.0566***	-0.0566***	-0.0566***	-0.0566***
Transport, Storage and Communications Sector	0.00921	0.00931	0.00954	0.00852	0.00915	0.00765	0.00735	0.00735	0.00735	0.00735	0.00735	0.00735	0.00735	0.00735	0.00735	0.00735	0.00735	0.00735	0.00735	0.00735	0.00735	0.00735	0.00735
Services Sector (2)	0.0217	0.0125	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120
Micro (base: micro)																							
Small	0.197***	0.177***	0.0811***	0.0735***	0.0767***	0.0659***	0.0623***	0.1035***	0.0548***	0.123***	0.145***	0.145***	0.145***	0.145***	0.112***	0.107***	0.107***	0.107***	0.107***	0.107***	0.107***	0.107***	0.107***
Medium and Large	0.314***	0.279***	0.172***	0.129***	0.137***	0.152***	0.170***	0.196***	0.209***	0.209***	0.209***	0.209***	0.209***	0.209***	0.234***	0.214***	0.214***	0.214***	0.214***	0.214***	0.214***	0.214***	0.214***
Urban area (base: Mexico City)																							
Guadalajara	-0.194***	-0.0945***	-0.071***	0.00771	0.0354***	0.0501***	0.0394***	0.0501***	0.0015	0.0407***	0.115***	0.0494***	0.0513***	0.0513***	0.190***	0.151***	0.151***	0.151***	0.151***	0.151***	0.151***	0.151***	0.151***
Mexico City	-0.0410***	-0.0407***	-0.0231***	0.0425***	0.0540***	0.135***	0.116***	0.125***	0.134***	0.163***	0.185***	0.107***	0.168***	0.206***	0.215***	0.226***	0.226***	0.226***	0.226***	0.226***	0.226***	0.226***	0.226***
Puebla	-0.120***	-0.105***	-0.0319	0.0353***	-0.0089	-0.0842	-0.0384***	0.00211	-0.0691	-0.0319	-0.0243	-0.0755***	-0.0755***	-0.0755***	-0.0691	-0.101***	-0.101***	-0.101***	-0.101***	-0.101***	-0.101***	-0.101***	-0.101***
Lima	-0.139***	-0.159***	-0.0266***	0.0266***	0.176***	0.0114	0.0137	0.0137	0.190***	0.0963***	0.134***	0.0830***	0.0830***	0.0830***	0.219***	0.176***	0.176***	0.176***	0.176***	0.176***	0.176***	0.176***	0.176***
Turkey	-0.049***	-0.189***	-0.116***	-0.0468***	-0.0759***	-0.0581***	-0.0926***	-0.0581***	-0.0774***	-0.0871***	-0.0452***	-0.0926***	-0.0926***	-0.0926***	0.0931***	0.0795***	0.0795***	0.0795***	0.0795***	0.0795***	0.0795***	0.0795***	0.0795***
San Juan Potosi	-0.197***	-0.197***	-0.0726***	-0.0865***	-0.0723***	0.0231	0.0095***	0.0095***	0.173***	0.114***	0.079***	0.144***	0.144***	0.144***	-0.0365***	-0.0262***	-0.0262***	-0.0262***	-0.0262***	-0.0262***	-0.0262***	-0.0262***	-0.0262***
Mérida	-0.203***	-0.210***	-0.103***	-0.164***	-0.121***	-0.139***	-0.148***	-0.148***	-0.139***	-0.139***	-0.139***	-0.139***	-0.139***	-0.139***	-0.203***	-0.203***	-0.203***	-0.203***	-0.203***	-0.203***	-0.203***	-0.203***	-0.203***
Chihuahua	-0.109***	-0.0740***	0.0278***	0.0684***	0.0707***	0.0684***	0.0684***	0.0684***	0.0684***	0.0684***	0.0684***	0.0684***	0.0684***	0.0684***	0.0684***	0.0684***	0.0684***	0.0684***	0.0684***	0.0684***	0.0684***	0.0684***	0.0684***
Temper	-0.220***	-0.179***	-0.0431***	-0.0648***	-0.158***	-0.110***	-0.165***	-0.165***	-0.208***	-0.172***	-0.122***	-0.154***	-0.154***	-0.154***	-0.0867***	-0.107***	-0.107***	-0.107***	-0.107***	-0.107***	-0.107***	-0.107***	-0.107***

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
Orizaba	-0.256*** [0.0279]	-0.259*** [0.0264]	-0.274*** [0.0271]	-0.360*** [0.0285]	-0.343*** [0.0278]	-0.384*** [0.0275]	-0.440*** [0.0273]	-0.440*** [0.0273]	-0.408*** [0.0294]	-0.381*** [0.0294]	-0.264*** [0.0290]	-0.311*** [0.0286]	-0.122*** [0.0269]	-0.128*** [0.0266]	-0.267*** [0.0258]	-0.277*** [0.0255]	-0.292*** [0.0256]	-0.343*** [0.0272]	-0.134*** [0.0254]	-0.160*** [0.0289]	-0.107*** [0.0341]	-0.157*** [0.0307]	
Veracruz	-0.0894*** [0.0289]	-0.134*** [0.0288]	-0.1664*** [0.0284]	-0.128*** [0.0298]	-0.173*** [0.0291]	-0.201*** [0.0291]	-0.218*** [0.0291]	-0.344*** [0.0295]	-0.230*** [0.0315]	-0.259*** [0.0302]	-0.140*** [0.0290]	-0.135*** [0.0296]	-0.122*** [0.0293]	-0.144*** [0.0294]	-0.151*** [0.0295]	-0.0564*** [0.0261]	-0.159*** [0.0253]	-0.192*** [0.0279]	-0.150*** [0.0288]	-0.130*** [0.0299]	-0.144*** [0.0290]	-0.142*** [0.0296]	-0.0912*** [0.0286]
Aguascalientes																							
Apaxtlahuasca																							
Mérida																							
Toluca																							
Saltillo																							
Villahermosa																							
Tuxtla Gutiérrez																							
Chalchicomula																							
Tijuana																							
Morelia																							
Morelos																							
Nuevo Laredo																							
Chihuahua																							
Hermosillo																							
Durango																							
Tepic																							
Campesino																							
Chihuahua																							
Coahuila																							
Oaxaca																							
Zacatecas																							
Culiacán																							
Mazatlán																							
Miñaca																							
Querétaro																							
Celaya																							
Impulso																							
Coahuila	2.799*** [0.0283]	2.799*** [0.0286]	2.815*** [0.0272]	2.844*** [0.0285]	2.876*** [0.0290]	2.876*** [0.0285]	2.890*** [0.0286]	2.843*** [0.0291]	2.670*** [0.0258]	2.448*** [0.0244]	2.340*** [0.0234]	2.448*** [0.0234]	2.449*** [0.0212]	2.615*** [0.0203]	2.709*** [0.0203]	2.679*** [0.0182]	2.752*** [0.0206]	2.780*** [0.0206]	2.723*** [0.0203]	2.826*** [0.0244]	2.892*** [0.0279]	2.892*** [0.0279]	2.791*** [0.0250]
Chihuahua	2.8650	3.0272	3.1142	3.4688	3.6832	3.7286	3.6908	3.1584	4.6974	7.1053	7.2718	7.6535	8.6665	9.3149	9.1179	8.7706	7.8070	5.3566	5.5742	5.8911	5.8400	5.4546	5.4546

Source: Own calculations. Results based on data panel ENEU-EOE surveys from 1987 to 2008.

Notes: (1) Including Electricity, Gas Steam, Air conditioning and Water Supply and (2) Including Financial Services. Robust standard errors in brackets *** p<0.01, ** p<0.05, * p<0.1.

Table A2.3.1. 10/90 Interquatile regressions, México (1987-2008)

	1987	1989	1990	1991	1992	1994	1996	1997	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008		
Gender (base male)	-0.063*** [0.019]	-0.059*** [0.020]	-0.172*** [0.018]	-0.127*** [0.012]	-0.091*** [0.015]	-0.043*** [0.009]	-0.106*** [0.017]	-0.099*** [0.009]	-0.077*** [0.006]	-0.059*** [0.005]	-0.096*** [0.012]	-0.091*** [0.012]	-0.089*** [0.008]	-0.093*** [0.015]	-0.048*** [0.009]	-0.027*** [0.009]	-0.039*** [0.016]	-0.046*** [0.015]		
Marital status (base: married)	-0.040*** [0.009]	-0.045*** [0.010]	-0.032*** [0.008]	-0.078*** [0.024]	-0.027 [0.019]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	
Single	-0.040*** [0.009]	-0.045*** [0.010]	-0.032*** [0.008]	-0.078*** [0.024]	-0.027 [0.019]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	
Other	-0.040*** [0.009]	-0.045*** [0.010]	-0.032*** [0.008]	-0.078*** [0.024]	-0.027 [0.019]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	-0.029 [0.016]	
Educational level (base: Primary)	-0.014 [0.002]	0.192 [0.011]	0.0508 [0.011]	-0.126*** [0.027]	-0.073 [0.027]	-0.077 [0.027]	-0.063 [0.026]	-0.069*** [0.026]	-0.083*** [0.026]	-0.085*** [0.026]	-0.085*** [0.026]	-0.079*** [0.026]	-0.070*** [0.026]	-0.072*** [0.026]	-0.071*** [0.026]	-0.054 [0.026]	-0.054 [0.026]	-0.054 [0.026]	-0.054 [0.026]	-0.054 [0.026]
No schooling or primary incomplete	-0.014 [0.002]	0.192 [0.011]	0.0508 [0.011]	-0.126*** [0.027]	-0.073 [0.027]	-0.077 [0.027]	-0.063 [0.026]	-0.069*** [0.026]	-0.083*** [0.026]	-0.085*** [0.026]	-0.085*** [0.026]	-0.079*** [0.026]	-0.070*** [0.026]	-0.072*** [0.026]	-0.071*** [0.026]	-0.054 [0.026]	-0.054 [0.026]	-0.054 [0.026]	-0.054 [0.026]	-0.054 [0.026]
Secondary	0.026*** [0.005]	0.068*** [0.005]	0.085*** [0.005]	0.109*** [0.005]	0.119*** [0.005]	0.119*** [0.005]	0.119*** [0.005]	0.119*** [0.005]	0.119*** [0.005]	0.119*** [0.005]	0.119*** [0.005]	0.119*** [0.005]	0.119*** [0.005]	0.119*** [0.005]	0.119*** [0.005]	0.119*** [0.005]	0.119*** [0.005]	0.119*** [0.005]	0.119*** [0.005]	0.119*** [0.005]
Upper secondary	0.156*** [0.019]	0.181*** [0.019]	0.245*** [0.019]	0.235*** [0.019]	0.235*** [0.019]	0.235*** [0.019]	0.235*** [0.019]	0.235*** [0.019]	0.235*** [0.019]	0.235*** [0.019]	0.235*** [0.019]	0.235*** [0.019]	0.235*** [0.019]	0.235*** [0.019]	0.235*** [0.019]	0.235*** [0.019]	0.235*** [0.019]	0.235*** [0.019]	0.235*** [0.019]	0.235*** [0.019]
Higher or tertiary	0.239*** [0.015]	0.339*** [0.015]	0.389*** [0.015]	0.409*** [0.015]	0.379*** [0.015]	0.379*** [0.015]	0.379*** [0.015]	0.379*** [0.015]	0.379*** [0.015]	0.379*** [0.015]	0.379*** [0.015]	0.379*** [0.015]	0.379*** [0.015]	0.379*** [0.015]	0.379*** [0.015]	0.379*** [0.015]	0.379*** [0.015]	0.379*** [0.015]	0.379*** [0.015]	0.379*** [0.015]
Occupation (base: Salty miners)	0.0815*** [0.011]	0.0727*** [0.011]	0.119*** [0.011]	0.138*** [0.011]	0.203*** [0.011]	0.235*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]
Professionals and technicians	0.0815*** [0.011]	0.0727*** [0.011]	0.119*** [0.011]	0.138*** [0.011]	0.203*** [0.011]	0.235*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]	0.211*** [0.011]
Agricultural workers	0.475 [0.043]	0.437 [0.043]	0.148*** [0.013]	0.254 [0.013]	0.035 [0.013]	0.035 [0.013]	0.035 [0.013]	0.035 [0.013]	0.035 [0.013]	0.035 [0.013]	0.035 [0.013]	0.035 [0.013]	0.035 [0.013]	0.035 [0.013]	0.035 [0.013]	0.035 [0.013]	0.035 [0.013]	0.035 [0.013]	0.035 [0.013]	0.035 [0.013]
Senior directors and Supervisors	0.132*** [0.018]	0.161*** [0.018]	0.150*** [0.018]	0.159*** [0.018]	0.202*** [0.018]	0.187*** [0.018]	0.187*** [0.018]	0.187*** [0.018]	0.187*** [0.018]	0.187*** [0.018]	0.187*** [0.018]	0.187*** [0.018]	0.187*** [0.018]	0.187*** [0.018]	0.187*** [0.018]	0.187*** [0.018]	0.187*** [0.018]	0.187*** [0.018]	0.187*** [0.018]	0.187*** [0.018]
Operators and transport workers	0.0309 [0.018]	0.039 [0.018]	0.044 [0.018]	0.051 [0.018]	0.051 [0.018]	0.051 [0.018]	0.051 [0.018]	0.051 [0.018]	0.051 [0.018]	0.051 [0.018]	0.051 [0.018]	0.051 [0.018]	0.051 [0.018]	0.051 [0.018]	0.051 [0.018]	0.051 [0.018]	0.051 [0.018]	0.051 [0.018]	0.051 [0.018]	0.051 [0.018]
Unemployed and personal service workers	0.269*** [0.025]	0.214*** [0.025]	0.160*** [0.025]	0.117*** [0.025]	0.073*** [0.025]	0.073*** [0.025]	0.073*** [0.025]	0.073*** [0.025]	0.073*** [0.025]	0.073*** [0.025]	0.073*** [0.025]	0.073*** [0.025]	0.073*** [0.025]	0.073*** [0.025]	0.073*** [0.025]	0.073*** [0.025]	0.073*** [0.025]	0.073*** [0.025]	0.073*** [0.025]	0.073*** [0.025]
Expansive	0.0281*** [0.008]	0.0307*** [0.008]	0.0322*** [0.008]	0.0339*** [0.008]	0.0377*** [0.008]	0.0382*** [0.008]	0.0382*** [0.008]	0.0382*** [0.008]	0.0382*** [0.008]	0.0382*** [0.008]	0.0382*** [0.008]	0.0382*** [0.008]	0.0382*** [0.008]	0.0382*** [0.008]	0.0382*** [0.008]	0.0382*** [0.008]	0.0382*** [0.008]	0.0382*** [0.008]	0.0382*** [0.008]	0.0382*** [0.008]
Expansive squared	1.75e-005 [8.8e-05]	-0.000972 [9.0e-05]	-0.000972 [9.0e-05]	-0.000972 [9.0e-05]	-0.000972 [9.0e-05]	-0.000972 [9.0e-05]	-0.000972 [9.0e-05]	-0.000972 [9.0e-05]	-0.000972 [9.0e-05]	-0.000972 [9.0e-05]	-0.000972 [9.0e-05]	-0.000972 [9.0e-05]	-0.000972 [9.0e-05]	-0.000972 [9.0e-05]	-0.000972 [9.0e-05]	-0.000972 [9.0e-05]	-0.000972 [9.0e-05]	-0.000972 [9.0e-05]	-0.000972 [9.0e-05]	-0.000972 [9.0e-05]
Economic sector (base: Industry and manufacturing sector (1))	0.181** [0.079]	0.189*** [0.079]	0.149*** [0.079]	0.099 [0.079]	0.067** [0.079]	0.121*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]
Manufacturing	0.181** [0.079]	0.189*** [0.079]	0.149*** [0.079]	0.099 [0.079]	0.067** [0.079]	0.121*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]	0.179*** [0.079]
Construction	-0.075*** [0.018]	-0.075*** [0.018]	-0.064*** [0.018]	-0.059*** [0.018]	-0.059*** [0.018]	-0.059*** [0.018]	-0.059*** [0.018]	-0.059*** [0.018]	-0.059*** [0.018]	-0.059*** [0.018]	-0.059*** [0.018]	-0.059*** [0.018]	-0.059*** [0.018]	-0.059*** [0.018]	-0.059*** [0.018]	-0.059*** [0.018]	-0.059*** [0.018]	-0.059*** [0.018]	-0.059*** [0.018]	-0.059*** [0.018]
Trade	-0.107*** [0.015]	-0.112*** [0.015]	-0.073*** [0.015]	-0.031 [0.015]	-0.053 [0.015]	-0.053 [0.015]	-0.053 [0.015]	-0.053 [0.015]	-0.053 [0.015]	-0.053 [0.015]	-0.053 [0.015]	-0.053 [0.015]	-0.053 [0.015]	-0.053 [0.015]	-0.053 [0.015]	-0.053 [0.015]	-0.053 [0.015]	-0.053 [0.015]	-0.053 [0.015]	-0.053 [0.015]
Transport, Storage and Communications	0.0730*** [0.016]	0.120*** [0.016]	0.139*** [0.016]	0.098*** [0.016]	0.141*** [0.016]	0.172*** [0.016]	0.205*** [0.016]	0.205*** [0.016]	0.205*** [0.016]	0.205*** [0.016]	0.205*** [0.016]	0.205*** [0.016]	0.205*** [0.016]	0.205*** [0.016]	0.205*** [0.016]	0.205*** [0.016]	0.205*** [0.016]	0.205*** [0.016]	0.205*** [0.016]	0.205*** [0.016]
Services Sector (2)	0.103*** [0.024]	0.111*** [0.024]	0.107*** [0.024]	0.071*** [0.024]	0.068* [0.024]	0.068* [0.024]	0.068* [0.024]	0.068* [0.024]	0.068* [0.024]	0.068* [0.024]	0.068* [0.024]	0.068* [0.024]	0.068* [0.024]	0.068* [0.024]	0.068* [0.024]	0.068* [0.024]	0.068* [0.024]	0.068* [0.024]	0.068* [0.024]	0.068* [0.024]
Firm size (base: nano)	-0.105*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]
Small	-0.105*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]	-0.028*** [0.020]
Medium and Large	-0.238*** [0.013]	-0.218*** [0.013]	-0.048*** [0.013]	-0.081*** [0.013]	-0.081*** [0.013]	-0.081*** [0.013]	-0.081*** [0.013]	-0.081*** [0.013]	-0.081*** [0.013]	-0.081*** [0.013]	-0.081*** [0.013]	-0.081*** [0.013]	-0.081*** [0.013]	-0.081*** [0.013]	-0.081*** [0.013]	-0.081*** [0.013]	-0.081*** [0.013]	-0.081*** [0.013]	-0.081*** [0.013]	-0.081*** [0.013]
Urban area (base: Mexico City)	0.024 [0.036]	0.036 [0.036]	0.036 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]
Chihuahua	0.024 [0.036]	0.036 [0.036]	0.036 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]	0.022 [0.036]
Monterrey	-0.103*** [0.019]	-0.098*** [0.019]	-0.075*** [0.019]	-0.075*** [0.019]	-0.075*** [0.019]	-0.075*** [0.019]														

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
Otrabes	[0.160*** [0.0211]	[0.152*** [0.0345]	[0.113*** [0.0190]	[0.0517*** [0.00178]	-0.00538 [0.02811]	-0.0482 [0.0335]	0.024 [0.0135]	-0.112*** [0.0371]	-0.0506 [0.0603]	-0.0378 [0.0230]	[0.0517*** [0.0200]	[0.0688** [0.0300]	[0.0290** [0.0117]	-0.0197*** [0.00446]	-0.00569** [0.00245]	0.0365 [0.00999]	-0.0266 [0.00338]	-0.0278 [0.0181]	0.0559*** [0.00654]	0.0497 [0.0588]	0.0717*** [0.00183]	0.0133 [0.0279]	
Venezuela	[0.124*** [0.00657]	[0.029*** [0.00706]	[0.102*** [0.00706]	[0.0359*** [0.00290]	[0.0148 [0.0143]	-0.0309** [0.00706]	0.0123 [0.00290]	-0.0626*** [0.00346]	0.0152 [0.0254]	-0.0677 [0.0119]	0.0269* [0.0119]	0.0269* [0.0119]	0.0269* [0.0119]	0.0269* [0.0119]	0.0269* [0.0119]	0.0269* [0.0119]	0.0269* [0.0119]	0.0269* [0.0119]	0.0269* [0.0119]	0.0269* [0.0119]	0.0269* [0.0119]	0.0269* [0.0119]	0.0269* [0.0119]
Aspeyudo	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Agua Calientes	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Moravia	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Toluca	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Sabido	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Villavieja	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Tuaca Cuatrecasas	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Ciudad Juárez	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Tijuana	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Matamoros	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Nuevo Laredo	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Culiacán	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Hermosillo	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Durango	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Tepic	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Campesina	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Guerrero	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Coahuila	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Oaxaca	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Zacatecas	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Chihuahua	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Morelia	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Michoacán	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Querétaro	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Colima	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Imperatriz	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	
Constant	[0.00657]	[0.029]	[0.102]	[0.0359]	[0.0148]	-0.0309	0.0123	-0.0626	0.0152	-0.0677	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	

Notes: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008. Source: (1) Including Electricity, Gas Steam, Air conditioning and Water Supply and (2) Including Financial Services. Robust standard errors in brackets *** p<0.01, ** p<0.05, * p<0.1.

Table A2.3.4. 25/75 Interquantile regressions, Mexico (1987-2008)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Gender (base: male)	-0.0204***	-0.0272***	-0.0173***	-0.101***	-0.0494***	-0.0510***	-0.0403***	-0.0403***	-0.0423***	-0.0508***	-0.0509***	-0.0509***	-0.0509***	-0.0509***	-0.0509***	-0.0509***	-0.0509***	-0.0509***	-0.0509***	-0.0509***	-0.0509***	-0.0509***
Marital status (base: Single)	-0.009113	-0.0271***	-0.0330***	-0.0364***	-0.0448***	-0.0487***	-0.0508***	-0.0508***	-0.0508***	-0.0508***	-0.0508***	-0.0508***	-0.0508***	-0.0508***	-0.0508***	-0.0508***	-0.0508***	-0.0508***	-0.0508***	-0.0508***	-0.0508***	-0.0508***
Single	0.00103	-0.0278***	-0.0462***	-0.0733***	-0.0865***	-0.0987***	-0.1088***	-0.1154***	-0.1188***	-0.1205***	-0.1212***	-0.1218***	-0.1223***	-0.1228***	-0.1233***	-0.1238***	-0.1243***	-0.1248***	-0.1253***	-0.1258***	-0.1263***	-0.1268***
China	0.00424	-0.0155	-0.0339***	-0.0664***	-0.1048***	-0.1494***	-0.1981***	-0.2468***	-0.2911***	-0.3287***	-0.3611***	-0.3881***	-0.4103***	-0.4281***	-0.4421***	-0.4528***	-0.4601***	-0.4648***	-0.4676***	-0.4691***	-0.4698***	-0.4703***
Education level (base: Primary)	-0.0100**	-0.0276***	-0.0571***	-0.0923***	-0.1318***	-0.1741***	-0.2181***	-0.2628***	-0.3071***	-0.3508***	-0.3938***	-0.4361***	-0.4768***	-0.5159***	-0.5534***	-0.5893***	-0.6237***	-0.6566***	-0.6880***	-0.7180***	-0.7465***	-0.7735***
No schooling or primary incomplete	-0.00861	-0.0143	-0.0219	-0.0312	-0.0424	-0.0552	-0.0695	-0.0851	-0.1018	-0.1194	-0.1378	-0.1568	-0.1762	-0.1960	-0.2161	-0.2364	-0.2569	-0.2775	-0.2981	-0.3187	-0.3393	
Secondary	0.00856**	0.0242***	0.0477***	0.0773***	0.1118***	0.1504***	0.1921***	0.2368***	0.2836***	0.3324***	0.3832***	0.4359***	0.4904***	0.5467***	0.6047***	0.6643***	0.7254***	0.7880***	0.8520***	0.9173***	0.9839***	
Upper secondary	0.00110**	0.00672	0.0219	0.0481	0.0849	0.1324	0.1907	0.2590	0.3373	0.4256	0.5239	0.6322	0.7505	0.8788	1.0171	1.1654	1.3237	1.4920	1.6703	1.8586		
Higher or Tertiary	0.011***	0.035***	0.078***	0.138***	0.214***	0.305***	0.411***	0.532***	0.669***	0.822***	0.991***	1.176***	1.378***	1.597***	1.833***	2.086***	2.356***	2.643***	2.947***	3.267***		
Occupation (base: workers)	0.0701***	0.0740***	0.0801***	0.0849***	0.0897***	0.0945***	0.0992***	0.1039***	0.1086***	0.1133***	0.1180***	0.1227***	0.1274***	0.1321***	0.1368***	0.1415***	0.1462***	0.1509***	0.1556***	0.1603***		
Professional and technicians	-0.00647	0.01123	0.0210	0.0342	0.0507	0.0695	0.0907	0.1142	0.1400	0.1681	0.2085	0.2612	0.3264	0.4041	0.4944	0.5973	0.7128	0.8411	0.9823			
Agrihultural workers	0.0837***	0.101***	0.1281***	0.1631***	0.2057***	0.2559***	0.3137***	0.3791***	0.4523***	0.5334***	0.6225***	0.7206***	0.8277***	0.9438***	1.0690***	1.2033***	1.3467***	1.4992***	1.6608***			
Senior directors and Supervisors	0.07776	0.10141	0.12271	0.1517	0.1889	0.2342	0.2876	0.3491	0.4187	0.4964	0.5821	0.6768	0.7805	0.8932	1.0150	1.1459	1.2869	1.4381	1.5995			
Operators and transport workers	0.118**	0.116**	0.1277***	0.1577***	0.1961***	0.2429***	0.2983***	0.3624***	0.4354***	0.5174***	0.6084***	0.7084***	0.8174***	0.9354***	1.0624***	1.1984***	1.3444***	1.4994***	1.6644***			
Salesperson and personal service workers	0.0711	0.09118	0.1129	0.14713	0.19478	0.25633	0.33288	0.42543	0.53498	0.66153	0.80508	0.96663	1.14718	1.34773	1.56828	1.80883	2.06938	2.34993	2.64048			
Expenditure	0.0164	0.02026**	0.02575**	0.03292**	0.04200**	0.05311**	0.06622**	0.08133**	0.09844**	0.11855**	0.14166**	0.16777**	0.20688**	0.25899**	0.32410**	0.40321**	0.49632**	0.60343**	0.72554**			
Experience squared	0.000076	4.06e-05	-8.96e-05**	-0.0000472	-0.0001035	-0.000182	-0.000300	-0.000469	-0.000693	-0.001079	-0.001639	-0.002485	-0.003729	-0.005383	-0.007557	-0.010261	-0.013505	-0.017269	-0.021553			
Economic sector (base: Industry and manufacturing Sector (1))	0.0722**	0.102**	0.0728***	0.0633**	0.0654**	0.0654**	0.0654**	0.0654**	0.0654**	0.0654**	0.0654**	0.0654**	0.0654**	0.0654**	0.0654**	0.0654**	0.0654**	0.0654**	0.0654**			
Agriculture, Forestry, Fishing and Mining Sector	0.00188	0.0045	0.00874	0.0161	0.0258	0.0384	0.0540	0.0728	0.0945	0.1191	0.1467	0.1773	0.2110	0.2478	0.2877	0.3307	0.3768	0.4260	0.4783			
Construction	-0.0122	-0.0244**	-0.0433	-0.0623**	-0.0835**	-0.1058**	-0.1293**	-0.1540**	-0.1799**	-0.2070**	-0.2353**	-0.2648**	-0.2955**	-0.3274**	-0.3605**	-0.3948**	-0.4303**	-0.4670**	-0.5049**			
Trade	-0.0597**	-0.0631**	-0.0671**	-0.0719**	-0.0774**	-0.0836**	-0.0904**	-0.0978**	-0.1058**	-0.1144**	-0.1236**	-0.1333**	-0.1435**	-0.1542**	-0.1654**	-0.1771**	-0.1893**	-0.2020**	-0.2152**			
Transport, Storage and Communication Sector	0.0798**	0.1246**	0.1825**	0.2544**	0.3404**	0.4416**	0.5580**	0.6907**	0.8407**	1.0082**	1.1933**	1.3960**	1.6173**	1.8573**	2.2160**	2.6933**	3.2905**	3.9977**	4.8050**			
Service Sector (2)	0.0655**	0.0711**	0.0733**	0.0733**	0.0733**	0.0733**	0.0733**	0.0733**	0.0733**	0.0733**	0.0733**	0.0733**	0.0733**	0.0733**	0.0733**	0.0733**	0.0733**	0.0733**	0.0733**			
Finan. Act. (base: econy)	-0.0620**	-0.0555**	-0.0510**	-0.0476**	-0.0452**	-0.0437**	-0.0431**	-0.0431**	-0.0431**	-0.0431**	-0.0431**	-0.0431**	-0.0431**	-0.0431**	-0.0431**	-0.0431**	-0.0431**	-0.0431**	-0.0431**			
Small	0.0255	-0.06131**	0.0313**	0.0117	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786			
Medium and Large	-0.0279**	-0.0158	-0.0339**	-0.0629**	-0.1048**	-0.1594**	-0.2277**	-0.3098**	-0.4064**	-0.5184**	-0.6464**	-0.7914**	-0.9544**	-1.2364**	-1.6384**	-2.1614**	-2.8064**	-3.5734**	-4.4644**			
Urban areas (base: Mexico City)	0.0255	-0.06131**	0.0313**	0.0117	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786	0.00786			
Quadriles	-0.0279**	-0.0158	-0.0339**	-0.0629**	-0.1048**	-0.1594**	-0.2277**	-0.3098**	-0.4064**	-0.5184**	-0.6464**	-0.7914**	-0.9544**	-1.2364**	-1.6384**	-2.1614**	-2.8064**	-3.5734**	-4.4644**			
Monertry	0.0333**	0.00933	0.0212	0.0353**	0.0518**	0.0698**	0.0893**	0.1103**	0.1328**	0.1568**	0.1823**	0.2093**	0.2378**	0.2678**	0.2993**	0.3323**	0.3668**	0.4028**	0.4403**			
Public	-0.0265**	-0.0584**	-0.0944**	-0.1348**	-0.1797**	-0.2291**	-0.2831**	-0.3417**	-0.4049**	-0.4727**	-0.5451**	-0.6221**	-0.7038**	-0.7903**	-0.8816**	-0.9777**	-1.0787**	-1.1846**	-1.2954**			
Latin	0.0115	-0.00661	-0.0146	-0.0234	-0.0332	-0.0440	-0.0558	-0.0686	-0.0824	-0.0971	-0.1128	-0.1294	-0.1469	-0.1653	-0.1846	-0.2048	-0.2259	-0.2479	-0.2708			
Tourism	-0.0161	-0.0287	-0.0429**	-0.0586**	-0.0758**	-0.0945**	-0.1147**	-0.1364**	-0.1596**	-0.1843**	-0.2105**	-0.2382**	-0.2674**	-0.2981**	-0.3303**	-0.3640**	-0.4002**	-0.4389**	-0.4792**			
San Luis Potosi	-0.0269**	-0.0281	-0.0281	-0.0281	-0.0281	-0.0281	-0.0281	-0.0281	-0.0281	-0.0281	-0.0281	-0.0281	-0.0281	-0.0281	-0.0281	-0.0281	-0.0281	-0.0281	-0.0281			
Mexico	0.0282	0.0289**	0.0289**	0.0289**	0.0289**	0.0289**	0.0289**	0.0289**	0.0289**	0.0289**	0.0289**	0.0289**	0.0289**	0.0289**	0.0289**	0.0289**	0.0289**	0.0289**	0.0289**			
Chihuahua	-0.0387**	-0.0401	-0.0401	-0.0401	-0.0401	-0.0401	-0.0401	-0.0401	-0.0401	-0.0401	-0.0401	-0.0401	-0.0401	-0.0401	-0.0401	-0.0401	-0.0401	-0.0401	-0.0401			
Tampico	0.0222**	0.167**	0.193**	0.225**	0.262**	0.304**	0.351**	0.403**	0.460**	0.522**	0.589**	0.661**	0.738**	0.821**	0.909**	1.002**	1.100**	1.203**	1.311**			

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Oaxaca	0.155***	0.124***	0.0467***	-0.0269	-0.0600***	-0.1157***	-0.0297	0.0916**	-0.0712***	-0.0494***	0.0135	-0.00863	0.0015	0.00187**	-0.04	0.0400***	-0.00342					
	[0.00721]	[0.00019]	[0.00440]	[0.0361]	[0.0131]	[0.0193]	[0.0181]	[0.0916]	[0.0211]	[0.0231]	[0.0401]	[0.0796]	[0.0295]	[0.00187**]	[0.0403]	[0.00117]	[0.0198]					
Veracruz	0.0849***	0.0473	0.111***	-0.0165	-0.0297	-0.0655***	-0.0211**	-0.0626***	-0.0291***	-0.0453	0.0021	0.0499**	0.0524***	0.0163	0.00495	0.103***	0.0271***	-0.0242***	0.00154	0.0270**	0.00408	0.013
	[0.00702]	[0.0482]	[0.00386]	[0.0460]	[0.0207]	[0.0347]	[0.00711]	[0.0121]	[0.00642]	[0.0377]	[0.0411]	[0.0133]	[0.00396]	[0.0231]	[0.00991]	[0.00991]	[0.00578]	[0.00991]	[0.00991]	[0.00991]	[0.00991]	[0.00991]
Aguascalientes																						
Moravia																						
Toluca																						
Saltillo																						
Villahermosa																						
Tuxtla Gutierrez																						
Ciudad Juarez																						
Tijuana																						
Mercurio																						
Nuevo Laredo																						
Chihuahua																						
Hermosillo																						
Durango																						
Tripic																						
Campesina																						
Cuicatlan																						
Cuicatlan																						
Oaxaca																						
Zacatecas																						
Colima																						
Morelia																						
Queretaro																						
Chalca																						
Tapachula																						
Coahuila																						
Observaciones																						

Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

Notes: (1) Including Electricity, Gas Steam, Air conditioning and Water Supply and (2) Including Financial Services. Robust standard errors in brackets *** p<0.01, ** p<0.05, * p<0.1.

Table A2.3.5. 50/75 Interquantile regressions, México (1987-2008)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
Gender (base: male)	-0.0266**	-0.0306***	-0.0258***	-0.0258***	-0.0271***	-0.0287***	-0.0287***	-0.0287***	-0.0287***	-0.0287***	-0.0287***	-0.0287***	-0.0287***	-0.0287***	-0.0287***	-0.0287***	-0.0287***	-0.0287***	-0.0287***	-0.0287***	-0.0287***	-0.0287***	
Marital status (base: married)	-0.0066	-0.0175**	-0.0272***	-0.0015	-0.0170***	0.0225	0.0034	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040
Single	[0.0126]	[0.0077]	[0.0045]	[0.0045]	[0.0045]	[0.0045]	[0.0045]	[0.0045]	[0.0045]	[0.0045]	[0.0045]	[0.0045]	[0.0045]	[0.0045]	[0.0045]	[0.0045]	[0.0045]	[0.0045]	[0.0045]	[0.0045]	[0.0045]	[0.0045]	
Other	-0.0033	0.0021	-0.0023*	-0.0023*	-0.0023*	-0.0023*	-0.0023*	-0.0023*	-0.0023*	-0.0023*	-0.0023*	-0.0023*	-0.0023*	-0.0023*	-0.0023*	-0.0023*	-0.0023*	-0.0023*	-0.0023*	-0.0023*	-0.0023*	-0.0023*	
Education level (base: primary)	-0.0119	-0.0317	0.0203*	-0.0203*	-0.0317	-0.0414***	-0.0389***	-0.0389***	-0.0389***	-0.0389***	-0.0389***	-0.0389***	-0.0389***	-0.0389***	-0.0389***	-0.0389***	-0.0389***	-0.0389***	-0.0389***	-0.0389***	-0.0389***	-0.0389***	-0.0389***
No schooling or primary completion	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	
Secondary	0.0192***	0.0138***	0.0313***	0.0313***	0.0313***	0.0313***	0.0313***	0.0313***	0.0313***	0.0313***	0.0313***	0.0313***	0.0313***	0.0313***	0.0313***	0.0313***	0.0313***	0.0313***	0.0313***	0.0313***	0.0313***	0.0313***	
Upper secondary	0.0609***	0.0409***	0.0769***	0.0769***	0.0769***	0.0769***	0.0769***	0.0769***	0.0769***	0.0769***	0.0769***	0.0769***	0.0769***	0.0769***	0.0769***	0.0769***	0.0769***	0.0769***	0.0769***	0.0769***	0.0769***	0.0769***	
Higher or tertiary	0.0709***	0.0591***	0.1029***	0.1029***	0.1029***	0.1029***	0.1029***	0.1029***	0.1029***	0.1029***	0.1029***	0.1029***	0.1029***	0.1029***	0.1029***	0.1029***	0.1029***	0.1029***	0.1029***	0.1029***	0.1029***	0.1029***	
Occupation (base: Salary earners)	0.0157	0.0114	0.0251*	0.0157	0.0251*	0.0353***	0.0623***	0.0623***	0.0623***	0.0623***	0.0623***	0.0623***	0.0623***	0.0623***	0.0623***	0.0623***	0.0623***	0.0623***	0.0623***	0.0623***	0.0623***	0.0623***	0.0623***
Professionals and technicians	[0.0126]	[0.0081]	[0.0040]	[0.0040]	[0.0040]	[0.0040]	[0.0040]	[0.0040]	[0.0040]	[0.0040]	[0.0040]	[0.0040]	[0.0040]	[0.0040]	[0.0040]	[0.0040]	[0.0040]	[0.0040]	[0.0040]	[0.0040]	[0.0040]	[0.0040]	
Agricultural workers	0.0399	-0.102***	-0.0923	0.111	0.0016	0.0462	0.078	0.078	0.078	0.078	0.078	0.078	0.078	0.078	0.078	0.078	0.078	0.078	0.078	0.078	0.078	0.078	
Social directors and Supervisors	0.0325**	0.0407**	0.0520**	0.0623**	0.0520**	0.0520**	0.0520**	0.0520**	0.0520**	0.0520**	0.0520**	0.0520**	0.0520**	0.0520**	0.0520**	0.0520**	0.0520**	0.0520**	0.0520**	0.0520**	0.0520**	0.0520**	
Operators and transport workers	[0.0073]	[0.0024]	[0.0078]	[0.0013]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	
Salespersons and personal service workers	0.0588**	0.0935**	0.0377**	0.0229	0.0416**	0.0155**	0.0300**	0.0300**	0.0300**	0.0300**	0.0300**	0.0300**	0.0300**	0.0300**	0.0300**	0.0300**	0.0300**	0.0300**	0.0300**	0.0300**	0.0300**	0.0300**	
Expansive	[0.0037]	[0.0029]	[0.0030]	[0.0030]	[0.0030]	[0.0030]	[0.0030]	[0.0030]	[0.0030]	[0.0030]	[0.0030]	[0.0030]	[0.0030]	[0.0030]	[0.0030]	[0.0030]	[0.0030]	[0.0030]	[0.0030]	[0.0030]	[0.0030]	[0.0030]	
Expansive required	0.00172	-0.00005	0.00238*	0.00238*	0.00238*	0.00238*	0.00238*	0.00238*	0.00238*	0.00238*	0.00238*	0.00238*	0.00238*	0.00238*	0.00238*	0.00238*	0.00238*	0.00238*	0.00238*	0.00238*	0.00238*	0.00238*	
Economic sector (base: Industry and mining sector (I))	0.0393	0.0504***	0.0146	0.0511***	0.0146	0.0113	0.0279	0.0468*	0.0783*	0.0477	0.0789**	0.0461**	0.0892**	0.0461**	0.0892**	0.0461**	0.0892**	0.0461**	0.0892**	0.0461**	0.0892**	0.0461**	
Manufacturing	[0.0078]	[0.0186]	[0.0111]	[0.0111]	[0.0111]	[0.0111]	[0.0111]	[0.0111]	[0.0111]	[0.0111]	[0.0111]	[0.0111]	[0.0111]	[0.0111]	[0.0111]	[0.0111]	[0.0111]	[0.0111]	[0.0111]	[0.0111]	[0.0111]	[0.0111]	
Construction	-0.0204**	-0.0207	-0.0253	-0.0253	-0.0253	-0.0253	-0.0253	-0.0253	-0.0253	-0.0253	-0.0253	-0.0253	-0.0253	-0.0253	-0.0253	-0.0253	-0.0253	-0.0253	-0.0253	-0.0253	-0.0253	-0.0253	
Trade	-0.0211**	-0.0239**	-0.0233*	-0.0169**	-0.0169**	0.0078	0.0078	0.0078	0.0078	0.0078	0.0078	0.0078	0.0078	0.0078	0.0078	0.0078	0.0078	0.0078	0.0078	0.0078	0.0078	0.0078	
Services	[0.0091]	[0.0041]	[0.0031]	[0.0046]	[0.0039]	[0.0039]	[0.0039]	[0.0039]	[0.0039]	[0.0039]	[0.0039]	[0.0039]	[0.0039]	[0.0039]	[0.0039]	[0.0039]	[0.0039]	[0.0039]	[0.0039]	[0.0039]	[0.0039]	[0.0039]	
Transport, Storage and Communications	0.0259**	0.0353**	0.0314**	0.0623**	0.0353**	0.0353**	0.0353**	0.0353**	0.0353**	0.0353**	0.0353**	0.0353**	0.0353**	0.0353**	0.0353**	0.0353**	0.0353**	0.0353**	0.0353**	0.0353**	0.0353**	0.0353**	
Services Sector (I)	[0.0030]	[0.0146]	[0.0066]	[0.0038]	[0.0038]	[0.0038]	[0.0038]	[0.0038]	[0.0038]	[0.0038]	[0.0038]	[0.0038]	[0.0038]	[0.0038]	[0.0038]	[0.0038]	[0.0038]	[0.0038]	[0.0038]	[0.0038]	[0.0038]	[0.0038]	
Private (base: micro)	-0.0181	-0.0051*	0.00177	0.0130**	0.00177	0.0133**	0.0142**	0.0085	0.0085	0.0085	0.0085	0.0085	0.0085	0.0085	0.0085	0.0085	0.0085	0.0085	0.0085	0.0085	0.0085	0.0085	
Small	[0.0148]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	[0.0010]	
Medium and Large	-0.0259**	-0.0259**	-0.0259**	-0.0259**	-0.0259**	-0.0259**	-0.0259**	-0.0259**	-0.0259**	-0.0259**	-0.0259**	-0.0259**	-0.0259**	-0.0259**	-0.0259**	-0.0259**	-0.0259**	-0.0259**	-0.0259**	-0.0259**	-0.0259**	-0.0259**	
Urban area (base: Mexico City)	0.0239***	-0.0122	-0.0093	-0.0055	-0.0122	-0.0137***	-0.0137***	-0.0137***	-0.0137***	-0.0137***	-0.0137***	-0.0137***	-0.0137***	-0.0137***	-0.0137***	-0.0137***	-0.0137***	-0.0137***	-0.0137***	-0.0137***	-0.0137***	-0.0137***	
Quintiles	[0.0072]	[0.0230]	[0.0107]	[0.0072]	[0.0072]	[0.0072]	[0.0072]	[0.0072]	[0.0072]	[0.0072]	[0.0072]	[0.0072]	[0.0072]	[0.0072]	[0.0072]	[0.0072]	[0.0072]	[0.0072]	[0.0072]	[0.0072]	[0.0072]	[0.0072]	
Money	-0.0128*	-0.0045	-0.0049	-0.00264	-0.00264	-0.00264	-0.00264	-0.00264	-0.00264	-0.00264	-0.00264	-0.00264	-0.00264	-0.00264	-0.00264	-0.00264	-0.00264	-0.00264	-0.00264	-0.00264	-0.00264	-0.00264	
Public	[0.0070]	[0.0191]	[0.0189]	[0.0088]	[0.0088]	[0.0088]	[0.0088]	[0.0088]	[0.0088]	[0.0088]	[0.0088]	[0.0088]	[0.0088]	[0.0088]	[0.0088]	[0.0088]	[0.0088]	[0.0088]	[0.0088]	[0.0088]	[0.0088]	[0.0088]	
Loan	0.0297*	-0.0172**	0.0098**	-0.0217	-0.0217	-0.0217	-0.0217	-0.0217	-0.0217	-0.0217	-0.0217	-0.0217	-0.0217	-0.0217	-0.0217	-0.0217	-0.0217	-0.0217	-0.0217	-0.0217	-0.0217	-0.0217	
Tax	[0.0145]	[0.0024]	[0.0032]	[0.0194]	[0.0194]	[0.0194]	[0.0194]	[0.0194]	[0.0194]	[0.0194]	[0.0194]	[0.0194]	[0.0194]	[0.0194]	[0.0194]	[0.0194]	[0.0194]	[0.0194]	[0.0194]	[0.0194]	[0.0194]	[0.0194]	
Tax	-0.0102	-0.0109**	-0.0111**	-0.0241**	-0.0241**	-0.0241**	-0.0241**	-0.0241**	-0.0241**	-0.0241**	-0.0241**	-0.0241**	-0.0241**	-0.0241**	-0.0241**	-0.0241**	-0.0241**	-0.0241**	-0.0241**	-0.0241**	-0.0241**	-0.0241**	
See Last Panel	[0.0054]	[0.0054]	[0.0054]	[0.0054]	[0.0054]	[0.0054]	[0.0054]	[0.0054]	[0.0054]	[0.0054]	[0.0054]	[0.0054]	[0.0054]	[0.0054]	[0.0054]	[0.0054]	[0.0054]	[0.0054]	[0.0054]	[0.0054]	[0.0054]	[0.0054]	
Mix	-0.0123***	-0.0133***	-0.0179***	-0.0119	-0.0119	-0.0119	-0.0119	-0.0119	-0.0119	-0.0119	-0.0119	-0.0119	-0.0119	-0.0119	-0.0119	-0.0119	-0.0119	-0.0119	-0.0119	-0.0119	-0.0119	-0.0119	
China	0.00649	0.00024	-0.0200**	-0.0208	-0.0208	-0.0208	-0.0208	-0.0208	-0.0208	-0.0208	-0.0208	-0.0208	-0.0208	-0.0208	-0.0208	-0.0208	-0.0208	-0.0208	-0.0208	-0.0208	-0.0208	-0.0208	
China	[0.0127]	[0.0030]	[0.00975]	[0.0224]	[0.0224]	[0.0224]	[0.0224]	[0.0224]	[0.0224]	[0.0224]	[0.0224]	[0.0224]	[0.0224]	[0.0224]	[0.0224]	[0.0224]	[0.0224]	[0.0224]	[0.0224]	[0.0224]	[0.0224]	[0.0224]	
Tempo	-0.015	-0.00674*	-0.0199**	-0.0113	-0.0113	-0.0113	-0.0113	-0.0113	-0.0113	-0.0113	-0.0113	-0.0113	-0.0113	-0.0113	-0.0113	-0.0113	-0.0113	-0.0113	-0.0113	-0.0113	-0.0113	-0.0113	
Tempo	[0.0199]	[0.0036]	[0.00136]	[0.00136]	[0.00136]	[0.00136]	[0.00136]	[0.00136]	[0.00136]	[0.00136]	[0.00136]	[0.00136]	[0.00136]	[0.00136]	[0.00136]	[0.00136]	[0.00136]	[0.00136]	[0.00136]	[0.00136]	[0.00136]	[0.00136]	

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008		
Oaxaca	0.0601*** [0.00413]	0.0637*** [0.0200]	-0.0039*** [0.00230]	-0.0437*** [0.0178]	-0.0444*** [0.0220]	-0.0107*** [0.00230]	-0.0234*** [0.00230]	-0.0144*** [0.00230]	-0.0144*** [0.00230]	-0.0144*** [0.00230]	-0.0144*** [0.00230]	-0.0144*** [0.00230]	-0.0144*** [0.00230]	-0.0144*** [0.00230]	-0.0144*** [0.00230]	-0.0144*** [0.00230]	-0.0144*** [0.00230]	-0.0144*** [0.00230]	-0.0144*** [0.00230]	-0.0144*** [0.00230]	-0.0144*** [0.00230]	-0.0144*** [0.00230]	-0.0144*** [0.00230]	
Veracruz	0.0243*** [0.00841]	0.0105 [0.0015]	0.0350*** [0.00631]	-0.0324*** [0.00818]	-0.0167*** [0.00413]	-0.0610*** [0.0133]	-0.0294*** [0.00133]	-0.0348 [0.0222]	-0.0371*** [0.00939]	-0.0255*** [0.00439]	-0.0255*** [0.00439]	-0.0365*** [0.0105]	-0.0365*** [0.0105]	-0.0365*** [0.0105]	-0.0365*** [0.0105]	-0.0365*** [0.0105]	-0.0365*** [0.0105]	-0.0365*** [0.0105]	-0.0365*** [0.0105]	-0.0365*** [0.0105]	-0.0365*** [0.0105]	-0.0365*** [0.0105]	-0.0365*** [0.0105]	-0.0365*** [0.0105]
Aguascalientes																								
Mérida																								
Toluca																								
Sanluis																								
Villahermosa																								
Tuxtla Gutiérrez																								
Chihuahua																								
Tijuana																								
Matamoros																								
Nuevo Laredo																								
Chihuahua																								
Hermosillo																								
Durango																								
Tepic																								
Compuche																								
Cuernavaca																								
Coahuila de Zaragoza																								
Oaxaca																								
Zacatecas																								
Colima																								
Michoacán																								
Querétaro																								
Chalco																								
Imperial																								
Constant	0.1868*** [0.0274]	0.228*** [0.00415]	0.236*** [0.00983]	0.243*** [0.0145]	0.243*** [0.0145]	0.270*** [0.0110]	0.270*** [0.0110]	0.267*** [0.0110]	0.274*** [0.0110]	0.251*** [0.0097]	0.254*** [0.0144]	0.263*** [0.0144]	0.263*** [0.0144]	0.263*** [0.0144]	0.263*** [0.0144]	0.263*** [0.0144]	0.263*** [0.0144]	0.263*** [0.0144]	0.263*** [0.0144]	0.263*** [0.0144]	0.263*** [0.0144]	0.263*** [0.0144]	0.263*** [0.0144]	
Observations	28630	33072	31142	34966	34832	67266	69688	71564	68074	71053	72738	76335	84665	93249	91179	87766	78070	35366	55742	55913	55800	54348		

Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

Notes: (1) Including Electricity, Gas Steam, Air conditioning and Water Supply and (2) Including Financial Services. Robust standard errors in brackets *** p<0.01, ** p<0.05, * p<0.1.

Annex 2.4. Decomposition of changes in wage distribution by sub-periods

I estimate cross-sectional decomposition of changes in wage distribution in three sub-periods, namely, 1987-1994 (pre-NAFTA); 1994-2001 (post-NAFTA) and 2001-2008. Table A2.4.1 shows the decomposition results in three subperiods. In particular, we report the estimated variation over time of some selected quantiles (10, 25, 50, 75, 90), and the related decomposition into the three components.⁷⁹ In a general way, I find different results in the three periods they are related to the trends of the inequality wage explained previously.

From 1987-1994, it comes out that the coefficients component (between) is negative to 10th, 25th, 50th and 75th and it increases in magnitude along the wage distribution, ranging from -0.331 at 10th percentile to -0.418 at the 50th percentile and -0.140 at the 75th.⁸⁰ However, at the 90th is positive (0.129). This implies that in the lower part of the distribution the decline of the price of human capital would have generated a shift to the left of the wage schedule, mainly concentrated in the right tail of the distribution, for residual components. This negative coefficients component is consistent with the dynamics of educational wage premia in Mexico. Airola and Juhn (2005), López-Acevedo (2006), Campos-Vázquez (2009) and Popli (2011) show that educational wage premia decreased over the period 1987-1994, and across the whole wage distribution.⁸¹ As for the covariates component, it is always negative and increasing along the wage distribution except at the 90th while the residual contribution is quite negligible at the 50th from lower and upper parts of the distribution becomes are relevant.

Indeed, these findings on the variations of selected quantiles of the wage distribution help to understand the dynamic relationship between the human capital attainments of the workforce and wage inequality (Autor *et al.*, 2005, Melly, 2005). Finally in Figures A2.4.1, A2.4.2 and A2.4.3 plot the decomposition results at 999 different quantiles placed on the x-axis and Figures A2.4.4a-c show the total of residuals effect in the decomposition.

⁷⁹ It is worth noting that the estimated variations at the selected quantiles fit well the observed variations, as well as the inequality indexes. This provides additional evidence in favour of the quantile decomposition method.

⁸⁰ Note that these variations are computed as differences of log wages of the estimated (or of the counterfactual) distributions. This means that the variations over time are given by the difference of two logarithms, i.e. a growth rate.

⁸¹ The results of Campos-Vázquez (2009) hold using two decomposition approach (Machado and Mata and Bound and Johnson decompositions), while Popli (2011) uses the Fields decomposition.

From 1994 to 2001 the coefficients (between) component is negative at the bottom and upper -0.125 and -0.017 respectively. This implies that the decline of the price of human capital would have generated a shift to the left of the wage schedule at the 10th percentile, for the covariates. However, at the 90th percentile decline responds to the slight negative effect to the covariate and residual components.

As for the covariates component, it is positive at the bottom of the wage distribution and slightly decreasing at the 75th and 90th percentile are negative, while the residual contribution is negative in all percentiles except in the median of the wage and becomes relevant at the 10th and 50th percentile.

In the period from 1994 to 2001 the wages suffer a substantially percentage change and the inequality decline at the middle of the distribution (Chapter 1). At the 25th, 50th and 75th we found that the coefficients component is positive and it increases in magnitude, ranging from 0.004 at the 25th percentile to 0.122 at the 75th percentile. This implies that the increase of the price of human capital would generated a shift to the right of the wage and the positive effect of characteristics on the median (e.g. at the 25th percentile) indicates that the workers' attributes had been rewarded the same in 2001 as in 1994, wages should have risen at the middle class in 2001. Moreover, the lower level of wages is explained by changes in coefficients, that is how workers characteristics are rewarded. Melly support this affirmation to explain that this is mainly the consequence of a lower constant and not the lower return to human capital characteristics. These results suggest that some factors that are effective in reducing dispersion at the bottom of the distribution.

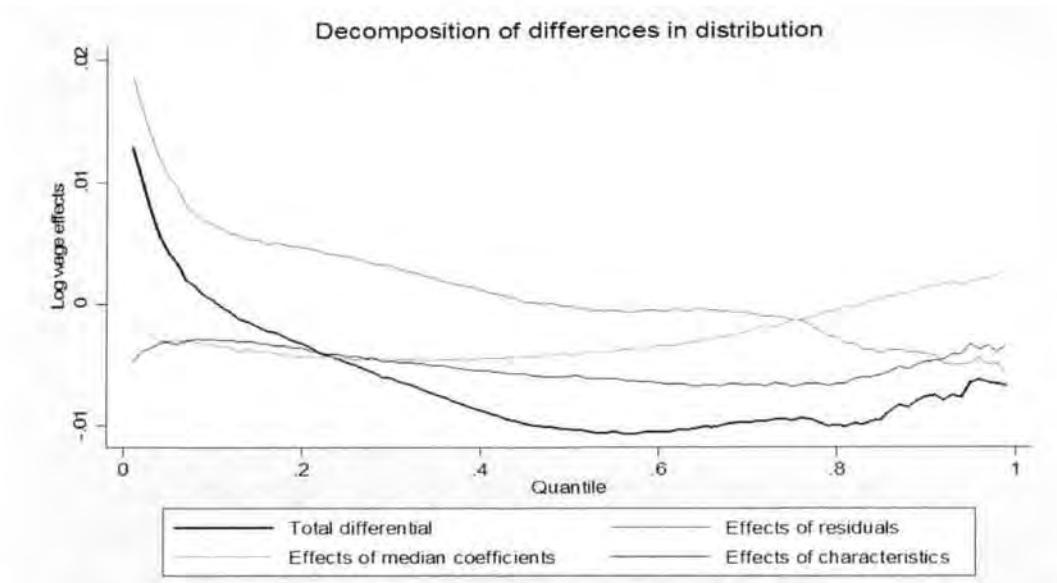
Between 2001 and 2008 the coefficient component turns out to be negative at the 10th, 25th and 50th percentiles and positive at the 75th and 90th percentiles. Furthermore, the within component displays an asymmetric impact on the wage distribution being negative at the lower quantiles (-0.230 at the 10th, -0.183 at the 25th and -0.197 at the 50th) and positive at the upper quantiles (0.354 at the 75th and 0.412 at 90th). The interplay between these forces determines the changes in the wage structure at the selected quantiles. In particular, below the median wage the positive impact of the coefficients component is dominated by the negative impact of the covariates component.

Table A2.4.1. Quantile and inequality decomposition in the contributions related to covariates, coefficients (between) and residuals (within) in Mexico, by subperiods

	10th quant. (%)	25th quant. (%)	Median (%)	75th quant. (%)	90th quant. (%)	90/10 (%)	50/10 (%)	90/50 (%)
Subperiod (1987-1994)								
Total estimated variation	0.037 (0.0044)	-0.474 (0.0027)	-1.033 (0.0000)	-0.963 (0.0017)	-0.769 (0.0039)	-0.806	-1.070	0.265
Covariates contribution	-0.289 (0.0011)	-0.423 (0.0008)	-0.596 (0.0007)	-0.688 (0.0011)	-0.479 (0.0010)	-0.190	-0.307	0.117
Coefficients contribution (between)	-0.331 (0.0025)	-0.443 (0.0010)	-0.418 (0.0016)	-0.140 (0.0043)	0.129 (0.0049)	0.460	-0.087	0.546
Residual contribution (within)	0.657 (0.0031)	0.391 (0.0025)	-0.020 (0.0022)	-0.135 (0.0037)	-0.418 (0.0019)	-1.076	-0.677	-0.399
Subperiod (1994-2001)								
Total estimated variation	-0.033 (0.0021)	0.150 (0.0000)	0.330 (0.0007)	0.087 (0.0029)	-0.196 (0.0044)	-0.163	0.363	-0.526
Covariates contribution	0.270 (0.0003)	0.195 (0.0001)	0.073 (0.0003)	-0.030 (0.0015)	-0.080 (0.0017)	-0.350	-0.197	-0.154
Coefficients contribution (between)	-0.125 (0.0002)	0.004 (0.0001)	0.124 (0.0010)	0.122 (0.0033)	-0.017 (0.0085)	0.108	0.249	-0.141
Residual contribution (within)	-0.178 (0.0022)	-0.050 (0.0002)	0.133 (0.0020)	-0.005 (0.0078)	-0.098 (0.0058)	0.079	0.310	-0.231
Subperiod (2001-2008)								
Total estimated variation	0.402 (0.0001)	0.447 (0.0014)	0.269 (0.0033)	0.243 (0.0075)	-0.492 (0.0129)	-0.894	-0.133	-0.761
Covariates contribution	-0.025 (0.0010)	-0.020 (0.0013)	0.010 (0.0021)	0.117 (0.0042)	0.192 (0.0051)	0.217	0.035	0.182
Coefficients contribution (between)	0.657 (0.0002)	0.650 (0.0000)	0.456 (0.0000)	-0.228 (0.0007)	-1.096 (0.0014)	-1.753	-0.200	-1.553
Residual contribution (within)	-0.230 (0.0013)	-0.183 (0.0001)	-0.197 (0.0012)	0.354 (0.0026)	0.412 (0.0064)	0.642	0.032	0.610

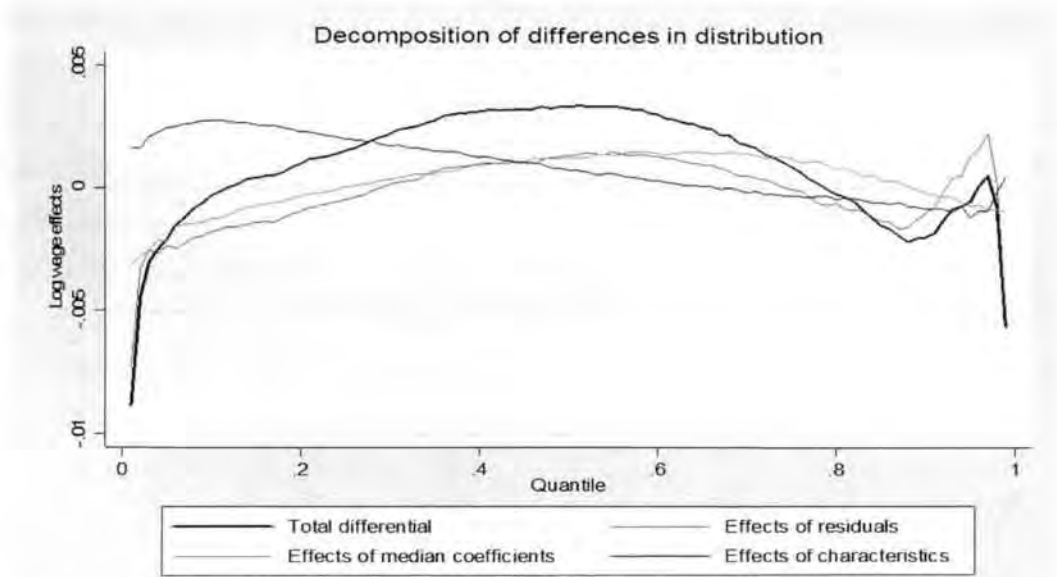
Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.
 Note: the results have been multiplied by 100. Bootstrap standard errors with 100 replications in parentheses.

Figure A2.4.1. Decompositions of differences in distribution using quantile regression, 1987-1994



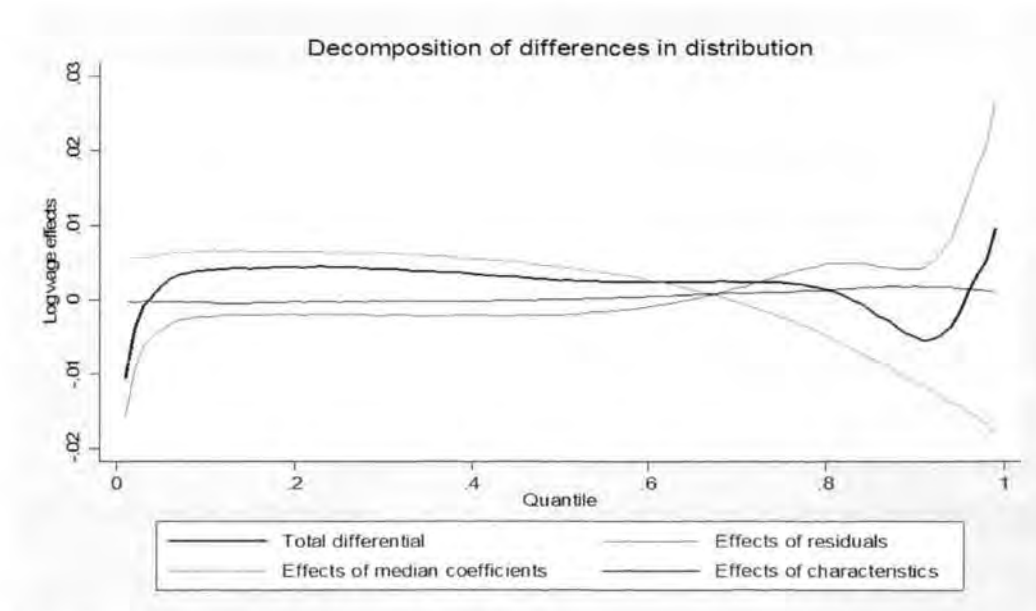
Source: Own elaboration from ENEU-ENOE 1987-1994.

Figure A2.4.2. Decompositions of differences in distribution using quantile regression, 1994-2001



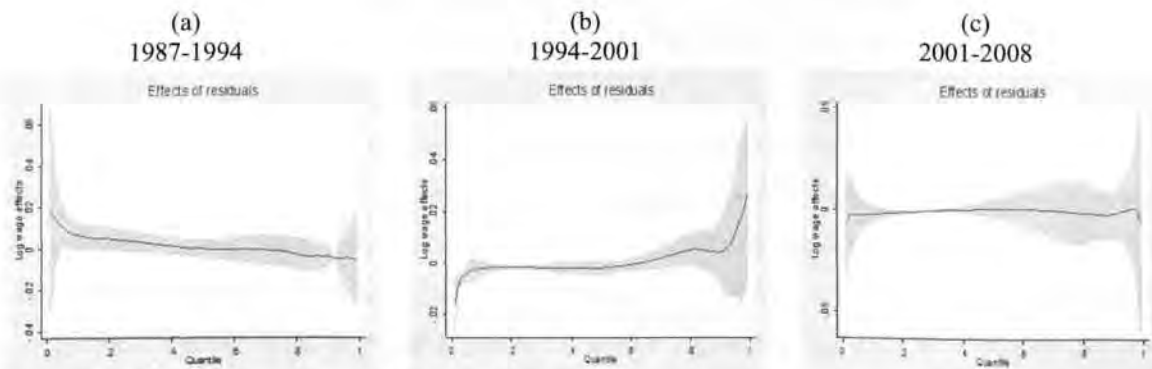
Source: Own elaboration from ENEU-ENOE 1994-2001.

Figure A2.4.3. Decompositions of differences in distribution using quantile regression, 2001-2008



Source: Own elaboration from ENEU-ENOE 2001-2008.

Figure A2.4.4a-c. Total residual effects of decomposition in distribution using quantile regression, 1987-2008



Source: Own elaboration from ENEU-ENOE 1987-2008.

Table A.2.4.1, also shows the standard inequality indexes (90-10, 50-10 and 90-50). We observe that the upper tail (90/50) of the wage distribution increases, while a wage compression is observed in the lower tail, i.e., the 50/10 index decreases since wages of low skilled group (10th) declined less than wages of individuals around the median wage level.

Considering the impact of the decomposition components on wage inequality, the coefficients (between) effect is negative for the changes of the 50/10 log wage ratio, while it is positive for the changes of both the 90/10 and the 90/50 log wage ratios. This negative price effect in 50/10 is reinforced by a less relevant negative covariates component and positive in the 90/10 and the 90/50 ratios. As for within component, we observe a significant negative impact on the three inequality indexes, in the first period.

The extent to which the negative residual component offset both the negative coefficients and covariates components depends on their relative magnitude across the wage distribution. Actually, the falling 50/10 ratio is mainly explained by the negative covariates and residuals components, while the coefficient inequality drives the increases in wage inequality at the top of the wage distribution.⁸² In particular, the stability of the 90/50 index is explained by positive coefficients and covariates effects that are counterbalanced by a negative residual component, the 90/10 index increases is only related to the coefficients component.

In order to provide an interpretation of the within component, we resort to the “skill price theory” (Juhn, Murphy and Pierce, 1993, and Lemieux, 2002a), which basically underlines two main effects. On the one hand, the positive (negative) changes in the coefficients component exert a positive (negative) impact on the residual component, along the wage distribution, providing a measure for “unmeasured price skills” On the other hand, the residual component is also related positively at the bottom of the distribution between 1987 and 1994 and at the top of the distribution in 2001-2008 and there are offsetting by the covariate or coefficient components in the labor force.

To sum up, the picture we get from these decomposition exercises could be explained by the fact that labor demand might have increased less than the labor supply: in 1994 individuals employed in the labor market are more educated than those in 1987 but receive lower wages for the same level of education. In other words, this evidence suggests that in Mexico we do not observe the standard features related to a skill-biased change, which is usually defined as an increase of the relative demand of skilled workers stronger than the increase in its labor supply. This also means that in Mexico the choice of schooling could have been crowded out by the contents of the productive process, where high skilled workers are employed.

⁸² These results are also consistent with other analysis concerning Europe, such as Barth and Lucifora (2006), which document an increasing trend in within-group wage inequality, especially for tertiary education.

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Wage mobility and the decomposition of wage inequality in Mexico, 1987-2008

3.1. Introduction

The measurement of changes in the wage distribution and the measurement of wage mobility focus on two distinct aspects of the analysis of wage inequality. The former is concerned with how wages are distributed among individuals over a given period of time while the latter is related to how individual wages change over time.

During the last decade, the study of wage mobility has evolved into a substantial literature and many different summary measures of wage mobility have been proposed. However, the concept of income or wage mobility is much less clearly defined than the concept of income inequality. Despite the lack of agreement on the meaning of mobility and the validity of the different measures, a rapidly expanding literature has produced over the last years new axiomatic contents, analytical properties, and different applications using empirical data to describe income or wage dynamics⁸³. The availability of longitudinal datasets has also made possible to carry out systematic empirical studies of wage mobility. In fact, the earlier literature on mobility measurement largely focused on summary mobility measures while the more recent literature has primarily been interested in establishing partial ordering conditions.⁸⁴ This evolution displays a similar path to early literature focusing on income inequality and poverty measurement.

⁸³ This importance has long been recognized by researchers. For example, Prais (1955) initiated the study of mobility measurement, expressed the need to appraise "... the statistical errors in the estimation of the transition matrix" and believed that such a practice was "rather important". Despite Prais' awareness, until recently there were no serious attempts to address this issue and the confidence bounds surrounding mobility measures were largely ignored. Several researchers, e.g. Trede (1999), Schluter (1998) and Maasoumi and Trede (2001) have taken up this issue and begun to devise statistical inference procedures for the measurement of mobility. These newly proposed procedures test mobility measures based upon transition matrices as well as the inequality reducing mobility measures proposed by Shorrocks (1978a) and Maasoumi and Zandvakili (1986). For a review of these measures, see Bartholomew (1996), Maassoumi (1997), and Fields and Ok (1999b).

⁸⁴ The literature of partial mobility orderings argues that income mobility is a multifaceted concept and no single measure can capture all the relevant characteristics of this concept. Thus, instead of seeking summary measures, researchers have derived dominance conditions similar to the Lorenz curve device in the measurement of income inequality. As a consequence, partial mobility orderings draw much more solid conclusions than a single or even several summary measures but may be unable to rank order all income generating regimes. Virtually all studies that seek to derive welfare

Previous studies for Mexico focusing on the evolution of income (or earnings) were carried out using comparable cross-sections and not longitudinal data sets (see, for instance, Lustig and Székely, 1999 and Cortés, 2000). In fact, many of these studies have focused on the evolution of poverty and inequality over time, but since they did not follow the same individuals, they do not constitute “real” mobility studies.

One of the exceptions is the mobility study using the ENEU surveys (1987-2002) by Duval (2006). This author analysed the average earnings mobility in urban areas of Mexico using a stochastic dominance analysis over the distribution of income finding that in the late eighties and early 2000 is when the individuals experienced the higher upward earning mobility and that after the 1994 Peso crisis, individuals experienced large losses. In a second work, Duval (2007) analysed the relationship between initial earnings and the determinants of mobility and he found a positive result for some groups and in the Border regions between 1987 and 1993. Wodon (2001) and Yitzhaki and Wodon (2003) also examined aggregate earnings mobility in Mexico and the *Time dependence* in economic positions: the first author, comparing urban areas in Mexico and Argentina and the second author, focusing only in Mexican rural areas.

Summarising, the available studies of income mobility for Mexico provide evidence of relatively high earnings mobility. However, most of these changes seem to be transitory and, to a great extent, they have failed to alter the long-term position of individuals along the income distribution. It is worth mentioning that data limitations have only made possible to analyse mobility during short periods of time and, so, this reduces the possibility of analysing to what extent this short-term mobility translates into an inequality reduction over a longer period of time.⁸⁵

In this chapter, my objective is to contribute to this literature exploring the links between wage inequality and wage mobility using microdata for Mexican urban regions. Using a set of established techniques, I first measure mobility and inequality and, second, I analyse the interaction between both using the decomposition method proposed by Jenkins and Van Kerm (2006). The hypothesis I want to test is if mobility varies over the distribution and tends to reduce structural inequality and, if this is the case, then it could be understood as an element of progressivity in wage growth, or, on the opposite, if this hypothesis does not hold, and mobility tends to increase inequality. In other

implications from mobility analysis rely upon the partial order approach to ranking income generating regimes (see Formby *et al.*, 2004).

⁸⁵ In a different way, there is a set of studies on *economic mobility* in Mexico that analyses other types of variables like education (Binder and Woodruff, 2002; Dahan and Gaviria, 2001; Behrman *et al.*, 2001), occupation (Latapi, 1992), sector of economic activity (Ibarlucea, 2003), and regional convergence in earnings (Aguayo-Tellez, 2006).

words, I want to test if rising (or decreasing) wage inequality is accompanied by similar trends in wage mobility in the short-term and in the long-term, so that we can affirm (or not) that wage growth has been or not *pro-poor* in urban areas.

In studies that have addressed similar issues, it has been common to measure the trends in the shape of distribution independently on the measurement of wage earnings or income mobility.⁸⁶ A wide array of methods has been used to measure wage mobility.⁸⁷ The main contribution of this chapter is to address jointly the measurement of distributional trends and mobility (and its trends).

Given the lack of evidence for developing countries and, particularly, for Mexico, the analysis of the relationship between wage mobility and wage inequality is particularly relevant. This chapter tries to contribute to the literature in two different ways. First, it provides a descriptive analysis of short-term and long-term mobility for five Mexican regions where data are available. Second, it focuses on the relationship between mobility and inequality using the previously mentioned methodology, in which, the implicit assumption is that wage movements over time are ‘progressive’.

The empirical analysis concentrates on Mexico from 1987 to 2008, a period in which the country experienced different trends of inequality and wage distributional changes. Moreover, I compare the differences among regions (Border, North, Centre, Capital and South). I estimate inequality changes and decomposition thereof considering annual wages for two consecutive years (21 years) and in three different moments (1987-88, 1997-98 and 2007-08) taking into account different subgroups (age, education, size firm and economic sector). The panels have been constructed using quarterly waves of the he National Survey of Labour and Employment (ENOE) and the National Urban Employment Survey (ENEU) carried out by National Institute of Statistics and Geography of Mexico (INEGI).

The rest of this chapter is organized as follows. Section 3.2 summarises the literature related to wage mobility and wage inequality. Section 3.3 describes the data used in the chapter and the applied methodology to construct the transition matrices, different indices of mobility and the decomposition of wage inequality in the short-term and in the long-term. Next, section 3.4 presents

⁸⁶ See, among others, Schluter (1998), Burkhauser and Poupore (1997) or Maasoumi and Trede (2001).

⁸⁷ An excellent summary for Latin America countries about mobility, how can it be measured and how it can differ from inequality can be found in Fields *et al.* (2006).

the empirical application and discusses the results. Section 3.5 concludes summarising the main results.

3.2. Review of the literature: mobility and inequality

The degree of wage mobility is an important complement to wage inequality studies. Most people are concerned with upward mobility. But upward mobility means different things to different people, for instance upward mobility can be understood as increasing inflation-adjusted wages or increasing real income or as upward movements along the income distribution. In consequence, social scientists have developed several measures to examine the different concepts of income or wage mobility using a variety of methods and longitudinal data sources.⁸⁸

In the last two decades, there is an extensive literature related to the analysis of wage (earnings) inequality, both from a theoretical and empirical perspective (see Katz and Autor, 1999 for a summary of the studies). However, there is a clear difference between those studies focused on the evolution of wage inequality and those concentrating on the analysis of wage mobility. In fact, the research on wage mobility is still limited (at least, in relative terms).⁸⁹

Prais (1955) proposed the first measure of income mobility although interests in quantifying the phenomenon go back much earlier (e.g., Ginsberg, 1929). Other researchers such as Shorrocks (1978a and 1978b) and Sommers and Conlisk (1979) approached mobility as a reranking phenomenon, this is, individuals switch positions in income rankings. According to this approach, mobility is a purely relative concept. However, on the contrary, Fields and Ok (1996, 1999a) think about the concept in absolute terms and they consider that mobility arises as soon as individuals move away from their initial wage levels.⁹⁰

⁸⁸ See Fields (2010).

⁸⁹ In contrast to theoretical and applied literature on income inequality as highlighted by Paul (2009).

⁹⁰ Most researchers measure mobility directly by following a specific characterization of mobility, but some others (i.e., Atkinson and Micklewright, 1983; Kanbur and Stiglitz, 1986; Shorrocks, 1978a; Chakravarty *et al.*, 1985; and Dardanoni, 1993) measure mobility by exploring its implications for social welfare. With the availability of panel survey data both at the individual and household levels in the recent past, researchers have developed a variety of first-stage indices capturing different facets of mobility (eg. Shorrocks, 1978a; King, 1983; Chakravarty, *et al.*, 1985; Maasoumi and Zandvakili, 1986, Fields and Ok, 1996, 1999; Fields, 2010). Relatively few attempts have been made to construct mobility indices based on transition matrices (eg. Prais, 1955; Bartholomew, 1973; Bibby, 1975).

Following the first approach, Shorrocks (1978b) proposed a mobility index which measures the relative reduction of inequality across time and also developed some axiomatic properties of mobility index should take into account and he also showed the inconsistencies among previous proposals. Subsequently, the Shorrocks' index was generalized by Maasoumi and Zandvakili (1986) and it is frequently applied at empirical work.⁹¹ Taking this approach as a starting point, Cowell and Schluter (1998) classified the measures of income mobility into two categories of indices. In the first category, the indices are constructed using individual or household level panel data on using information on the income distribution for two different time periods. In the case of the second category, the data are first transformed into a transition matrix, which is then used to construct summary measures of mobility.⁹²

Both approaches have also considered the possibility of disaggregating the overall analysis of inequality. Some authors have focused on the analysis by population subgroups, such as those defined by age, race, among others, while other have preferred to analyse the sources of total income.⁹³

In general, the main findings related to the analysis of earnings mobility come from the consideration of panel data sets. Economists have analysed these data to determine both the level of mobility and its main determinants. This has permitted to identify the frequency of mobility, the determinants of this mobility and its impact across the distribution of wages. The arguments put forward to concentrate on the analysis of wage mobility (instead of wage inequality) usually relate to the achievement of a particular objective, namely equity (Sloane and Theodossiou, 2000). The implicit assumption is that a distribution of earnings with low inequality is more desirable than one with higher inequality. However, the earnings distribution is merely a snapshot of a complicated pattern of earnings dynamics, which is continuously changing through time, but, as Atkinson, *et al.* (1992) have remarked, mobility may be desired intrinsically (for example, as a contribution to the reduction of lifetime inequality).

Examining income inequality and mobility provide information on the dispersion of income and a snapshot of well-being. The debate is not closed (see, for instance, Lillard and Willis, 1978;

⁹¹ On this, see also Burkhauser and Poupore (1997).

⁹² Earlier studies often used the coefficient of correlation of income in two periods. See Atkinson *et al.* (1992) for a comprehensive overview of the literature.

⁹³ A number of studies have considered the disaggregation of income into different factor components and proposed methods for decomposing the overall inequality value into the corresponding component contributions (Rao, 1980; Fei *et al.*, 1978; Fields, 1979; Layard and Zabalza, 1979; Pyatt *et al.*, 1980).

Gottschalk, *et al.*, 1994; Buchinsky and Hunt, 1999 and OECD, 1997), although more recent studies are trying to explore changes in income inequality, growth and poverty simultaneously.

To analyse the moments in which growth income is pro-poor, Jenkins and Van Kerm (2006) and Grimm (2007)⁹⁴ point out, on the one hand, that if the growth income is defined as pro-poor (in a relative sense) ought to be based not on whether income inequality falls or rises but rather on whether those toward the bottom of the initial income distribution experience faster income growth than those toward the top. On the other hand, if the growth is pro-poor (in an absolute sense), it should be defined not on the basis of whether poverty has fallen but rather on the basis of whether there has been an increase in average income among those who were initially poor.

While the relationship between average income growth and changes in inequality and poverty is clearly of interest, it actually tells us little about how the fortunes of those who are initially poor change as average incomes rise. The reason is that people are unlikely to stay in the same position in the income distribution over time: in the move from one income distribution to another, some individuals move up the income distribution, while others move down.

One method to analyse the changes in income inequality was proposed by Jenkins and Van Kerm (2006). They decompose the change in the Gini coefficient over time as the difference between two components reflecting the degree of income mobility associated with the distributional change. They prove that the changes in the Gini coefficient between two points come about via two channels: (1) summarizing changes in relative positions of individuals, and (2) summarizing progressivity in income growth.⁹⁵ Since this paper, the decompositions derived here have been used in a number of studies including works by Arcos (1996), Fields *et al.* (1998), Sánchez and Núñez (1998), Fields and Mitchell (1999), Ravallion and Chen (1999), Fields and Yoo (2000), Contreras (2002), Contreras *et al.* (2007), Andersen (2000), Redmond and Kattuman (2001), Gindling and Trejos (2005), Heltberg (2003), Yun (2006) and Neilson *et al.* (2008). This is the method I will apply to analyse changes in wage inequality in Mexico during over the last two decades.

⁹⁴ Thus, Ravallion and Chen (2003) and Ravallion (2004) define growth as pro-poor (in an absolute sense) if it reduces poverty and if income inequality falls as growth occurs, while Kakwani and Pernia (2000) essentially define growth as pro-poor (in a relative sense). Dollar and Kraay (2002) conclude that 'growth is good for the poor' from their finding that 'there is no systematic relationship between average incomes and the share of income accruing to the poorest fifth of the income distribution' or in other words, on average, the incomes of the poor rise equi-proportionately with average incomes.

⁹⁵ This kind of decomposition is borrowed from the literature on taxation, e.g. Reynolds-Smolensky tax progressivity measures for the assessment of redistribution schemes (vertical and horizontal equity). For more details, see Reynolds and Smolensky (1977), King (1983) or Yitzhaki and Wodon (2004).

As previously mentioned, the research of mobility and earning dynamics in Mexico is limited. The papers studying income mobility in Mexico provide a picture of an economy with very high earnings mobility. However, most of these changes seem to be transitory and, to a great extent, they have failed to alter the long-term position of individuals in the income distribution (Wodon, 2001 and Wodon and Yitzhaki, 2002).⁹⁶ Cunningham and Maloney (2000), Maloney *et al.* (2004), World Bank (2004), among others, have also examined the vulnerability and the distribution of income shocks in Mexico, a clearly related topic to the analysis of income mobility. These authors found a substantial amount of heterogeneity in the distribution of shocks across population groups and different results of the effects of earnings changes between levels of education and poor and non-poor individuals.⁹⁷

Antman and McKenzie (2007a) also analysed micro-mobility in urban Mexico using pseudo-panels in which the incomes of specific age-education cohort groups are tracked from 1987 to 2001. They report little convergence between the earnings of rich and poor households 'absolute mobility' and a rapid and increasing conditional convergence of the household's earnings to its own average level 'conditional mobility'. In addition to that, they also exploited those pseudo-panels to test the existence of poverty traps in Mexico and to study the possibility of nonlinearities in household labour income dynamics.⁹⁸ From a different perspective, Duval (2006 and 2007) used the ENEU surveys between 1987 and 2002 to analyse issues of macro-mobility. In particular, he studied the evolution of directional mobility and the mobility as an equalizer of longer-term incomes for the whole economy as well as for several groups of the population. His results also show a much more detailed analysis of the relationship between earnings mobility and initial advantage, also

⁹⁶ Wodon (2001) has already been discussed under the literature review for Argentina. Wodon and Yitzhaki (2002) use a dataset related to the rural subsidies program PROCAMPO. The study was conducted in rural areas in Mexico in 1994 and 1997. Time-dependence in ranks is captured by the Gini index of mobility for four welfare measures: per capita income, per capita land owned, per capita land cultivated, and PROCAMPO transfers. In general, time-dependence in ranks is quite high in these rural samples, meaning that individuals preserve their ranks over time. Also, time-dependence is smaller using land measures than using per capita income. Finally, PROCAMPO caused limited reranking in the distribution.

⁹⁷ In particular, Cunningham and Maloney (2000) study the conditional earnings mobility distribution. The periods covered by these studies include before, during and after the 1994 Peso crisis, as well as 1998-2002. The authors find a substantial amount of heterogeneity in the distribution of shocks across population groups and small effects of earnings changes in the least educated and poor individuals. Finally, the authors show that the structure of the determinants of earnings changes is quite stable regardless of whether the economy is in recession or not. In opposite direction World Bank shows different conclusion, less educated households in rural areas seem to suffer greater shocks than the more educated ones. This study analyses consumption shocks and evaluates poverty between 1998 and 2000 with the PROGRESA dataset.

⁹⁸ They analyse urban households and reach the conclusion that there is no poverty traps for Mexican workers. Similar results have been obtained by Duval (2006) and Fields *et al.* (2006).

considering the robustness of his results to different types of measurement error in earnings and to the presence of attrition in the data.⁹⁹

A few studies have examined earnings mobility. One of the studies finding that earnings mobility has declined significantly over the years is Kopczuk *et al.* (2010). They find that changes in earnings mobility have been smaller than changes in inequality and the authors conclude that ‘changes in mobility have not substantially affected the evolution of inequality, so that annual snapshots of the distributions provide a good approximation of the evolution of the longer term measures of inequality’.

Finally, the idea to study wage mobility and inequality in Mexico can provide information on the relationship between (1) inequality in one year with inequality in another and (2) short-term inequality and long-term inequality. The trend in inequality is affected by wage growth and reranking or mobility within the wage distribution –whose wage grows and by how much affects inequality. Additionally, Gottschalk and Smeeding (1997) note that inequality in each subperiod and mobility across subperiods would both impact the inequality of permanent (or average) earnings.

3.3. Data sources, variable definition and methodology

3.3.1. Data sources and variable definition

The empirical analysis is carried out with data from the National Survey of Labour and Employment (ENOE) and the National Urban Employment Survey (ENEU) realised by the National Institute of Statistics and Geography of Mexico (INEGI).

From 1987 to 1991, data were collected from persons living in private households in 16 cities throughout the country and after that, every year the survey included more cities. So many as 2000, data were collected in the 48 biggest cities taking into account the 93% of total population living in the cities of more than 100,000 inhabitants. Mexico City, Guadalajara and Monterrey represent

⁹⁹ Also, the amounts of attrition in the panel and of non-reporting of the earnings variable are large, which calls for caution before generalizing the results found in the sample to the overall population.

about a quarter of the entire population.¹⁰⁰ Since 2004 the cover and the structure of the survey was again modified. Nowadays, the survey is a rotating panel drawn in 32 Mexican cities. This is the only quarterly household panel survey in Mexico and the rotating panel implies surveys a household for five quarters before replace it. The survey provides detailed information on the economic activities of all the household members older than twelve, such as employment status, employment conditions, working hours, labour income, characteristics of the workplace, etc., but no information on non-labour income. Nowadays, the ENOE covers the whole country and the sample has been increased to 126,000 individuals, approximately. The new survey stands out from the former because it includes new questions related to work experience, training, occupational mobility, migration and some specific variables to analyse informal jobs.

For the analysis in this chapter, I have built three panels using ENEU-ENOE from 1987 to 2008 in order to carry out a study on earnings mobility in the short-run.¹⁰¹ This chapter focuses on earnings mobility from the initial interview quarter to the same quarter next year (5 quarters). The survey follows individuals for at most five quarters, so, at most one observation of yearly earnings changes exists per individual.¹⁰²

These samples include workers between 15 and 65 years of age who work regularly full-time. The number of worked hours is associated to the principal job.¹⁰³ I chose not to incorporate the self-employed and seasonal or unpaid workers in order to focus on the formal or mainstream labour market and to avoid problems with dealing with retained or non-declared earnings. Some problems of missing individuals and non-reporting in the panel are related to disappearing from the sample in further re-interviews, to mismatch according to variables of age and education, to missing earnings or dwellings information and to outliers in the earnings variables. The main reason for missing individuals from the sample is attrition.¹⁰⁴

¹⁰⁰ See Villagomez (1998).

¹⁰¹ The short temporal coverage of each panel makes it impossible to draw conclusions on what happens with earnings mobility in the long-run. We created separate unbalanced panels of workers selecting only those individuals who are present in at least two consecutive quarters. Unfortunately, the ENEU and ENOE surveys only allow us to follow individuals in the short-term. Duval (2006) uses a similar panel analysis structure from 1987 to 2002 and many short-lived overlapping panels.

¹⁰² The variation in the number of individuals in each panel responds to the changes of the surveys, in particular, the enlargement or reduction of the sample of respondents or the inclusion of other metropolitan areas.

¹⁰³ The reason for applying these restrictions is to avoid having to analyse the mobility associated with first time entries into the labour force by young people who recently graduated from school, retirement decisions, and transitions-in-and-out of the labour force in general.

¹⁰⁴ The fact that the ENEU tracks dwellings and not households explains part of this high attrition. In any case, this extra peak in attrition is less worrisome as it is unlikely to be driven by economic reasons, and it probably does not generate much bias in the estimates. Besides attrition, the other categories more relevant for the exclusion of individuals from the sample are missing earnings reports, missing dwelling characteristics, and mismatches.

Wage and employment data are collected for the week before the survey date. Wages have been computed as hourly wages as the ratio between monthly earnings and the number of actual worked hours by week multiplied by 4.3. For individuals who report their wages as a multiple of the minimum wage, we assigned them the mean of the respective minimum wage in each city and year.¹⁰⁵ Real hourly wages have been obtained deflating nominal hourly wages by the consumer price index (INPC 2002), which is disaggregated in 46 different cities classified by locality size (small, medium and big). This structure permits to have data for at least one representative city in each state.¹⁰⁶

In order to analyse the main differences across Mexico's regions in terms of wage mobility, we will consider five different regions: 1) Border, 2) North, 3) Centre, 4) Capital and, 5) South regions.¹⁰⁷ The five regions cover the 62% of urban employment in Mexico. These regions are obtained by aggregating cities' data and they were proposed by Chiquiar (2005 and 2008), Hanson (2007) and Chiquiar and Hanson (2005). Moreover, we review the mobility and the decomposition inequality by three age groups (16-25, 26-45 and 46-65); three levels of education (low, medium and high education)¹⁰⁸, four economic sectors¹⁰⁹ (Agricultural, Forestry, Fishing and Mining; Industry and manufacturing sector includes Construction, Manufacture and Electricity, Gas Steam, Air

¹⁰⁵ The population that does not declare wages is less than one %. We dropped the extreme values in wage (above the 99th percentile and below the 1st percentile) for the first panel 58 observations; in the second panel 179 observations and 597 observations in the third panel.

¹⁰⁶ The INPC is calculated since 1969 and it has changed four times of base year in 1978, 1980, 1994 and 2002. In order this study we use the base to 2002 that correspond a weighting for consume of population structure in 2000. The INPC, is calculated and published on a monthly basis by the Central Bank (Bank of Mexico). The index gathers the prices of family shopping basket, prices of goods and services (<http://www.banxico.org.mx>).

¹⁰⁷ The cities comprised in the five regions are: 1) Border region: Monterrey, Torreón, Chihuahua, Tampico, Ciudad Juárez, Tijuana, Matamoros, Nuevo Laredo, Saltillo, Hermosillo, Monclova and Mexicali; 2) The northern region: San Luis Potosí, Aguascalientes, Culiacán, Durango, Tepic, Zacatecas and La Paz. 3) The centre region: Guadalajara, Puebla, León, Orizaba, Veracruz, Morelia, Cuernavaca, Coatzacoalcos, Colima, Manzanillo, Querétaro, Celaya, Irapuato, Tlaxcala and Pachuca. 4) The capital region: Mexico City and its surroundings. 5) The southern region: Mérida, Villahermosa, Tuxtla Gutierrez, Campeche, Oaxaca, Cancún and Ciudad del Carmen.

¹⁰⁸ See Cortez (2001).

¹⁰⁹ In November 1993, INEGI joined to the works that the United States and Canada were developing to construct a new classification of economic activities, based on the concept of the production function: the North American Industrial Classification System (NAICS). The new classification is used by Mexico, the United States and Canada for all the production and analysis of economic statistics, in substitution of the classifications previously used in the three countries. The *North American Industrial Classification System Mexico, 2002* Manual contains the classification's background, principles and criteria; the explanation of its structure; titles and descriptions of the categories; correspondence tables with SCIAN (in Spanish). SCIAN Mexico 2002 is available in INEGI's website. The structure can be compared with International Classifications of economic activities the ISIC (International Standard Industrial Classification of all Economic Activities) and the NACE (Classification of Economic Activities in the European Community).

conditioning and Water Supply; Transport, Storage and Communications; and Trade and Services, including financial services) and firm size (micro, small, medium and large enterprises).¹¹⁰

3.3.2. Methodology

This section outlines the methods used to review how wage mobility can affect wage inequality. First, I examine mobility through the construction of transition matrices and different mobility measures that have been derived from such matrices. Second, I apply the approach originally proposed by Jenkins and Van Kerm (2006) to decompose the inequality change.

There are many ways in which wage mobility has been studied. In fact, Fields (2006) points out that mobility is not easy to define and he distinguishes six different concepts related to mobility: time-independence, positional mobility, shares movement, income flux, directional income change and equalizer of long-term income. Even nowadays, there is little consensus on methods to be used and results usually differ depending on the considered methods. For instance, D'Agostino and Dardanoni (2009) use the Markovian approach, but they introduce *monotone mobility matrices*.¹¹¹ This approach makes clear two elements: temporal independence and aggregate income movements. However, other researchers divide the measures of mobility in absolute and relative mobility. Most analysts seem to be interested in the variation of the income shares or rank orders of the agents through time, and hence, they conduct their analysis by means of relative measures, but there are also persuasive arguments that can be made for absolute inequality measures (Kolm, 1976, and Blackorby and Donaldson, 1980a and 1980b, inter alia).

3.3.2.1. Mobility measurement and transition matrices

The transition matrices permit to analyse the relative mobility across the whole distribution and the changes from one time period to another of individual wage positions within distribution. Indeed,

¹¹⁰ Small and Medium-sized Enterprises (SMEs) are classified according to the number of employees (10, 50, 250 and more than 250, respectively) into micro, small, medium, and large enterprises. World Bank (2006) and the Economic Census (2010), INEGI.

¹¹¹ Dardanoni (1993) applied the social mobility ordering it to a Markov chain model of social mobility, and shows the equivalence of a version of this ordering to some very intuitive concepts of greater social mobility. In particular, appropriately defining father's and sons' status as monotonic functions of their rank, Some of the theorems proposed by Dardanoni can be adapted to the context to show the equivalence with useful partial orderings for making rank mobility comparisons in ways that parallel the classical Lorenz ordering. Monotone Markov chains have a lot to say on the issue of intertemporal inequality dominances.

they provide a simple picture of the *movement* of the individuals among specific income classes.¹¹² However, the transition matrices refer to groups of individuals rather than to individual themselves, for example, the percentage of individuals who stay over time in the same quantile. These quantiles may be defined on the basis of relative or fixed thresholds, a useful distinction made by Hungerford (2008) as well as by Jarvis and Jenkins (1997).

I analyse mobility across the whole distribution by examining transitions between the quintiles of wage distribution. More specifically, I construct transition matrices. The idea behind to this construction is to check the existence or not of the reranking wage effect.

The transition (mobility) matrix induced by a transformation $x \rightarrow y$ is then defined as the matrix $P(x, y) = [P_{rs}(x, y)] \in R^+_{m \times m}$, where $P_{rs}(x, y)$ is the proportion of people that were in class r in the distribution x and have now moved to class s . By definition, we have $\sum_{ms} = 1$ $P_{rs}(x, y) = 1$ for all r , a transition matrix is necessarily stochastic.¹¹³ We begin our mobility analysis by examining quintile-to-quintile transition rates in three points of time, region and subgroups in each region. I compute these mobility rates as follows. For each year I rank individuals according to their wages and assign each worker to a quintile of the wage distribution. However, I also use these data to measure movements by individuals within the distribution by defining indicator variables t_{qr}^i , where t_{qr}^i is equal to 1 if individual i made a transition from quintile q to quintile r , and is equal to zero otherwise. The probability of moving between quintiles q and r is given by

$$P_{qr} = \frac{\sum_{i=1}^{i=N} w^i t_{qr}^i}{\sum_{i=1}^{i=N} w^i} \quad (3.1)$$

where w^i is the weight for individual i .

¹¹² Some critics about transitions matrices are that in quantile transition matrices may confound exchange and structural mobility. Therefore, great care should be taken when conducting a transition matrix analysis and perhaps the analysis must be supplemented by mobility measures that utilize directly the data from the distributional transformations, see Atkinson, *et al.* (1992). Other studies point out that the main problems to use transition matrices are that they ignores the income churning that takes place within subgroups; it does not take into account the fact that the absolute income changes that are needed to move between classes would be radically different in the lower and higher fractiles due to the empirically observed positive-skewness of the income distributions and fractile matrix may fail to reflect the effect of income growth on the mobility pattern of the society.

¹¹³ See also Gottschalk and Spolaore (2002), Trede (1998) and Moffitt and Gottschalk (2002).

Variations in wages that move individuals across the wages distribution may be permanent or transitory phenomena. Transition probabilities provide insights into the nature of the dynamics that underlie inequality observed in cross sections. One possibility is that the ranking of workers is almost static and changes in inequality stem largely from changes in labour earnings per se. Burkhauser, *et al.* (1997) relate these movement to inequality, given that a distribution one would anticipate large probabilities of remaining in the same quintile ($p_{qr} \approx 1$ for $q=r$) and low probabilities of mobility ($p_{qr} \approx 0$ for $q \neq r$). Alternatively, changes in inequality may be driven by changes in the position of individuals in the earnings distribution. In a more flexible labour market, one would expect to observe a greater probability of changing quintiles, and a correspond lower probability of remaining in the same location in the earnings distribution.

I also compute and discuss various summary indicators of relative income mobility based on transition matrices.¹¹⁴ Among these mobility measures I distinguish between the immobility ratio (called immobility ratio-1 in this paper) which is defined as the average percentage of people staying in the same quintile of the distribution and the average absolute jump which measures the amplitude of the movements – i.e. the number of quintiles the typical individual “jumps over” between two time periods. All mobility measures can be compared with the “perfect mobility” case, when the probability of being in each quintile is independent of the starting point. I differentiate between upward and downward movements and calculate proportions of those moving up and down. My data allows computing mobility indices for the two-year interval (1987-1988, 1997-1998 and 2007-2008) and then turn to short-term (*year-to-year*) transitions. Large part of the mobility consists of moves to adjacent quintiles and contains purely exchange mobility. Thus, we recalculated the immobility ratio taking this into account.

Therefore, it is also useful to define direct mobility indices such as the rank correlation in earnings from year t to year $t+1$ (or quintile mobility matrices from year t to $t+1$). Such mobility indices are likely to be closely related to the Shorrocks indices as reranking from one period to another is precisely what creates a wedge between long-term inequality and the average of short-term inequality. The most popular is probably an index proposed by Shorrocks (1978a) which has been used, for example, by Buchinsky *et al.* (2003), Buchinsky and Hunt (1999) and Ramos (1999).

¹¹⁴ The results about mobility and scalars (indices) in the short-term were obtained by transition matrices but are not necessarily (the transition probabilities) in a Markov sense. We count transitions from each observation to the next one in each panel. In view of the fact that we use unbalanced panels, the matrix does not normalize for missing periods, and does not count transitions from nonmissing to missing or from missing to nonmissing. Thus if the data are fully rectangularized, that technique would produce (inefficient) estimates of the Markov transition matrix.

The Shorrocks's index obeys the period invariance principle, that is, that are not sensitive to the number of periods separating time t from time $t+1$. The main advantage of the Shorrocks mobility index is that it formally links short-term and long-term inequality which is perhaps the primary motivation for analysing mobility. The disadvantage of the Shorrocks index is that it is an indirect measure of mobility (Kopczuk, *et al.*, 2010). Shorrocks (1978b) observed that in transition matrices the higher values tend to cluster about the main diagonal. The assumption that transition matrices has a dominant diagonal is, however, too strict. The requirement that the probability of remaining in the same category is no less than that of transferring to any other particular group is slightly better.

Shorrocks (1978a) developed an axiomatic framework for mobility measuring if the data is available in form of a transition matrix.¹¹⁵ Shorrocks type indices are all normalized between 0 and 1. They reach the value zero for the identity matrix which implies no mobility, that is to say perfect dependence, while the value one is reached for perfect independence.¹¹⁶

Using the transition matrix P rather than *c.d.f* $K(x, y)$, a mobility measure can be defined as a function $M(P)$, which maps P into a scalar. We compute four Shorrocks type indices: Shorrocks-Prais index, Prais-Bibby index, the Determinant index and immobility Index.

The measure proposed by Shorrocks-Prais¹¹⁷ evaluates the concentration around the diagonal of the matrix:¹¹⁸

$$M^S(P) \equiv n - \text{trace } P / n - 1 \quad (3.2)$$

Prais-Bibby index is a simple measure of mobility built on trace, this index was proposed by Prais (1955) and Bibby (1975),

$$M_P = 1 - (\text{trace } P) / n \quad (3.3)$$

¹¹⁵ Many mobility measures are purely statistical in nature and no attempt, except Shorrocks (1978b), has been made to understand their welfare properties. Shorrocks presents some axiomatic properties/conditions but encounters conflicts between few of them. One way to avoid conflicts is to drop the problematic/undesirable conditions and add some plausible ones. The axiomatic properties are: non-negativity, monotonicity, symmetry, larger move bias, normalization, Shorrocks' monotonicity, immobility, maximum mobility, subgroup decomposability, pro-poor social preferences and directional decomposability. For more details, see Paul (2009).

¹¹⁶ See Fessler, *et al.*, (2012).

¹¹⁷ Sometimes, it is referred as the Shorrocks Mean Exit Time (MET) or the Prais Index. It measures the average probability across all classes that individual will leave her initial class in the succeeding period; it is also interpreted as the normalized distance of p from the identity matrix I (Bartholomew, 1996). The Prais-Bibby index works out the up and down movement. The Determinant index is the product of all *eigenvalues*, that is, $I = |\lambda_1| > |\lambda_2| > \dots > |\lambda_m|$.

¹¹⁸ See Paul (2009).

However, this measure ignores the distances travelled by the movers. The Determinant Index, given as:

$$M^D(P) \equiv 1 - \det(P)^{1/n-1m} \quad (3.4)$$

And the immobility or rigidity index is a measure based on the trace of the transition matrix. Consider a transition matrix P of $n \times n$ dimension where each cell p_{ij} is the proportion of individual who move from wage group i to wage group j over a period of s years (where $s \geq 1$). The elements on the diagonal p_{ii} represent stayers and the off-diagonal terms p_{ij} represent movers. If everyone stays in the same class, the trace of matrix P is n . The trace is less than n if some individuals move away from their income group.

Consequently a number of scalar measures mapping transition matrices to the real unit interval have been developed to summarize the entire matrix into a single mobility index.¹¹⁹ Naturally, a great amount of information is deliberately lost in the process.

The analysis of this kind of mobility on the size distribution of wage is insufficient to evaluate inequality and the well-being of a society.¹²⁰ In these sense, I complement the analysis of mobility as integral part of the approach of the decomposition of inequality proposed by Jenkins and Van Kerm (2006) tracking wage changes for individuals, rather than wage changes for wage groups in the long-term and short term.

3.3.2.2. The decomposition of inequality change

The changes in income inequality over time can be additively decomposed into different terms. One of them represents the progressivity of income growth (wage in our case) i.e. whether income

¹¹⁹ Bartholomew (1996) builds his index is based on the expected value of the absolute difference in the values attached to categories in the initial and final distribution. However, Bartholomew's index is sensitive to the initial and final marginal distributions, and therefore, it may give a misleading picture of the transition process. For example, assume that everyone in the society is promoted by one category. If this is the case, Bartholomew's index would indicate transition although there is no change in the ranking of members. On the other hand, the Gini mobility index is not affected by linear transformations of the marginal distributions (see Boudon, 1973 and 1975 for a discussion of the properties of Bartholomew's index).

¹²⁰ Mehran formulated preferences in terms of a social welfare function and compare the alternative distributions according to the values of the derived income inequality measure and one basic principle for inequality comparisons is the Pigou-Dalton transfer principle. A linear inequality measure satisfies the principle if and only if its score function is strictly increasing (Mehran, 1976).

growth is pro-poor rather than pro-rich and the other the reranking or reshuffling of the individuals in the income pecking order, i.e. the mobility concept.

Jenkins and Van Kerm (2006) show that when income inequality is measured using any member of the generalized Gini class of indices (Gini or S-Gini), the change in inequality between two points in time. The S-Gini coefficient is expressed as a weighted average of the difference between the Lorenz curve of the income distribution (L) and the line of perfect equality. A formal derivation is also included in the Annex 3.1. Moreover, in this approach is developed an analytical framework within which changes in income inequality over time are related to the pattern of income growth across the income range and the changing individual rankings in the distribution. The decomposition is derived by adding and subtracting the concentration coefficient (C_1^0) to the Lorenz curve. This leads (equations A3.3-A3.5 in the annex 3.1) to the following key expression:

$$\Delta Gini \equiv Gini_1 - Gini_0 = \underbrace{(Gini_1 - C_1^0)}_{\text{Reranking}} - \underbrace{(Gini_0 - C_1^0)}_{\text{Pro-poor growth}} \quad (3.5)$$

where (C_1^0) is the concentration coefficient for year 1 incomes which uses year 0 income ranking. In geometrical terms it is twice the area between the concentration and the line of perfect equality. The idea of concentration curve is similar to the relationship between the Gini index and the Lorenz curve. The Gini coefficient is twice the area between the Lorenz curve and the line of perfect equality. The Lorenz curve shows for the cumulative proportion $x\%$ of ordered individuals, what cumulative proportion $y\%$ of the total income they have. Both values refer to the same period. The concentration curve is derived from the Gini but it differs, as the x variable is based on year 0 income order and the y variable is year 1 incomes. The concentration curve shows the cumulative proportion of year 1 income where individuals are ordered according to year 0 income.

Summarizing (3.5), we can also write:

$$\Delta G(v) = R(v) - P(v) \quad (3.6)$$

where v is an inequality aversion parameter. The conventional Gini coefficient, perhaps the most commonly-used inequality index, is a particular member of this general class and is obtained with $v = 2$. Other members incorporate different ethical judgments. Values of $v > 2$ yield indices that give greater social weight to poorer individuals than the Gini does, and values of $v < 2$ yield indices giving relatively lower social weight to them.

The key to decompose inequality in the previously mentioned components is the recognition that membership of income groups such as the poor and the rich changes over time. With this aim, we track income changes for individuals, rather than income changes from income groups such as the poor or in a reference income such as the bottom quintile or the mean income among the poor. This inequality change decomposition is similar in spirit to the decompositions of poverty trends that are popular in development economics, but with a key difference in implementation.¹²¹ Within this framework, I will provide a decomposition of the change in the inequality of actual incomes into progressivity and mobility components. Mobility is associated with changes in ranking along the wage scale, as in many previous studies, see, *inter alia*, King (1983) or Yitzhaki and Wodon (2004).¹²²

Finally, the sampling variability of all estimates is going to be assessed using standard errors derived from bootstrap resampling methods. Resampling consisted of sampling with replacement from the sample of households interviewed in wave 1 to wave 5 of the quarterly ENEU and ENOE surveys. This procedure ensures that the sampling dependence of the two sub-samples was preserved. Resampling in the first wave of the survey was done independently within sampling strata.¹²³

3.4. Empirical analysis

The empirical analysis examines the degree of wage mobility in Mexico and in their regions from 1987 to 2008. I study in detail two aspects of mobility tracking wage changes for individuals. First,

¹²¹ This decomposition approach requires information about the joint distribution of income at two points in time. The emphasis in the joint distribution is also shared by the literature on the social welfare evaluation of multi-period income streams, in which the leading studies include Atkinson and Bourguignon (1982), Gottschalk and Spolore (2002), and Bourguignon and Chakravarty (2003).

¹²² Studies for Mexico have found that the individuals fall into poverty and some escape it. During recent years, there has been a growing interest in the analysis and implementation of measures related to the mobility income in Mexico. For example, Wodon (2001), Yitzhaki and Wodon (2003), Cunningham and Maloney (2000), Maloney *et al.* (2004), World Bank (2004), Antman and McKenzie (2007b), Duval (2006).

¹²³ All standard error estimates are based on 250 bootstrap replications.

the relative and absolute mobility where we can observe some improvement to the positions of poorest, but over the period we see only modest reduction in inequality. Second using the approach proposed by Jenkins and Van Kerm (2006), I analyse the changes in wage inequality over time in five Mexican regions and the decomposition by subgroups in three points of time. This allows one to explain the link between wage trend, reranking and wage growth for the whole population, as well as the various subgroups by region formed on the basis of any criterion (e.g. age group, education level, firm size and economic sector).

3.4.1. Wage mobility and inequality

Great attention has been given recently to the change over time in the average wages of *quintiles*, families or households ranked top to bottom by income and divided into fifths. However, such time line comparisons between rich and poor ignore a central element of the Mexican economy, which is the extent to which individuals move from one quintile to another. Figures on wage mobility are more characteristic of the nature of our fluid society than comparisons of average wages by quintile, which would only be statistically meaningful if Mexico were a caste society where the people comprising the quintiles remained constant over time.

There are a large number of inequality indices that may be used to measure the dispersion of wages at cross section t . Here, we have selected several measures to estimate the inequality at each cross section in our panel data and to show different results among coefficients. It is well known that the Gini coefficient is more sensitive to wage changes around the mean of the distribution while the Coefficient of Variation is more sensitive at the extreme values. The Mehran index is relatively more sensitive to changes in the lower end of the distribution, when compared to the Gini index, while the Piesch index is relatively more sensitive to changes in the upper end of the distribution.¹²⁴

Table 3.1 shows the results from the calculation of wage inequality measures in Mexico for the three different time periods considered in our analysis. From the first period 1987-1988 to the second 1997-1998, inequality measures increased its values, while over the period 2007-2008 they

¹²⁴ The Gini and Mehran indices are particular cases of the extended Gini coefficient introduced by Yitzhaki (1983). Nygard and Sandstrom (1981) mention two more measures of the same nature: the measures proposed by Bonferroni and De Vergottini. We are not going to deal with these two measures because their value changes if we replicate the distribution an integer number of times, that is, if we duplicate, triplicate, etc. the distribution. See Cowell (1985) and Cowell and Schluter (1998) to review different measures of inequality and axiomatic criteria.

declined. However as I have previously highlighted, these static estimates do not provide a full picture of Mexican inequality evolution if there is a degree of wage mobility within our distribution.

If we review wage inequality among some characteristics in each panel, we find that in Border, North, Centre and South regions it keep on the same trend than the general analysis: an increase in the second period and a decline in the period 2007-2008. The Gini coefficients in 1987-1988 were between 35.6% and 38.1%. From 1997 to 1998 the coefficient experienced an important increase between 44.3% and 47.5% in these four regions. However, the Capital region has a different behaviour as wage inequality increases in the three periods of analysis: moving from 35.6% in the first period to 42.2% and 46% in the second and third period, respectively. The Mehran index shows that there are high levels of inequality among individuals in the lower end of the distribution in the five regions. These differences are greater than those observed at the upper end of the distribution. I also find differences in inequality according to the considered socio-demographic characteristics. The wage inequality by age group shows that the most affected group was the age group from 46 to 65 years old increasing from 39.9% to 50.9% in 1997-1998 and it experienced a reduction to 48.4% in the period 2007-2008. The same trend is observed in other measures, but with a different magnitude. For example, the Mehran measure is larger than the Piesch measure. Another important change in wage inequality is the one observed for high levels of education. In particular, between 1997 and 1998 and between 2007 and 2008 the Gini coefficient was of 43.7% and 46.3%, respectively. And these differences increased when we look at the measures in different parts of the distribution. As for firm size, the individual wage inequality among workers in the micro enterprises increased from 36% to 38%, while for the small and medium and large enterprises, wage inequality increased sharply from 36.1% to 43.4% and from 34.3% to 44.6% in the third period. The dispersion among economic sectors is clear in each period, the wage inequality increased between 1997 and 1998 and decreased from 2007 to 2008, except in the Transport, Storage and Communications sector.

It is also important to highlight that the patterns of wage inequality are different within and across subgroups. At a descriptive level, results from inequality in the three panels indicate, on the one hand, different trends in the short term of the wage inequality among individuals and the characteristics by group and, on the other hand, the results suggest the problem of growing wage inequalities and differences for low-wage earners. The results of inequality measures by group of analysis in each region are shown in Annex 3.2.

Table 3.1. Wage inequality estimates for Mexico 1987-2008

	Relative mean deviation	Coefficient of variation	Gini coefficient	Mehran measure	Plesch measure	Theil GE(1)	Theil GE(-1)
1987-1988	27.0	89.1	37.5	48.7	31.9	26.1	32.0
R e g i o n	Border	27.7	94.7	38.1	48.7	32.9	27.8
	North	25.7	78.1	35.8	47.2	30.0	22.6
	Center	26.3	81.5	36.7	48.5	30.8	23.9
	Capital	25.5	79.0	35.6	46.8	30.0	22.7
	South	26.9	84.0	37.6	49.5	31.6	25.3
A g e	16 to 25	23.8	83.4	34.0	44.7	28.6	22.2
	26 to 45	27.0	85.8	37.3	48.7	31.6	25.0
	46 to 65	28.8	96.6	39.9	51.4	34.2	29.8
E d u c a t i o n	Low	23.0	93.6	33.4	43.9	28.1	23.3
	Medium	23.7	81.1	33.5	43.7	28.4	21.5
	High	25.4	75.4	35.3	46.9	29.4	21.5
F i r m s	Micro	26.3	108.4	38.0	49.2	32.4	30.2
	Small	26.0	100.8	36.1	45.5	31.4	27.1
	Medium and Large	24.8	76.7	34.3	44.8	29.0	21.0
E c o n o m i c s e c t o r	AFFMS (1)	30.7	92.2	42.5	55.9	35.8	31.3
	IMS (2)	23.2	75.7	32.3	41.8	27.5	19.7
	TSCS (3)	23.7	69.7	32.7	43.0	27.6	18.7
	TSS (4)	29.3	96.3	40.6	52.7	34.5	30.1
1997-1998	34.2	134.3	46.1	58.1	40.1	40.9	43.6
R e g i o n	Border	34.9	149.3	46.6	57.9	40.9	43.9
	North	34.6	113.7	46.2	58.7	40.0	39.1
	Center	33.0	134.6	44.3	56.1	38.4	37.9
	Capital	31.2	99.6	42.2	53.9	36.3	32.2
	South	35.5	115.0	47.5	60.3	41.0	40.6
A g e	16 to 25	26.8	122.1	37.5	47.9	32.3	29.4
	26 to 45	32.7	115.7	44.3	56.9	38.0	35.8
	46 to 65	37.9	159.5	50.7	63.6	44.3	50.6
E d u c a t i o n	Low	23.7	87.4	33.6	43.8	28.4	22.2
	Medium	25.9	139.5	36.3	46.7	31.0	28.3
	High	31.8	116.0	43.7	57.0	37.0	35.1
F i r m s	Micro	25.7	109.4	36.3	46.2	31.4	28.5
	Small	32.0	134.9	43.1	53.5	37.9	38.1
	Medium and Large	32.1	123.8	43.5	55.8	37.4	35.9
E c o n o m i c s e c t o r	AFFMS (1)	38.6	115.7	50.9	64.4	44.2	45.8
	IMS (2)	30.0	146.1	41.1	51.3	36.0	36.5
	TSCS (3)	31.7	116.5	43.5	55.3	37.6	36.8
	TSS (4)	35.4	131.2	47.4	60.1	41.0	41.9
2007-2008	31.4	128.3	43.5	55.5	37.5	36.8	38.6
R e g i o n	Border	30.0	149.6	42.0	53.5	36.2	38.3
	North	31.6	117.9	43.3	55.4	37.2	35.4
	Center	30.3	110.8	42.2	54.2	36.2	34.0
	Capital	33.4	123.5	46.0	57.9	40.0	41.1
	South	32.6	131.6	44.7	56.6	38.7	39.0
A g e	16 to 25	24.9	132.7	35.7	46.4	30.4	28.6
	26 to 45	30.7	124.5	42.7	55.2	36.4	35.2
	46 to 65	35.7	124.8	48.4	61.3	41.9	43.4
E d u c a t i o n	Low	21.6	82.4	31.1	42.0	25.7	19.0
	Medium	23.9	121.5	34.3	45.4	28.8	25.3
	High	33.5	124.2	46.3	60.2	39.4	39.8
F i r m s	Micro	25.8	114.1	36.8	47.8	31.4	27.7
	Small	31.3	121.5	43.4	55.8	37.2	36.4
	Medium and Large	32.2	125.0	44.6	57.3	38.2	37.9
E c o n o m i c s e c t o r	AFFMS (1)	37.3	108.5	49.4	63.3	42.5	42.4
	IMS (2)	26.3	115.6	37.4	48.6	31.9	28.6
	TSCS (3)	31.4	153.2	44.3	56.3	38.3	42.0
	TSS (4)	32.6	128.7	44.7	57.0	38.6	38.5

Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008. Notes: Inequality is measured using the real hourly wage. All coefficients are multiplied by 100. (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply, (3) Transport, Storage and Communications Sector and (4) Trade and Services Sector. Including Financial Services.

Table 3.2 depicts the direction of Mexican wage mobility, the flow of individuals between quintiles from time period 1 to time period 2 (i.e. Q1987/Q1988, Q1997/Q1998 and Q2007/Q2008) and, hence, provides a detailed picture of mobility within the distribution. An examination of each panel of the analysis shows that a 55.16% of individuals in the lowest wage group during Q1987 were also in the lowest quintile for Q1988, while 23.67% of these low wage earners had progressed to the second quintile over this period. Remarkably, only 3.17% of individuals in the lowest wage group from 1987 found themselves in the highest income group in 1988. However, in the second and the third panels, we can see a clear different trend.

Table 3.2. Transition matrix for Mexican real hourly wage quintiles (%) from 1987 to 2008

Q1987/Q1988	I	II	III	IV	V	Total
I	55.16	23.67	12.51	5.49	3.17	100
II	21.1	37.14	26.11	10.9	4.76	100
III	9.56	25.88	34.63	22.28	7.65	100
IV	4.78	11.02	21.77	40.75	21.68	100
V	2.49	4.49	8.15	24.6	60.27	100
Total	17.78	20.39	20.9	21.27	19.66	100
Q1997/Q1998	I	II	III	IV	V	Total
I	51.53	26.87	12.73	5.76	3.11	100
II	24.87	39.85	23.97	8.7	2.61	100
III	11.71	23.46	37.96	21.31	5.57	100
IV	5.15	8.13	20.49	45.18	21.04	100
V	2.92	2.58	5.63	22.54	66.33	100
Total	18.64	19.94	20.31	21.21	19.9	100
Q2007/Q2008	I	II	III	IV	V	Total
I	40.71	21.05	13.94	12.15	12.14	100
II	20.32	40.06	23.5	11.36	4.76	100
III	13.88	22.44	35.18	22.12	6.37	100
IV	12.75	10.35	21.01	36.96	18.93	100
V	12.18	4.77	6.69	19.63	56.73	100
Total	19.92	19.67	20.12	20.56	19.73	100

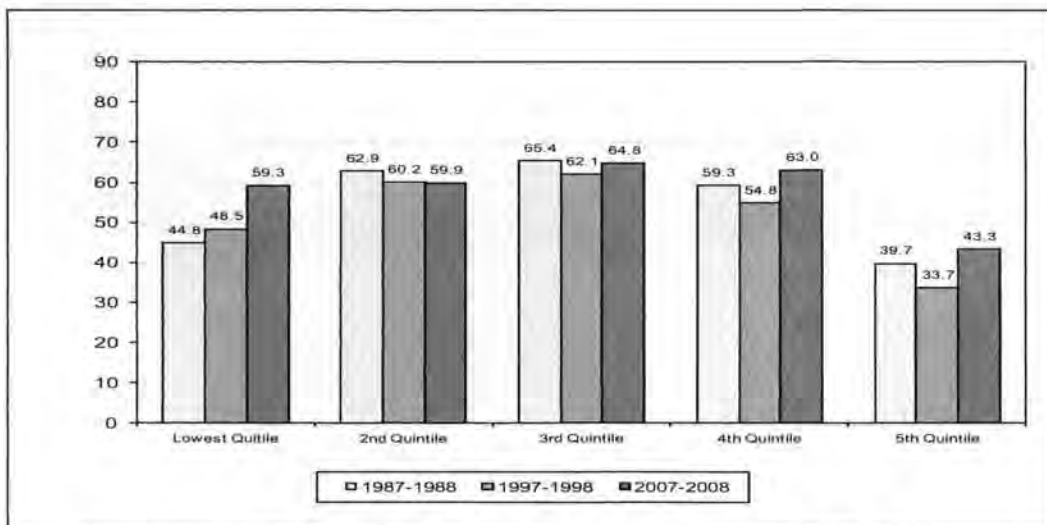
Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

A notable feature of this table is the stability of the highest earning wage group. Around 60%, 66% and 57% of individuals in this quintile remained present after two years in each period, which is the highest of all five wage groups. The next most stable group is the lowest 20% while the most unstable is group the second lowest 20%, in particular from 2007 to 2008. Considered together, these results show a picture of the Mexican wage distribution where the wages of both low and high end earners are persistent while there is a reasonable degree of volatility in the middle and lower middle parts of the wage distribution.

The large values across the main diagonal reveal that in all cases the quintile an individual occupies at time 1 is the best predictor of his or her wage group at time 2, and that this trend is especially strong at the tails of the distribution. The symmetry outside the diagonal elements indicates that movements from one quintile to another are largely offset by movements in the opposite direction. For example, 12.51% of individuals in quintile I moved into quintile III between 1987 and 1988, while 9.56% of individuals moved from quintile III down to quintile I. From 1997 to 1998 the percentage of individuals is 12.73% and 11.71%, in 2007-2008 13.94% and 13.88%, correspondingly.

Another way to observe the mobility is summarized in the general movement across the distribution. Figure 3.1 displays the wage mobility between 1987 and 2008 by quintiles. In all but the top quintile, at least 33.7 % of individuals exited their 1997-1998 wage quintile and 43.3 % from 2007 to 2008. By 1987-1988, the second and third quintile show more mobility of the wages. While for the top fifth more stability was observed, over one-third had slipped downward to be replaced by others moving up. The very high degree of wage mobility displayed above shows that the composition of the various quintiles changes greatly over time. A majority of individuals have indeed moved to different quintiles between 1987 and 2008.

Figure 3.1. Proportional moving to different quintile (%), 1987-2008

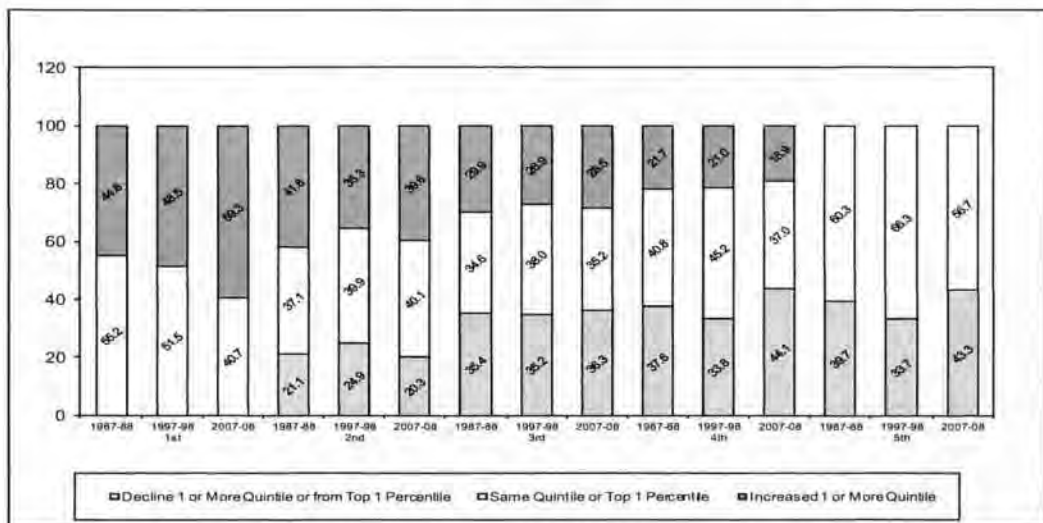


Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

The direction of wage mobility is analysed in Figure 3.2. It displays the direction of the movement between 1987-1988, 1997-1998 and 2007-2008. In the lowest quintile the individuals that increased 1 or more quintiles increased between 48% and 59 % while in the second quintile, the rates were around 35% and 41% and in the third and four quintiles, the rates were between 18 % and 29 %, observing important changes from 2007 to 2008.

According to the data, the 44.8% of individuals in the bottom quintile in 1987 had exited this quintile by 1988. The corresponding mobility rates were 62.9% for the second lowest quintile, 65.4% for the middle quintile, 59.3% for the fourth quintile, and 39.7% for the top quintile. In 1997, the 48.5% of individuals in the bottom quintile had exited this quintile by 1998. The corresponding mobility rates were 60.2% for the second lowest quintile, 62.1% for the middle quintile, 54.8% for the fourth quintile, and 33.7% for the top quintile. In the third period, we observed an increase of the proportion: the 59.3% of individuals in the bottom quintile in 2007 had exited this quintile by 2008 and the mobility rates were 59.9% for the second lowest quintile, 64.8% for the middle quintile, 63.0% for the fourth quintile, and 43.3% for the top quintile. Given the relative starting position, the very high mobility from the bottom quintile obviously reflects the improvement. In addition, the upward movement in the second, third, and fourth quintiles is much larger than downward movement.

Figure 3.2. Net progress in the bottom four quintiles, 1987-2008

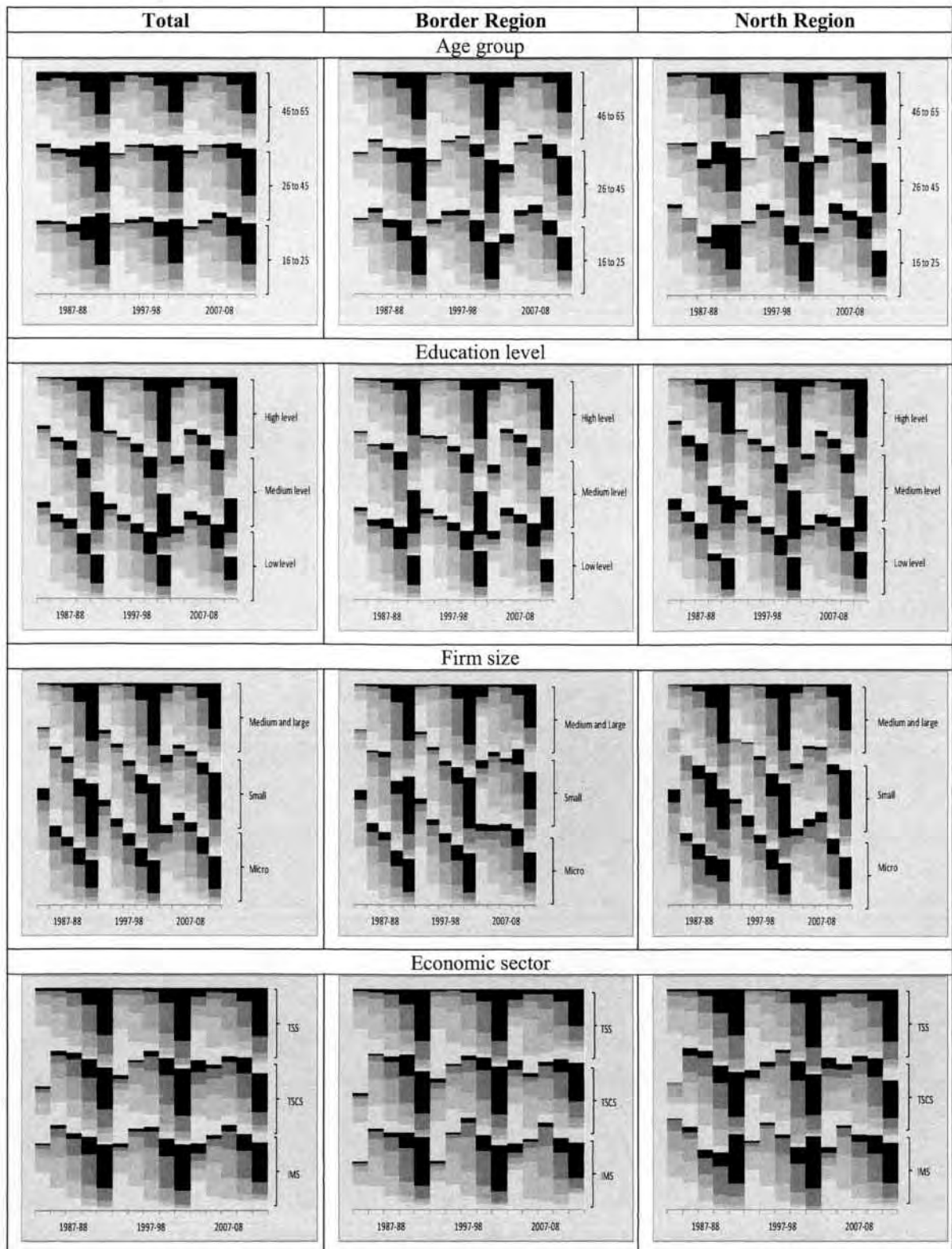


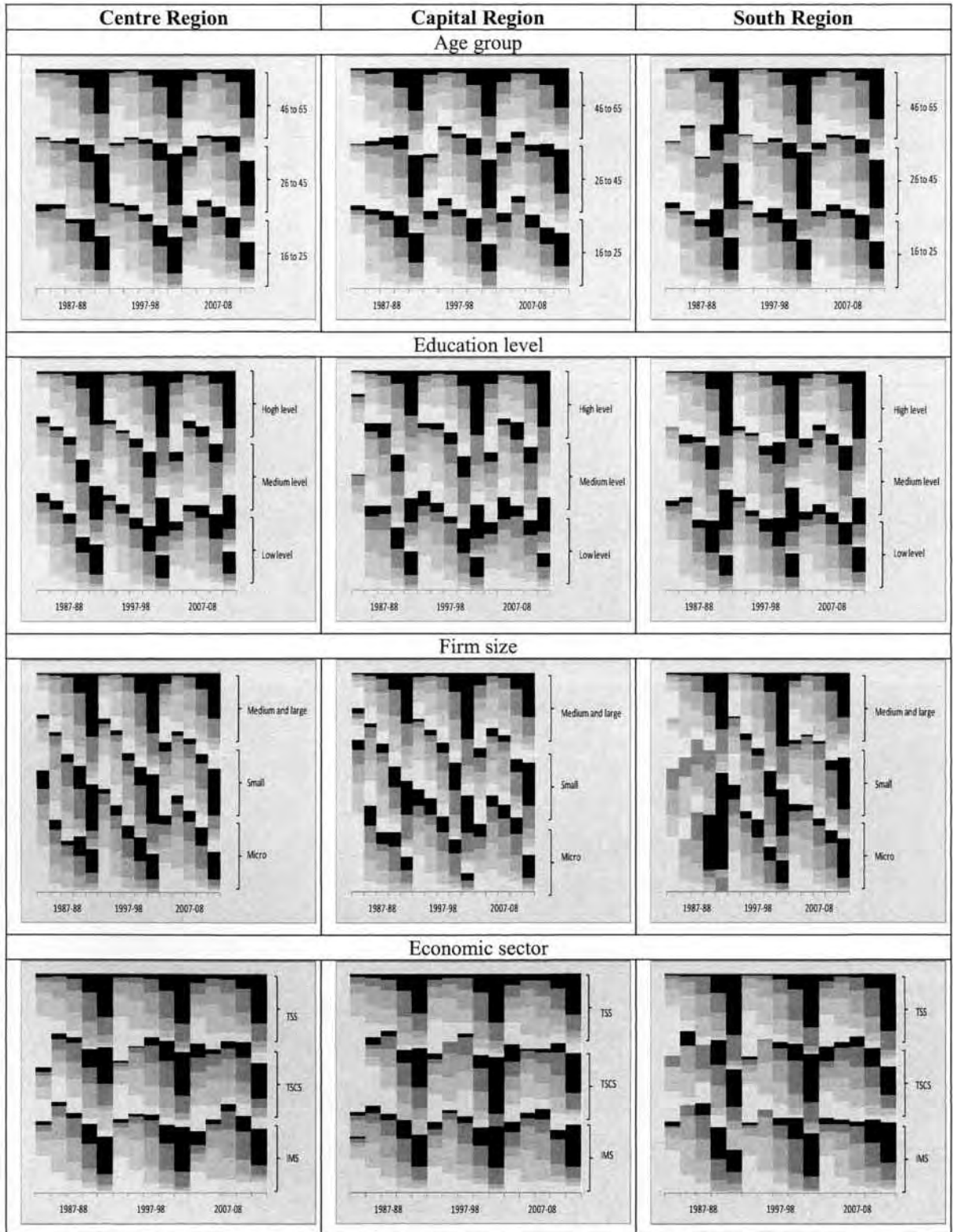
Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

In the long overdue debate over the significance of wage mobility in Mexico, some may argue that mobility would tend to reflect slippage in inequality wage, especially among the middle class. The data contradict this hypothesis. To those in the middle quintile the 29.9%, the 26.9% and the 28.5% moved upward to the fourth or fifth quintile by 1988, 1998 and 2008 respectively. However, nearly the 36% in the three periods had fallen from the third quintile into the 1st and 2nd quintile. Overall, in the bottom four quintiles, net improvement was the rule, not the exception. I analyse the wages at two points in time and I report the probabilities of transition between groups. Figure 3.3 depicts a visual representation of the transition matrices, arranged from the bottom to the top according to the origin wage group and to the destination wage group, that is, the low wage groups at the bottom and the high wage groups at the top.¹²⁵

¹²⁵ Results for each transition matrix are available on request.

Figure 3.3. Subgroup patterns of mobility real hourly wage quintiles (%), 1987-2008





Source: Own calculations based on transition matrices. Results based on panel data from ENEU-ENOE surveys 1987-2008.

The analysis of wage mobility is completed with various summary indicators of relative wage mobility based on transition matrices. The analysis of wage mobility across quintiles of the distribution undertaken above is an analysis of movement across wage thresholds. Moreover, the movement across wage quintiles describes relative movement and is consistent with the real wage of all individuals falling or rising. Table 3.3 shows the values of three indices of mobility and the immobility index by the groups of characteristics in each panel 1987-2008. Among these mobility measures, we distinguish the immobility ratio which is defined as the average percentage of individuals staying in the same quintile of the distribution and the mobility indices measure the amplitude of movements using the Shorrocks-Prais index, Bibby-Prais index and Determinant index.

The less mobile wage groups in 1987-1988 is related to individuals who work in the Border and Centre regions, between 26-45 years old, those workers that have a medium level of education, individuals into the small enterprises and in the Agricultural, Forestry, Fishing and Mining Sector. In the next two periods it can observe important changes. From 1997 to 1998 the regions that show less mobility were the South, North and Border regions; the 45-65 age group and the medium and large enterprises while between 2007 and 2008 workers in the 25-45 age group and high level of education stayed at the same wage group. Contrary to the immobility ratio, the Shorrocks' index shows more mobility in the first period in Capital and North regions, in the 46-65 age group, in workers with high level of education, in micro enterprises and in the Industry and Manufacturing; Transport, Storage and Communications sectors. From 1997 to 2008 there is more mobility in wage groups in the Capital and Centre regions, younger groups, in the low levels of education and in the Trade and Services sectors. These changes correspond with the changes in the economic structure in Mexico.

Although these mobility indices provide a representation of intertemporal wage movements over the entire distribution, they are silent on where this mobility occurs. For instance, it is important to distinguish between distributions at the lower, middle or higher end of the wage scale. Mobility solely at the lower end of the wage distribution enables lower wage earners to increase their long run welfare by progressing upwards, but provides little chance for a low wage earner to reach the top end in the future. Conversely, mobility at the top of the distribution implies that the chances of an individual progressing to the top of the wage distribution are quite good; providing they did not start at the lower end of the wage scale where earnings are rigid.

Table 3.3. Mexican wage immobility and mobility indices for Mexico, 1987-2008

	Immobility Index			Bibby-Prais Index			Shorrocks-Prais Index			Determinant Index			
	1987-88	1997-98	2007-08	1987-88	1997-98	2007-08	1987-88	1997-98	2007-08	1987-88	1997-98	2007-08	
General	45.6	48.2	41.9	54.4	51.8	58.1	68.0	64.8	72.6	77.0	72.3	77.4	
Border	47.0	49.1	42.7	53.0	50.9	57.3	66.3	63.6	71.6	73.9	70.1	75.7	
R e g i o n	North	40.3	50.1	43.6	59.7	49.9	56.4	74.7	62.4	70.5	89.1	71.4	75.5
	Center	44.6	45.6	39.8	55.4	54.4	60.2	69.2	68.0	75.3	80.6	75.6	79.8
	Capital	33.3	40.4	36.2	66.7	59.6	63.8	83.4	74.5	79.7	89.7	81.9	84.1
South	44.3	49.5	43.6	55.7	50.5	56.4	69.7	63.1	70.5	81.2	72.2	77.3	
A g e	16-25	44.6	45.3	38.0	55.4	54.7	62.0	69.2	68.3	77.5	76.3	74.0	81.5
	26-45	44.8	47.3	42.3	55.2	52.7	57.7	69.0	65.9	72.2	79.5	73.4	76.7
	46-65	43.7	47.4	42.2	56.3	52.6	57.8	70.4	65.8	72.3	81.1	74.9	77.5
E d u c a t i o n	Low	42.7	43.8	37.1	57.3	56.2	62.9	71.7	70.3	78.6	78.6	75.4	83.5
	Medium	43.3	44.8	38.6	56.7	55.2	61.4	70.9	69.0	76.8	77.3	75.1	80.2
	High	38.8	43.6	40.7	61.2	56.4	59.3	76.5	70.6	74.1	89.4	77.8	79.1
F S i z e	Micro	39.6	41.4	39.2	60.4	58.6	60.8	75.5	73.3	76.1	84.2	79.4	80.3
	Small	47.1	45.5	42.9	52.9	54.5	57.1	66.1	68.1	71.3	71.1	74.7	75.5
	Medium and Large	42.4	46.1	43.3	57.6	53.9	56.7	72.0	67.3	70.9	80.6	74.0	75.9
E c o n o m i c	AFFMS (1)	49.1	51.3	44.4	50.9	48.7	55.6	63.6	60.8	69.5	72.6	72.8	80.6
	IMS (2)	44.4	48.2	42.7	55.6	51.8	57.3	69.5	64.8	71.6	76.6	71.1	75.5
	TSCS (3)	37.3	44.9	37.8	62.7	55.1	62.2	78.4	68.9	77.7	89.3	78.0	81.2
	TSS (4)	46.6	48.3	42.3	53.4	51.7	57.8	66.7	64.6	72.2	77.7	73.0	77.5

Source: Own calculations. Results based on results from transition matrices for Mexican real hourly wage (quintiles) from 1987 to 2008. Notes: (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply, (3) Transport, Storage and Communications Sector, (4) Trade and Services Sector. Including Financial Services.

These data demonstrate that the wage mobility in Mexico, over this period, still remains dynamic and some individuals in the bottom three-fifths experience a way up in the economic ladder. In this point of the chapter, it is premature to give conclusions about the relationship between overall mobility and the observed reduction in wage inequality. However, my analysis suggests that an important part of wage inequality is due to short-term shocks that do not persist (year-to-year

transition probabilities between quintiles as well as the probabilities of moving in and out of the wage distribution are clearly in favour of this result). I also compute the summary indicators of relative mobility and immobility based on transition matrices by group of analysis in each region (see Annex 3.3).

3.4.2. Trends in wage inequality, pro-poor wage growth, and wage mobility in Mexico

I consider the approach proposed by Jenkins and Van Kerm (2006). They show that the change in the Generalized Gini coefficient over time is equal to a reranking index minus a measure of progressivity of wage growth (the extent to which wage growth is experienced by the poor rather than the rich, itself a type of wage-movement mobility index). One implication of this identity is that, even if wage growth is pro-poor, inequality may rise over time if reranking more than offsets pro-poor wage growth.

Mobility is, then, defined as the proportionate reduction in inequality of aggregated wages compared to the average of inequality in the marginal distributions. The index is non-directional and scale invariant, but not intertemporal scale invariant.¹²⁶ However, the resulting measure is additively decomposable into the two sources, mobility due to the transfer of wage within a given structure and mobility due to economic growth or contraction.

Some authors use inequality indices by which it is possible to obtain complete rankings of income distributions (see Bourguignon and Chakravarty, 2003 and Ferreira and Gignoux, 2011). Dardanoni *et al.* (2006) and Pistolesi (2009) use parametric models, while Checchi and Peragine (2010) use a non parametric method for their estimations. In a non-parametric analysis, when the ex-ante approach is used, overall inequality is decomposed into two parts, inequality between types, intended as opportunity inequality, and inequality within types, intended as effort inequality. And to analyse low wage dynamics and persistence of (relative) poverty, a major problem in interpreting evidence on the distribution of wage is the need to distinguish two basically different kinds of

¹²⁶ One feature of the Shorrocks mobility index reviewed is that it is well defined for any number of time periods, not just two. The idea is that, if one were to longitudinally average each person's wage over a number of years, the inequality because each individual's wage fluctuations would be smoothed out and no longer contribute to overall dispersion. See Fields and Ok (1996 and 1999a); Hart (1976a and 1976b) for a review of this argument.

inequality; temporary (i.e., short-term differences in wage), and differences in long-term income status.¹²⁷

3.4.2.1. Decomposition in the long-term in Mexico

In order to provide additional evidence, in this section I decompose inequality with the aim of analysing the long-term evolution of mobility and progressivity and changes in wage inequality. I estimate S-Gini changes and its decomposition in Mexico over the period from 1987 to 2008 and at the same time in five regions. In particular, I consider the inequality change in individuals' annual wage for two consecutive years (real hourly wage of each observation at a given survey year, in the previous year survey and in the next year survey). I estimate these values for the longest period possible in my dataset (and, in fact, in any other currently available dataset for the Mexican economy).

To estimate the S-Gini indices and the components of the decomposition, I proceed as follows. I selected the observations for which a wage was observed in the data for both the base year and the final year. I then estimated a social weight for all these sample observations using an estimate of the empirical cumulative distribution function for each wave, and then, I estimated the sample wage-to-mean values. The S-Gini coefficients, and its change, as well as the components of the decomposition were then estimated using simple sample means and covariances taking sample weights into account.¹²⁸ The analysis has also been conducted for different values of the parameter within the range 1.5 to 4. It turns out that the qualitative results are stable across parameter values and, so, we only report values for $\alpha = 2$, giving the 'standard' Gini coefficient (henceforth Gini coefficient).¹²⁹

The obtained results are presented numerically in Table 3.4. This table refers to the successive annual changes over the period in Mexico while Tables A3.4.1 to A3.4.5 in the Annex 3.4 show the

¹²⁷ Consider two societies that have the same distribution of annual income. In one there is great mobility and change so that the position of particular families in the income hierarchy varies widely from year to year. In the other, there is great rigidity so that each family stays in the same position year after year. Clearly, in any meaningful sense, the second would be the more unequal society. Alternatives to this method include the decomposition into rearranging (horizontal inequity) and ex post inequality (vertical inequity) proposed by King (1983) using an Atkinson index, or decomposition of a change (over time, but easily preconceived as two tax regimes instead of two calendar years) into progressivity of income changes and rearranging proposed by Jenkins and Van Kerm (2006) using a generalized Gini index.

¹²⁸ Standard errors for all these statistics have been obtained by bootstrap resampling taking into account both intraindividual and inter-temporal income correlations see Shao and Tu, 1995; Horowitz, 2001; Biewen, 2002).

¹²⁹ Results for other values of the parameters within the mentioned range are available on request.

results to the regional changes (Border, North, Centre, Capital and South regions, respectively). The tables report estimates of base period and final period inequality and of its change, and report the estimated values of both the progressivity (P) and the reranking (R) components.

Selected results are also presented graphically in Figures 3.4a and 3.4b (for the successive changes) and in Figures 3.5^a and 3.5b (for the regional changes). In Figure 3.4a presents results for Mexico the trends in inequality change and Figure 3.4b the trends in the underlying progressivity and reranking components. Figure 3.5a shows the inequality change among regions and Figure 3.5b depicts the progressivity and reranking components for each one.

The first result that can be highlighted is that the inequality changes that we observe are clearly associated with positive estimates of progressivity. The total decrease in per capita wage inequality is entirely attributable to the progressivity of growth over the period on average. Moreover, the two effects of R and P in Mexico and in their regions contributed to explain the decrease or rising in wage inequality. The wage gains have been more than disproportionately received by the poor. In a general way, this is true for the total and regions results, however, when we review a detail the results reflect some differences among regions in different points of time.

Over the period in Mexico, the equalising effect of 'progressive' wage growth has been more than offset by the disequalising effect of reranking. The same effect is observed in Border, Centre and South regions while the opposite effect happens in the North and Capital regions where the reranking (R) is larger in absolute size than progressivity effect (P).

In general, Tables 3.4 and A3.4.1 to A3.4.5 show that the equalising effect of the progressive income growth is exactly offset by the disequalising effect of reranking. Furthermore, in the periods in which the Gini coefficient fell would have been slight reranking from one year to the next. As we can see, for the total and regions, the results point up the similar effects (on average) of reranking/mobility and progressivity during the long period. Nevertheless, the evidence suggests small individual changes in wage inequality although the wage inequality in Mexico maintains high levels among regions.

The decrease in wage inequality coupled with progressive wage growth while the periods in which increase the inequality are related to reranking component. During the period 1987-996 the

reranking has had a significant disequalising effect on the total wage distribution and in the North region.

Whereas, the reranking effect predominates in the period 1987-1996, except in Capital and South regions. The progressivity effect of growth predominates in the period 1996-2008 at the overall level and in the Border, North, Centre and South regions. Hence, in the periods where the progressivity was greater than reranking the Gini index fell (for example 5.8% in the Border, 4.7% in the North, 4.9% in the Centre, 4.6% in Capital and 7.5% in the South regions on average). If we examine the situation in the different regions, we can observe sharp contrasts.

For the 1997-1998 and 2007-2008 periods, the Figures 3.4b and 3.5b show that the components decrease sharply with substantial variability. The changes of wage inequality in the North region were attributable to the reranking effect for the pre 1997-1998 period, whereas in the period after 1998 only in the Capital region the reranking effect was larger than the rest of the regions.

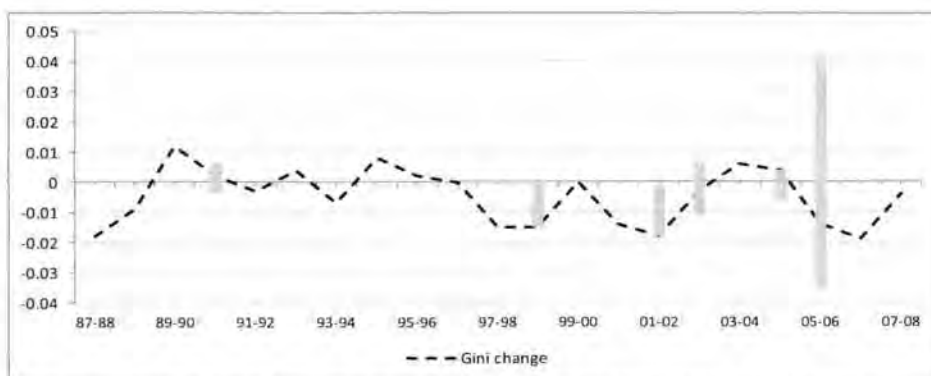
An interesting case is the South region which had experienced larger levels of wage inequality than the others regions in the entire period of study, at the same time, this region shows a constant fall in wage inequality over the period due to the large effect of the progressivity of growth (see Annex 3.4).

Table 3.4. Decomposition of inequality change into pro-poor growth (P) and mobility (R) components for Mexico, 1987-2008

Years	Base Gini (1)	Final Gini (2)	Gini change (3): (2)-(1)	Percentage (4): 100 x (3)/(1)	R comp. (5)	P comp. (6)	N
Annual Change							
1987-1988	0.35	0.33	-0.02 (0.002)	-5.1	0.12 (0.004)	0.14 (0.004)	19047
1988-1989	0.37	0.36	-0.01 (0.002)	-2.4	0.33 (0.005)	0.34 (0.005)	27880
1989-1990	0.38	0.39	0.01 (0.002)	3.2	0.37 (0.005)	0.36 (0.005)	28309
1990-1991	0.39	0.39	0.00 (0.003)	0.5	0.39 (0.005)	0.39 (0.005)	29916
1991-1992	0.39	0.39	0.00 (0.002)	-0.8	0.38 (0.004)	0.38 (0.004)	36052
1992-1993	0.41	0.41	0.00 (0.002)	1.1	0.41 (0.003)	0.41 (0.003)	56179
1993-1994	0.42	0.42	-0.01 (0.002)	-1.6	0.41 (0.003)	0.41 (0.003)	56955
1994-1995	0.43	0.44	0.01 (0.002)	1.9	0.41 (0.003)	0.41 (0.003)	52749
1995-1996	0.44	0.44	0.00 (0.002)	0.4	0.42 (0.003)	0.42 (0.003)	53349
1996-1997	0.45	0.45	0.00 (0.002)	0	0.54 (0.004)	0.45 (0.004)	52416
1997-1998	0.46	0.44	-0.02 (0.002)	-3.2	0.11 (0.003)	0.13 (0.003)	47060
1998-1999	0.44	0.42	-0.02 (0.002)	-3.4	0.39 (0.003)	0.40 (0.003)	57514
1999-2000	0.42	0.42	0.00 (0.002)	0	0.39 (0.003)	0.39 (0.003)	66983
2000-2001	0.42	0.40	-0.01 (0.002)	-3.4	0.40 (0.003)	0.41 (0.004)	66532
2001-2002	0.41	0.40	-0.02 (0.001)	-4.3	0.38 (0.003)	0.40 (0.003)	62999
2002-2003	0.41	0.40	0.00 (0.004)	-0.9	0.40 (0.006)	0.40 (0.005)	30687
2003-2004	0.39	0.40	0.01 (0.002)	1.5	0.39 (0.004)	0.38 (0.004)	38257
2004-2005	0.39	0.40	0.00 (0.002)	1.1	0.39 (0.005)	0.38 (0.005)	34610
2005-2006	0.41	0.40	-0.01 (0.020)	-3.3	0.39 (0.023)	0.40 (0.021)	53835
2006-2007	0.42	0.40	-0.02 (0.020)	-4.5	0.37 (0.023)	0.39 (0.027)	53723
2007-2008	0.43	0.43	0.00 (0.002)	-0.9	0.20 (0.005)	0.21 (0.005)	42304

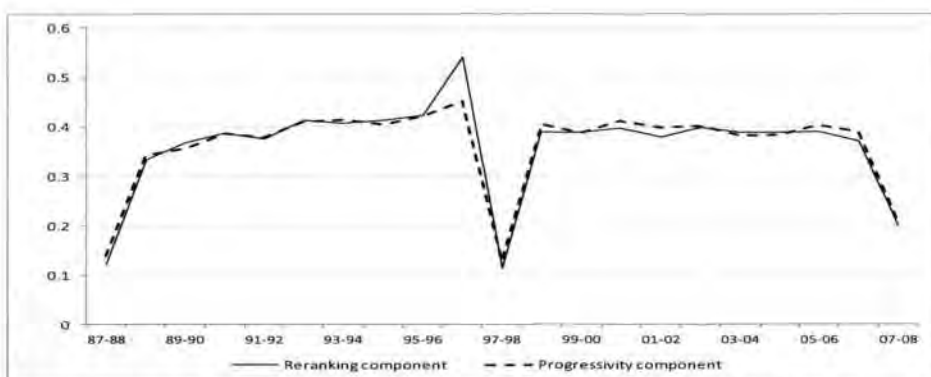
Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008. Notes: (a) Change in inequality $\Delta(v) = \Delta(2)$; (b) Reranking component (mobility), R(2); (c) Progressivity component (pro-poor), P(2). N is the number of individuals in each panel. In parenthesis are the standard errors obtained through bootstrapping.

Figure 3.4a. Successive Gini changes for Mexico, 1987-2008



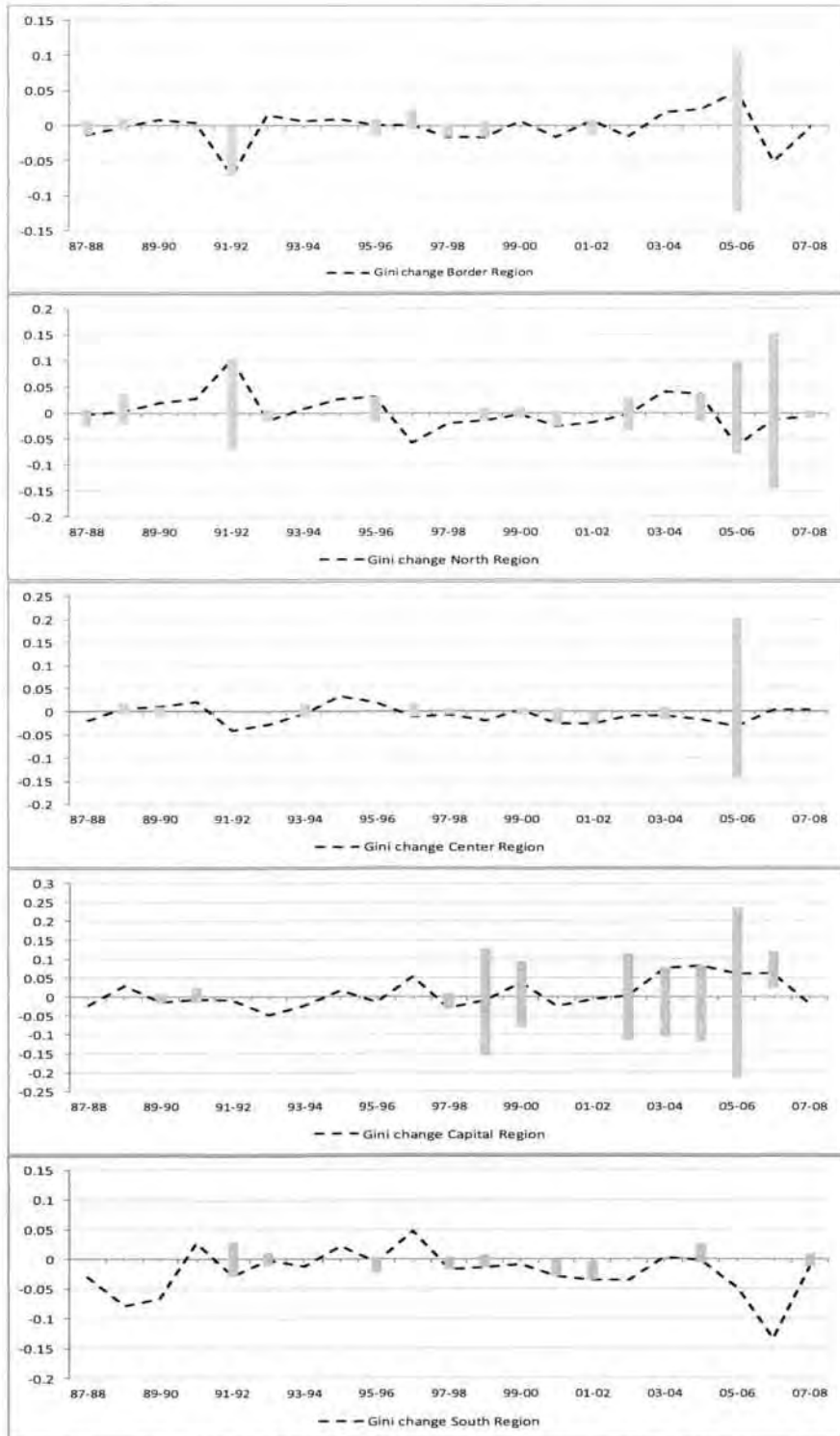
Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008. *Notes:* Vertical bars are bootstrap pointwise 95 perc. conf. bands.

Figure 3.4b. Progressivity and reranking components for Mexico, 1987-2008



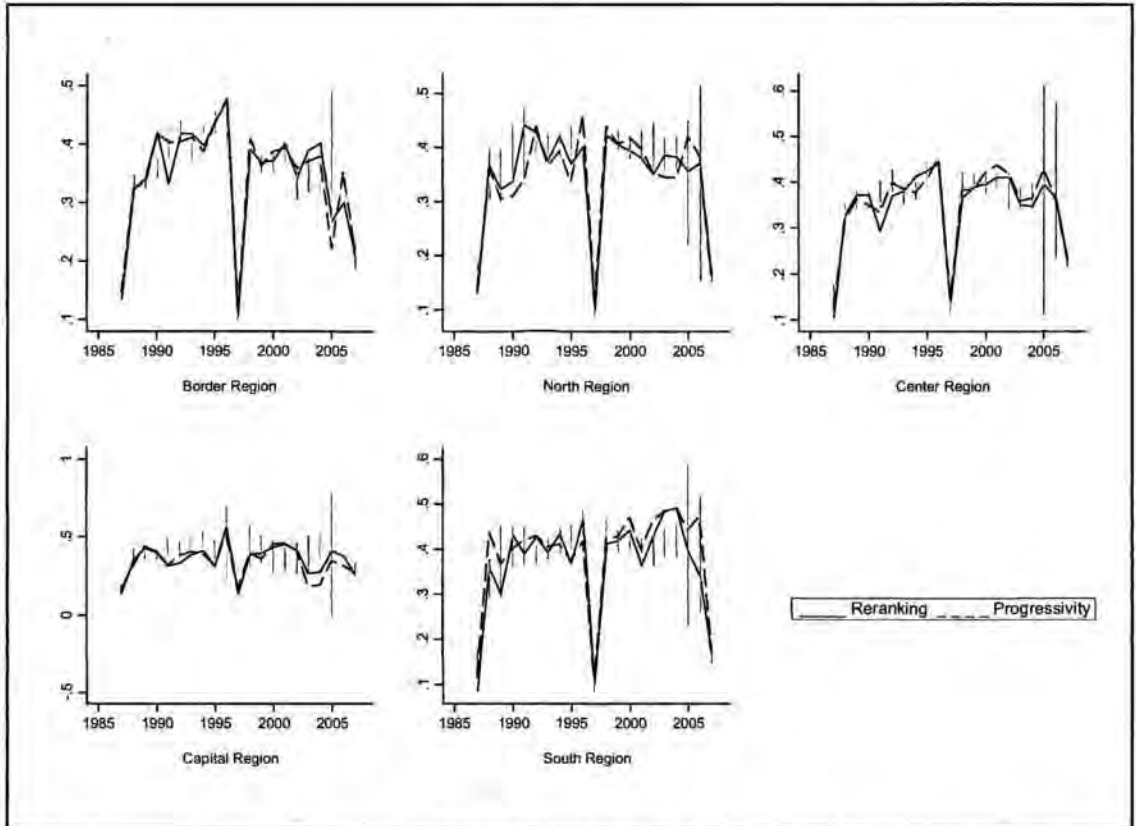
Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

Figure 3.5a. Successive Gini changes by regions, 1987-2008



Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008. Notes: Vertical bars are bootstrap pointwise 95 perc. conf. bands.

Figure 3.5b. Progressivity and reranking components by regions, 1987-2008



Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008. *Notes:* Vertical bars are bootstrap pointwise 95 perc. conf. bands.

From 1987 to 1996 the redistributive effect has been larger for the Border and South region, the absolute value of progressivity was 37 and 38 on average, respectively. Between 1998 and 2008, the values of P for the Centre and South region were 38 and 42.7, respectively. The differences among the other regions show that the redistributive effect of progressivity has ranged in absolute values between 35 and 37 of the base period Gini. In absolute values, the progressivity effect in regions has been similar to the total, i.e. the weighted average of wage-to-mean change was about the same in the Border, North, Centre and Capital regions,¹³⁰ although the progressivity effect has been lower in the Capital region.

¹³⁰ The values obtained for the progressivity effect are similar when compared to the values obtained by Jenkins and Van Kerm (2006) while the values of the reranking/mobility effect are the half of the values obtained for developed countries by the same authors.

Finally, wage variations had a redistributive effect. However, wage variations are also associated with a redistribution of ranks in the income pecking order. To measure the net inequality reduction over time, these rerankings need to be controlled for by adjusting the individuals' social weights according to their new wage. Reranking offset the redistributive effect of progressivity in the five regions. In Mexico, reranking has actually more than offset the progressivity effect over the period, however, the net impact of wage variations on inequality show different trends (increase and decrease) in inequality over two decades. The $P(v)$ component has been larger than the $R(v)$ component in thirteen pairs of years and for the South region in seventeen out of twenty-one pairs of years considered. The reranking effect has been lower (on average) in the Border, North and Centre regions. This may indicate that the gains to the poor in these regions tend to be more balanced across individuals, whereas in the Capital and South regions, the change tend to be of the rags-to-riches type where a few strike substantially richer whereas a majority keep a fairly constant income.

3.4.2.2. Subgroup decomposition for regions in Mexico

In this section, I show that the components of the inequality change can be additively decomposed by subgroup in each region. I perform the analysis using three points of time (1987-1988; 1997-1998 and 2007-2008), periods in which we observe changes in magnitude of the components in comparison to other years. This analysis allows us to observe that most of the change in wage inequality occurs within subgroups and the important differences among regions in each period.

Table 3.5 shows the estimates of the inequality change decompositions by subgroups.¹³¹ Inequality decreased by 1.8, 1.5 and 0.4 percentage points over each of the three periods considered. It is worth mentioning that there are differences in the point estimates of inequality change, but their 95% confidence intervals overlap substantially. The largest change was for 1987-1988, when the Gini coefficient decreased by 1.8 percentage points from 0.349 to 0.303. Between 1997 and 1998 the Gini coefficient decreased 1.5 percentage points from 0.458 to 0.443. While in 2007-2008 the change is small and the reduction of Gini coefficient was of 0.4 percentage points from 0.434 to 0.430. There is a consistent pattern to the decomposition too (the cases are illustrated in Figure 3.6).

¹³¹ For each pair of years, the sample consists of all valid wage pairs in the dataset. This sample construction implies that Gini estimates for a given year taken as base year may differ slightly from the estimates of the same year when taken as final period, since estimation samples are different (the whole panel data series is unbalanced).

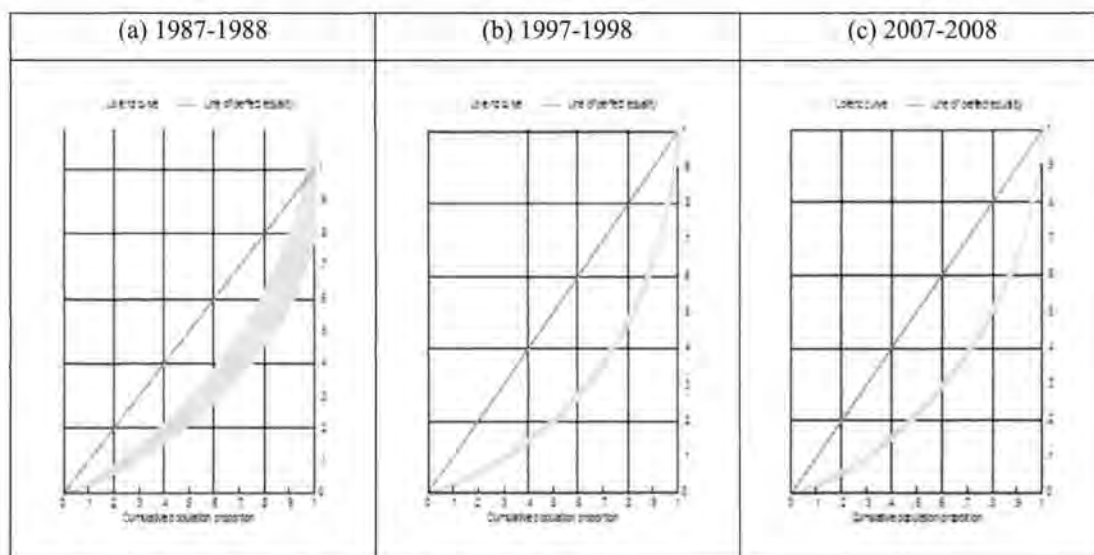
Table 3.5. Subgroup decomposition of inequality change into pro-poor growth (P) and mobility (R) components for Mexico, 1987-2008

	1987-1988			1997-1998			2007-2008		
	Initial Gini	Final Gini	Change in Gini*	Initial Gini	Final Gini	Change in Gini*	Initial Gini	Final Gini	Change in Gini*
General	0.349	0.332	-0.018 (0.002)	0.458	0.443	-0.015 (0.002)	0.454	0.430	-0.024 (0.002)
Border	0.355	0.341	-0.014 (0.004)	0.466	0.451	-0.016 (0.003)	0.384	0.392	0.008 (0.004)
North	0.316	0.313	-0.003 (0.009)	0.467	0.448	-0.020 (0.005)	0.432	0.426	-0.006 (0.007)
Center	0.334	0.315	-0.020 (0.009)	0.434	0.427	-0.007 (0.005)	0.420	0.424	0.004 (0.007)
Capital	0.342	0.319	-0.023 (0.005)	0.426	0.397	-0.029 (0.008)	0.468	0.452	-0.017 (0.007)
South	0.364	0.353	-0.011 (0.010)	0.464	0.446	-0.018 (0.003)	0.464	0.452	-0.012 (0.010)
16 to 25	0.309	0.293	-0.016 (0.005)	0.360	0.348	-0.012 (0.004)	0.336	0.335	-0.001 (0.006)
26 to 45	0.350	0.340	-0.010 (0.005)	0.436	0.426	-0.011 (0.006)	0.415	0.418	0.003 (0.006)
46 to 65	0.355	0.327	-0.029 (0.007)	0.501	0.487	-0.014 (0.004)	0.485	0.47	-0.015 (0.010)
Low	0.294	0.27	-0.023 (0.003)	0.339	0.322	-0.018 (0.003)	0.296	0.296	0.001 (0.003)
Medium	0.301	0.277	-0.023 (0.005)	0.339	0.345	0.006 (0.009)	0.332	0.319	-0.013 (0.006)
High	0.32	0.314	-0.005 (0.004)	0.43	0.411	-0.019 (0.002)	0.452	0.451	-0.001 (0.007)
Micro	0.386	0.31	-0.075 (0.008)	0.332	0.331	-0.001 (0.013)	0.344	0.340	-0.004 (0.008)
Small	0.317	0.342	0.026 (0.013)	0.410	0.407	-0.004 (0.018)	0.433	0.428	-0.005 (0.018)
Medium and Large	0.314	0.301	-0.013 (0.003)	0.429	0.411	-0.017 (0.005)	0.437	0.428	-0.009 (0.008)
AFRMS (1)	0.345	0.304	-0.043 (0.036)	0.489	0.457	-0.033 (0.021)	0.544	0.478	-0.066 (0.046)
IMS (2)	0.298	0.303	0.004 (0.004)	0.405	0.402	-0.002 (0.004)	0.384	0.381	-0.003 (0.009)
TSS (3)	0.284	0.276	-0.008 (0.001)	0.441	0.408	-0.032 (0.012)	0.416	0.428	0.011 (0.017)
TSS (4)	0.378	0.353	-0.025 (0.003)	0.466	0.452	-0.014 (0.002)	0.446	0.442	-0.003 (0.002)
N									
				15047	47060	42304			

Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

Notes: (a) Change in inequality $\Delta(v) = \Delta(2)$; (b) Reranking component (mobility), R(2); (c) Progressivity component (pro-poor), P(2); (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply. (3) Transport, Storage and Communications Sector, (4) Trade and Services Sector. Including Financial Services. N is number of individual in each panel, 1987-1988, 1997-1998 and 2007-2008. In parenthesis are the standard errors obtained through bootstrapping.

Figure 3.6. Lorenz curves for wages in Mexico by subperiods



Source: Based on data panel ENEU-ENOE surveys from 1987 to 2008.

The table also shows that the inequality change decompositions for regions decreased between 1987 and 2008, except for the Centre region in the third period in which they increased 0.4 percentage points. We can stress that in 1987-1988, inequality in the Border, Capital and South regions took down by more 1.4 and 3.1 percentage points, from 1997 to 1998 turned down between 1.6 and 2.9 percentage points. Instead of the inequality decreased in the third period the results show slight changes by regions. Similar results can be observed in age group, level education, size firm and sector economic. Only the inequality rose by more 0.1 and 2.6 in small size firm and in the Industry and Manufacturing sector during 1987-1988 and from 2007 to 2008 in the Centre region, the 26 to 45 age group, the low level of education and Transport, Storage and Communication Sector. There is a consistent pattern to the decomposition, too.

Wage growth over each period was progressive: $P > 0$ in each case. That is, wage growth was pro-poor- proportionately greater for the relatively poor than for relatively rich.¹³² With pro-poor wage growth, a number of individuals who were poor in the initial year moved out of low wage, but were replaced at the bottom of the wage distribution by individuals who were non-poor initially and who had lower wages (on average) in the final year of the period than those whom they replaced. Put more generally, when the inequality in each cross-section was decreasing, there were also changes

¹³² Similar examples can be found in Danziger and Gottschalk (1995); in Gottschalk and Smeeding (1997) and in Karoly (1992).

in membership of the poor, middle-wage and rich groups. By contrast, I calculate wage changes for regions with a fixed group membership (defined by initial wage position), and add in a separate term to account for changing wage regions membership in the three periods.¹³³ More specifically, we see from Table 3.4 that, in general, in each panel the progressivity index P was larger than of the reranking index R. Looking at within regions results, I find that in some regions the equalizing effect of progressive wage growth was more than offset by the disequalizing effect of reranking.

Clearly, over the three periods in Mexico, the table shows similarities and differences by region subgroups. Wage inequality was significantly higher in the period 1997-1998 in the five regions: for example, in 1998 the Border region Gini coefficient was 0.451 compared to 0.341 in 1988. Inequality grew during the mid-1990s in all regions. In 2007-2008 the rate was generally similar even in the Capital and South regions with Gini coefficients larger than in the previous periods.

More specifically, we can see from Tables A3.5.1 to A3.5.5 in Annex 3.5 that there is a notable difference in the patterns for the five regions during 1987-2008. It can be seen that progressivity of wage growth was significantly higher in the regions, except in the Centre region in 1987-1988. The decomposition of inequality change in the Border region was substantial reranking in 1987-1988 for individuals in the small, medium and large firms and in the Industry and Manufacturing sector, this pattern change in the second period where only the medium level education was reranking. From 2007 to 2008 the inequality change (where $R > P$) were in the 45 to 65 age group and Transport, Storage and Communications sector. In Table 3.6 we show the components expressed as percentage of initial S-Gini, we can see that the reranking in these groups were from 32.2% to 78%. In the North region there are different patterns in each group of analysis and the period. In 1987-1988 the groups which $R > P$ were the 16 to 25 and 46 to 65 age group; medium and high level of education and the Industry and Manufacturing and Transport, Storage and Communications sectors. There is a notable difference in the patterns for the two next periods from 1997 to 1998 the only groups that were $R > P$ medium level education and small firm. And in 2007-2008 the age group of 26 to 45 years and Industry and Manufacturing sector. In the Centre, Capital and South regions find more groups where the reranking index R was larger than of the progressivity index P in particular during the third period 2007-2008 see the Annex 3.6 (Tables A3.6.1 to A3.6.5).

¹³³ When I treated the ENEU-ENOE panel data as series of separate cross-sections, I found that wage changes for different groups took patterns as those described related to the changes in the economic structure in Mexico in some studies cited earlier.

These results on the five regions show that the relation between the components of reranking and progressivity ($R > P$ or $R < P$) in some groups were greater only by a small amount and, as it happens, during the three periods, the components offset each other almost exactly (and inequality hardly changed). However, comparing the proportion that each component represent of the initial Gini in the three periods and by region it can be stressed that from 2007 to 2008 the percentage was larger than the percentage between 1987 and 1998 (Tables A3.6.1 to A3.6.5).

Table 3.6. Subgroup components expressed as percentage of initial S-Gini for Mexico, 1987-2008

	Change in Gini ^a	Reranking ^b	Progressivity ^c	Change in Gini ^a	Reranking ^b	Progressivity ^c	Change in Gini ^a	Reranking ^b	Progressivity ^c	
		(R)	(P)		(R)	(P)		(R)	(P)	
	1987-1988			1997-1998			2007-2008			
General	-5.1	35.0	40.1	-3.2	24.9	28.1	-0.9	46.5	47.4	
Region	Border	-4.0	37.8	41.8	-3.4	22.8	28.1	-0.5	52.9	53.4
	North	-0.9	41.8	42.7	-4.2	21.4	25.6	-1.4	37.0	38.3
	Center	-5.9	31.7	37.6	-1.5	31.9	33.4	0.9	56.7	55.7
	Capital	-6.7	39.6	46.3	-6.8	31.9	38.7	-3.6	55.1	58.7
	South	-8.0	22.6	30.6	-3.8	22.1	25.9	-2.6	36.2	38.9
Age	16 to 25	-5.2	35.3	40.4	-3.4	34.7	38.1	-0.2	65.5	65.7
	26 to 45	-2.9	39.6	42.5	-2.5	27.8	30.2	0.8	47.3	46.6
	46 to 65	-8.0	30.6	38.6	-2.8	22.2	25.0	-3.0	42.4	45.5
Education	Low	-7.9	38.2	46.1	-5.2	33.5	38.6	0.1	60.3	60.2
	Medium	-7.8	47.3	55.1	1.8	36.0	34.2	-3.9	51.8	55.8
	High	-1.7	51.7	53.4	-4.3	34.1	38.4	-0.2	50.7	50.8
Financial Services	Micro	-19.5	31.9	51.4	-0.3	40.6	40.9	-1.2	52.3	53.5
	Small	8.1	60	51.8	-0.9	28.2	29.1	-1.0	37.6	38.6
	Medium and Large	-4.0	40.5	44.5	-4.0	29.8	33.8	-2.0	48.5	50.5
Economic Sector	AFFMS (1)	-12.3	41	53.3	-6.7	27.2	34.0	-12.2	43.1	55.3
	IMS (2)	1.2	47.5	46.3	-0.6	29.4	30.0	-0.7	57.1	57.8
	TSCS (3)	-2.9	49.7	52.5	-7.3	23.7	31.0	2.8	53.5	50.7
	TSS (4)	-6.5	29.1	35.7	-3.0	23.7	26.7	-0.7	43.0	43.8
N		19047		47060		42304				

Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008. Notes: (a) Change in inequality $\Delta(v) = \Delta(2)$; (b) Reranking component (mobility), $R(2)$; (c) Progressivity component (pro-poor), $P(2)$. (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply. (3) Transport, Storage and Communications Sector, (4) Trade and Services Sector. Including Financial Services. N is number of individual in each panel, 1987-1988, 1997-1998 and 2007-2008.

Finally, the subgroup decomposition in regions allows observing that wage mobility is essentially a divergent process among regions and the high levels of wage mobility not improve the measures of wage inequality in Mexico. Accordingly, the equalizing effect of the progressive wage growth is offset by the disequalising effect of reranking. From an economic policy perspective, wage mobility can reflect economic, political and social changes of the environment in Mexico, but within regions, it can also express important differences in the structure of their labour market and the allocation of some economic sectors and enterprises.

3.5. Concluding remarks

In this chapter, I investigated the link between individual wage inequality and mobility in Mexico from 1987 to 2008. The empirical analysis has considered the case of five regions (Border, North, Centre, Capital and South) as well as the various subgroups by regions formed on the basis of different criterion (e.g. age group, education level, firm size and economic sector).

Using the framework proposed by Jenkins and Van Kerm (2006) inequality changes are seen as the net effect of intra-distributional changes.¹³⁴ I applied this method to study the intra-distributional changes that were associated with different trend in wage inequality in Mexico over two decades. The obtained results following this approach can be summarised as follows:

First, contrary to other developing countries in Mexico the inequality decreases are associated with substantial progressivity. The year-to-year wage gains are not equally distributed across all individuals, but tend to be higher for the poorest individuals. If we keep the base period social weights as reference, mobility is clearly welfare improving.

Second, the progressivity effect is more than offset by rerankings; in particular in the North and the Capital regions. Thence, after adjusting the social weights according to the new wage ordering, the net effect in these regions is related to an increase in inequality.

¹³⁴ Jenkins and Van Kerm (2006) point out that "More specifically, the change in the S-Gini coefficient over time is written as the difference between an inequality reducing progressivity effect (when the income gains are more than proportionally concentrated on the poor) and an (inequality increasing) effect resulting from the adjustment of social weights due to the reranking of individuals in the income pecking order over time."

Third, in absolute values, the progressivity component has been similar over the analysed period, but this result clearly changes in the second decade. We can also highlight the different situation of two particular regions: first, in the South region the progressivity component was larger than the rest of regions and experienced a small decrease in inequality, however in this region a higher inequality prevails; Second, in contrast, in the Capital region the reranking component was larger than the progressivity component; thence this region has experienced larger inequality increases.

Fourth, when progressivity is considered in relation to the inequality level, that is, when measuring the percentage reduction of inequality that progressivity would imply in the absence of rerankings, the picture is favourable only in some periods and regions. For example in Border region for the 1991-1992 and the 2006-2007 periods; in the North region for 1996-1997 and 2005-2006; in the Centre region or 1991-1992; in the Capital region for 1992-1993 period and in the South region from 1988 to 1990 and from 2005 to 2007.

Fifth, the obtained results have also shown that there is a high mobility in terms of wages, but also that there are some individuals in the bottom three-quintiles that have experienced a clear increase in the economic ladder. Specifically, we have analysed year-to-year transition probabilities between quintiles as well as the probabilities of moving in and out of the wage distribution, so focusing on the short-term dynamics due to data limitations. In this context, our main findings concerning relative wage mobility in Mexico in these three different periods are the following: first, wage growth over each period was progressive ($P > 0$ in each case); second, wage growth in Mexico was pro-poor in the three periods, but the inequality-reducing effect in some regions was offset by the effect of reranking and, as a result, overall reduction in cross-sectional inequality was only modest. Notwithstanding, there are also relevant differences by regions, age groups, education levels, firm size and economic sector.

As previously explained, these differences are in line with the described changes in the structure of the Mexican Economy and the relevance of trade liberalization in these different subperiods. Moreover, the relative wage mobility in Mexico and its regions is roughly of the same magnitude for year-to-year mobility and for the relative and absolute mobility is slightly higher than in developed countries in some years. The obtained results for the five different regions show that the relationship between the components of reranking (mobility) and progressivity ($R > P$ or $R < P$) in some groups were greater only by a small amount and, as it happens, during the three periods, the components offset each other almost exactly (and inequality hardly changed).

Last, our results suggest, on the one hand, that the wage growth was pro-poor and, hence, generated an inequality reduction, but this was offset by changes in the wage pecking order that have a disequalizing impact. So, the decrease in cross-section inequality is reflective of wage reranking and, therefore, low wages appear not to be a transitory phenomenon, but a permanent one. And, on the other hand, the increases in inequality in different periods have been associated with an upward trend in reranking wages. So, the obtained results support the hypothesis that wage growth in Mexico and their regions was not strongly pro-poor over the period.

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Annex 3.1. Methodological note of the decomposition of inequality change

Wage or income inequality has been commonly measured by the Gini coefficient. The Jenkins and Van Kerm's (2006) approach decomposes the change in the Gini coefficient over time as the difference between two components reflecting the degree of income mobility associated with the distributional change¹³⁵. The Gini coefficient used is similar as presented by Donaldson and Weymark (1983), the S-Gini coefficient is expressed as a weighted average of the difference between the Lorenz curve of the income distribution (L) and the line of perfect equality:

$$G(v) = \int_0^1 k(s; v)(s - L(s))ds, \quad v > 1, \quad (\text{A3.1})$$

where $k(s; v) = v(v-1)(1-s)^{v-2}$. $G(v)$ ranges between zero (income equality) and one (maximal inequality).¹³⁶ Integrating (A3.1) by parts and applying a change of variable $s = F(x)$ (where F is the cumulative distribution function of income), the S-Gini coefficient can also be written as

$$G(v) = 1 - \int_{Z_-}^{Z_+} w(F(x); v) \frac{x}{\mu} f(x)dx \quad (\text{A3.2})$$

where $w(F(x); v) = v(1-F(x))^{v-1}$, f is the probability density function of income x , and Z_- and Z_+ are the lower and upper limits of the domain of x , i.e. $Z_- = F^{-1}(0)$ and $Z_+ = F^{-1}(1)$. Writing the S-Gini coefficient in this way reveals that it is a weighted mean of each individual's relative wage (i.e. wage divided by the mean) where the weight, $w(F(x); v) > 0$, is a decreasing function of the individual's rank in the wage pecking order. The rank of a person with wage x is given by $F(x)$ and is thus the proportion of people with a wage less than x . Each individual's contribution to aggregate inequality is therefore determined by both her relative wage and her wage rank.

The inequality change considers the change in the S-Gini between some base year (0) and final year (1) for a fixed population of individuals. Letting L_j denote the Lorenz curve for the year j , the change in $G(v)$ can be written

¹³⁵ In my case, the change in wage inequality.

¹³⁶ v is an inequality aversion parameter.

$$\Delta G(v) \equiv G_1(v) - G_0(v) = \int_0^1 k(s; v)(L_0(s) - L_1(s))ds \quad (\text{A3.3})$$

or,

$$\Delta G(v) = \int_Z^{Z^+} w(F_0(x); v) \frac{x}{\mu_0} f_0(x) dx - \int_Z^{Z^+} w(F_1(x); v) \frac{x}{\mu_1} f_1(x) dx \quad (\text{A3.4})$$

where F_j , f_j , and μ_j are the cumulative distribution, the density function and the mean wage in year j . Equation (A3.4) indicates that inequality changes are associated with both changes in individuals' relative wages and changes in their social weights (which depend on their ranks in the wage distribution). These two types of changes may not be independent since a large increase in relative wage will often be associated with an increase in rank and hence a reduction in social weight. Wage changes and rank changes are not perfectly correlated, however.¹³⁷

In consequence, the concentration curve of year 1 wages where individuals are ordered according to year 0 wages:

$$C_1^{(0)}(p) = \mu_1^{-1} \int_{Z^-}^{F_0^{-1}(p)} E_1(x) f_0(x) dx \quad (\text{A3.5})$$

where $E_1(x)$ is the expectation of year 1 wage conditional on year 0 wage being equal to x . From (A3.3) by adding and subtracting $C_1^{(0)}$ to the Lorenz curves the components of the key expression (3.6), showed in section 3.2 comes from:

$$\begin{aligned} P(v) &= \int_0^1 k(s; v) (C_1^{(0)}(s) - L_0(s)) ds \\ &= (v) - G_1^{(0)}(v) \end{aligned} \quad (\text{A3.6})$$

¹³⁷ For instance, a mean-preserving spread of wages reduces the wages of those with relative wages less than one and increases the wages of those with relative wages greater than one, but ranks are preserved. Ranks are also preserved if all wages change uniformly, whether in proportionate or absolute terms. Moreover, an individual's relative wage may remain constant but her social weight change, because the relative wages of other individuals change.

$$\begin{aligned}
R(v) &= \int_0^1 k(s; v) \left(C_1^{(0)}(s) - L_1(s) \right) ds \\
&= G_1(v) - G_1^{(0)}(v)
\end{aligned}
\tag{A3.7}$$

and where $G_1^{(0)}(v)$ is the (generalized) concentration coefficient for year 1 wages calculated using year 0 rankings. As we explain shortly, $P(v)$ can be interpreted as a measure of the progressivity of wage growth and $R(v)$ can be interpreted as an index of mobility in the form of reranking. Thus (3.6) states that inequality is reduced by progressive wage growth unless more than offset by concomitant wage mobility.

$P(v)$ and $R(v)$ can be interpreted further by rewriting them in terms of the joint distribution of wages in years 0 and 1. Letting h denote the joint probability density function of wages in years 0 and 1, we can also write:

$$P(v) = \int_{z^-}^{z^+} \int_{z^-}^{z^+} w(F_0(x); v) \left[\frac{y}{\mu_1} - \frac{x}{\mu_0} \right] h(x, y) dx dy,
\tag{A3.8}$$

$$R(v) = \int_{z^-}^{z^+} \int_{z^-}^{z^+} [w(F_0(x); v) - w(F_1(y); v)] \left(\frac{y}{\mu_1} \right) h(x, y) dx dy.
\tag{A3.9}$$

These expressions show that $P(v)$ is a social-weighted average of the changes in relative wages between years 0 and 1 with weights determined by year 0 ranks. It summarizes the progressivity of wage growth across the base year wage distribution. When everyone experiences equi-proportionate wage growth, relative wages remain constant, and $P(v)=0$. Insofar as the three elements of the decomposition from (3.6) cannot have three distinct and independent welfare implications. For a given level of progressivity $P(v)$, a higher $R(v)$ will lead to lower reduction in cross-section inequality between a base year and final year. For a given change in inequality over time $\Delta G(v)$, a higher $R(v)$ will be associated with a greater progressivity of wages, i.e. a growth of wages which is more 'pro-poor'. Holding reranking fixed, more pro-poor wage growth is associated with lower inequality growth.

Table A3.2.1. Wage inequality estimates for Mexico by Regions, 1987-2008

Gender/Region	1987-1988						1997-1998						2007-2008						
	Relative mean deviation	Coefficient of variation	Gini coefficient	Mehran measure	Piesch measure	Theil GE(-1)	Relative mean deviation	Coefficient of variation	Gini coefficient	Mehran measure	Piesch measure	Theil GE(-1)	Relative mean deviation	Coefficient of variation	Gini coefficient	Mehran measure	Piesch measure	Theil GE(-1)	
A	23.4	82.7	33.1	42.9	28.2	21.7	16.7	24.8	88.1	34.7	44.5	28.8	23.7	20.0	33.0	42.7	28.2	23.6	16.7
B	26.9	84.7	38.1	49.3	32.5	25.8	23.8	33.8	105.2	45.0	57.1	38.9	36.5	33.1	38.9	50.5	33.1	28.2	23.6
C	27.9	100.7	41.2	62.0	35.9	28.4	28.4	37.0	114.0	49.4	62.9	42.6	43.3	42.2	44.4	58.8	38.2	36.1	33.3
D	23.3	80.2	33.5	43.2	28.7	23.8	19.7	24.1	88.4	34.2	43.8	29.3	23.9	19.7	28.0	37.2	23.4	16.8	13.8
E	24.7	86.6	34.6	44.3	29.7	23.5	19.9	25.2	90.5	35.1	45.1	30.2	24.3	20.4	22.3	42.1	26.8	20.1	17.5
F	26.7	77.1	36.9	48.9	30.9	23.2	22.4	32.5	97.3	44.3	57.8	37.6	34.0	33.7	31.1	100.0	43.3	36.6	33.1
G	26.5	108.4	37.8	47.9	32.7	30.6	25.1	28.2	112.9	39.3	49.3	34.3	32.7	25.9	24.2	30.2	29.3	23.6	20.2
H	29.2	97.6	39.3	48.0	34.5	30.3	25.1	33.9	111.9	45.0	56.1	38.4	38.2	33.0	27.7	94.8	38.8	33.1	28.2
I	25.5	78.1	35.0	45.3	29.8	22.0	18.8	33.3	105.1	44.3	56.1	38.4	35.8	32.2	29.8	101.1	40.9	35.1	31.4
J	26.1	80.3	35.9	46.4	30.6	23.1	20.6	37.2	105.3	48.4	62.1	41.6	40.5	40.7	34.1	94.8	44.9	38.2	34.4
K	23.0	75.4	32.0	41.2	27.3	19.3	16.5	28.5	106.3	38.8	48.3	34.0	31.0	24.6	25.4	95.7	35.7	45.8	30.6
L	22.6	67.3	31.4	41.4	26.4	17.4	15.8	32.0	108.4	43.6	55.8	37.6	35.4	31.7	28.4	105.1	41.1	53.3	35.0
M	30.6	96.7	41.7	53.3	35.9	31.7	28.2	36.4	112.2	41.8	60.9	41.6	41.5	39.1	29.5	100.7	40.8	52.5	35.0
North Region																			
A	24.3	74.4	34.1	45.2	26.5	20.6	19.9	26.9	107.0	37.2	47.1	32.3	25.1	22.8	23.8	94.5	43.4	26.9	23.3
B	25.3	76.2	35.2	46.5	29.5	21.8	20.8	31.4	92.2	42.5	55.7	38.0	31.1	30.6	30.4	93.8	41.7	54.3	35.4
C	24.7	74.8	34.7	45.6	29.2	21.3	20.3	27.9	121.4	50.8	64.7	43.8	46.5	45.7	34.1	101.3	45.8	59.3	35.5
D	19.3	60.6	27.9	38.5	22.7	14.2	14.2	22.9	84.8	32.3	41.9	27.5	21.1	17.4	22.2	77.2	31.5	41.8	26.4
E	22.8	72.7	32.4	42.8	27.2	19.3	17.9	27.0	96.2	37.3	47.7	32.2	27.3	22.9	23.3	82.6	32.9	43.3	27.7
F	22.1	65.2	31.3	42.4	25.8	17.0	16.5	30.4	93.7	41.9	55.3	35.2	30.8	30.4	31.4	93.0	43.2	57.0	36.3
G	23.3	71.9	33.2	45.1	27.2	19.7	19.9	23.4	107.5	33.4	42.7	28.7	25.4	19.0	26.4	94.0	36.9	47.3	31.8
H	20.5	63.7	28.7	37.6	24.3	15.1	13.4	31.9	110.7	42.7	53.2	37.5	35.6	29.7	30.1	96.2	41.3	53.7	35.1
I	23.9	71.6	33.1	43.7	27.8	19.2	17.8	31.1	95.3	42.5	55.4	38.0	31.8	30.5	31.8	96.4	43.5	56.5	38.9
J	26.8	86.5	38.0	49.5	32.2	26.6	24.5	38.2	141.2	51.5	62.5	46.0	53.3	44.5	31.0	107.3	42.9	55.2	36.8
K	23.8	77.6	32.7	41.6	28.2	20.4	17.2	31.8	123.6	43.0	53.0	38.0	38.7	30.4	25.2	84.0	35.5	46.3	30.1
L	19.1	66.2	27.0	36.5	22.8	14.6	15.3	33.4	141.6	46.4	57.4	40.9	46.6	38.5	29.7	106.1	41.8	53.9	35.7
M	27.4	76.7	38.0	51.2	31.5	24.6	25.7	34.1	103.2	45.7	58.9	39.0	36.5	35.3	32.2	95.4	43.6	56.1	37.3
Center Region																			
A	23.5	71.9	33.5	44.8	27.9	20.9	19.8	25.7	97.2	35.8	45.8	30.8	25.5	21.1	23.2	85.7	33.2	43.9	27.9
B	25.9	75.9	35.9	47.9	30.0	22.3	22.1	31.2	94.0	42.3	54.9	36.0	31.2	29.7	28.6	98.7	41.3	53.7	36.0
C	26.9	78.3	37.4	48.8	31.3	24.0	24.0	34.3	107.0	45.9	59.9	39.5	37.8	35.5	35.1	111.0	47.4	60.1	41.0
D	22.1	69.7	31.8	43.1	26.1	18.3	18.1	21.5	86.5	30.1	40.1	25.1	16.2	14.9	20.3	67.6	29.3	40.1	15.9
E	23.4	71.1	33.0	43.8	27.6	20.2	18.9	24.0	82.5	33.5	44.0	28.2	20.9	18.3	22.4	76.8	32.1	43.2	26.5
F	22.6	66.7	32.9	44.6	27.1	18.3	18.5	30.0	88.6	41.2	54.7	34.5	29.1	29.2	33.3	103.4	45.8	59.7	38.8
G	25.4	91.6	36.3	48.1	30.4	25.3	24.2	22.8	83.8	32.3	41.6	27.6	21.1	17.4	23.6	86.6	33.9	44.5	28.5
H	21.7	71.2	30.6	40.1	25.8	17.6	15.7	28.0	96.6	38.1	48.4	33.0	27.9	23.5	29.4	98.7	41.0	53.2	34.9
I	24.0	69.5	33.1	44.1	27.6	18.9	18.0	30.2	92.6	41.2	53.6	35.0	29.8	28.1	31.5	107.0	43.7	56.7	37.1
J	37.6	111.4	49.6	63.9	42.4	42.9	43.6	33.5	124.4	44.9	55.4	39.6	40.8	32.8	34.3	109.7	45.4	62.3	39.9
K	22.3	71.6	31.2	40.9	26.4	16.1	16.3	28.7	96.4	39.1	49.6	33.8	29.4	24.8	26.0	88.1	35.9	47.2	30.3
L	26.2	74.8	35.6	47.2	30.1	21.9	21.1	27.8	94.2	38.4	50.1	32.6	27.2	24.5	30.6	113.5	43.0	56.2	36.9
M	28.1	82.8	39.0	51.9	32.5	26.1	26.6	33.9	104.1	45.3	57.9	39.0	36.4	34.1	31.8	105.1	43.5	55.8	37.4

Capital Region	1987-1988										1997-1998										2007-2008									
	Relative mean deviation	Coefficient of variation	Gini coefficient	Mishan measure	Fischer measure	Theil entropy GE(1)	Theil mean log deviation GE(1)	Relative mean deviation	Coefficient of variation	Gini coefficient	Mishan measure	Fischer measure	Theil entropy GE(1)	Theil mean log deviation GE(1)	Relative mean deviation	Coefficient of variation	Gini coefficient	Mishan measure	Fischer measure	Theil entropy GE(1)	Theil mean log deviation GE(1)									
A	23.3	80.1	35.5	44.4	28.0	21.3	19.8	34.7	81.8	34.2	44.2	29.2	22.0	19.0	24.9	112.3	38.0	48.6	32.7	29.9	23.9									
B	25.0	72.9	34.7	45.9	29.1	20.8	20.6	30.8	92.3	41.7	53.5	35.6	30.4	28.5	32.4	114.3	44.7	57.1	38.6	37.7	33.5									
C	27.5	81.7	37.8	48.2	31.7	24.7	23.9	33.4	111.3	45.1	57.7	38.8	37.4	34.1	38.4	131.6	51.7	63.8	45.9	51.7	46.1									
E	21.0	67.4	30.4	41.4	24.8	17.1	17.4	20.2	66.0	28.5	37.9	23.8	15.1	13.4	22.3	77.0	31.7	42.5	26.4	18.9	16.8									
F	21.3	65.6	30.0	39.9	25.0	16.2	15.1	22.7	69.2	31.8	42.1	28.7	17.9	16.4	23.6	96.7	33.9	45.1	26.3	23.2	16.8									
G	24.1	89.3	33.3	44.4	27.8	18.9	18.1	29.8	89.9	41.1	54.2	34.5	20.2	28.7	35.8	123.2	50.2	63.7	43.4	46.1	43.9									
H	26.0	86.8	36.3	48.2	30.3	24.9	24.3	23.1	103.3	32.6	41.8	28.2	24.3	18.2	25.2	112.3	36.2	46.9	30.8	28.3	22.2									
I	21.8	68.8	30.3	39.2	25.9	17.4	15.1	28.8	89.8	38.6	49.1	33.4	27.4	23.9	33.1	106.6	44.7	57.4	38.4	36.1	33.3									
J	23.9	71.3	32.9	43.1	27.8	19.0	17.4	29.7	90.5	40.5	52.9	34.3	28.7	27.1	35.9	126.0	48.2	62.0	42.8	45.6	41.3									
K	26.0	70.0	36.1	48.4	29.4	21.3	22.4	30.1	81.4	38.8	52.5	33.4	26.4	26.5	18.3	66.6	27.1	36.1	22.9	15.1	12.8									
L	23.5	76.0	32.5	41.8	27.9	20.1	17.3	26.8	99.8	39.2	48.0	34.3	30.3	24.8	30.2	118.3	42.2	53.6	36.5	35.3	29.5									
M	24.1	86.5	32.5	43.2	27.2	17.7	16.9	31.2	119.2	42.6	54.3	36.7	36.1	30.3	32.5	124.1	46.5	57.6	39.4	40.7	35.0									
N	26.2	79.0	36.7	48.7	30.6	23.6	23.6	31.6	97.3	42.7	55.2	36.5	32.2	30.1	34.4	124.4	47.1	59.1	41.0	42.6	37.0									
South Region	1987-1988										1997-1998										2007-2008									
	Relative mean deviation	Coefficient of variation	Gini coefficient	Mishan measure	Fischer measure	Theil entropy GE(1)	Theil mean log deviation GE(1)	Relative mean deviation	Coefficient of variation	Gini coefficient	Mishan measure	Fischer measure	Theil entropy GE(1)	Theil mean log deviation GE(1)	Relative mean deviation	Coefficient of variation	Gini coefficient	Mishan measure	Fischer measure	Theil entropy GE(1)	Theil mean log deviation GE(1)									
A	23.8	70.1	34.0	45.2	27.9	20.0	20.5	28.6	101.5	35.5	45.3	34.0	30.2	25.7	24.1	81.2	33.8	44.3	28.5	21.3	18.7									
B	26.0	78.5	36.1	47.4	30.4	23.0	21.9	33.4	95.2	44.9	58.5	38.2	34.3	34.4	30.5	94.2	41.8	54.4	38.6	30.9	28.2									
C	29.8	92.9	41.0	54.0	34.5	30.4	32.8	36.9	119.5	49.2	62.5	42.8	43.5	41.5	37.4	117.3	49.8	62.7	43.3	44.7	42.1									
E	20.8	57.3	29.9	42.0	23.8	15.1	17.4	24.3	81.1	34.0	44.5	28.7	21.6	19.1	21.8	87.5	30.8	41.1	25.6	16.9	15.8									
F	20.5	60.4	29.5	40.7	23.9	15.1	15.5	26.5	81.4	36.2	47.5	30.6	23.2	21.4	23.0	80.2	32.4	42.8	27.1	19.9	17.4									
G	27.0	78.5	37.1	48.4	31.0	23.8	23.3	31.5	80.0	42.8	56.7	35.9	31.1	32.0	32.7	98.9	44.8	58.5	38.0	34.8	35.0									
H	22.8	66.8	32.9	45.6	28.5	18.8	19.8	23.4	95.3	33.4	43.4	28.4	23.2	18.8	26.6	91.1	37.1	47.5	31.6	28.2	22.5									
I	20.7	61.7	29.5	38.4	24.5	15.2	14.5	26.6	101.5	38.8	48.8	33.8	29.8	24.4	33.4	105.8	46.0	57.5	36.4	33.8	33.8									
J	25.3	77.6	35.0	45.9	29.6	21.8	20.5	31.5	91.8	42.7	55.9	36.1	31.1	30.8	31.0	98.7	43.0	55.6	36.8	33.2	31.3									
K	19.8	47.1	25.9	37.5	20.1	11.0	13.4	31.0	85.2	42.9	57.5	35.6	30.6	34.4	32.3	88.1	45.0	60.7	37.2	34.0	40.8									
L	21.7	72.0	30.6	40.8	25.5	17.7	16.1	30.8	109.4	41.8	52.4	36.5	34.3	28.5	25.6	85.1	36.9	47.2	30.3	23.8	21.4									
M	21.7	62.0	30.0	40.3	24.9	15.3	14.4	33.8	108.8	45.9	57.8	38.5	37.8	34.6	26.8	97.9	36.1	46.5	31.0	26.5	21.9									
N	29.1	88.3	40.5	53.4	34.0	28.7	29.5	35.3	106.4	47.2	60.4	40.6	38.0	37.5	32.8	106.1	44.5	56.7	38.5	36.1	32.8									

Source: Own calculations. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

Notes: Inequality is measured using the real hourly wage. All coefficients are multiplied by 100. (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply, (3) Transport, Storage and Communications Sector and (4) Trade and Services Sector. Including Financial Services.

Annex 3.3. Mexican wage immobility and mobility indices, 1987-2008

Table A3.3.1. Wage immobility and mobility indices in the *Border Region*, 1987-2008

Border Region		Immobility Index			Bibby-Prals Index			Shorrocks-Prals Index			Determinant Index		
		1987-88	1997-98	2007-08	1987-88	1997-98	2007-08	1987-88	1997-98	2007-08	1987-88	1997-98	2007-08
Age	16 to 25	45.7	46.5	40.0	54.3	53.5	60.0	67.9	66.9	75.0	73.5	71.9	78.7
	26 to 45	46.2	47.4	42.7	53.8	52.6	57.3	67.2	65.8	71.6	76.7	72.6	75.5
	46 to 65	44.8	49.8	43.5	55.2	50.2	56.5	69.0	62.8	70.7	78.8	71.3	75.0
Education	Low	43.9	47.0	39.8	56.1	53.0	60.2	70.1	66.2	75.3	76.4	70.2	79.1
	Medium	47.4	45.7	39.0	52.6	54.3	61.0	65.8	67.8	76.3	70.6	73.8	79.5
	High	39.0	44.5	41.3	61.0	55.5	58.7	76.2	69.4	73.4	94.0	77.3	77.7
Firm Size	Micro	41.3	44.3	39.5	58.7	55.7	60.5	73.4	69.6	75.6	81.3	77.2	79.4
	Small	48.8	48.1	42.4	51.2	51.9	57.6	64.0	64.9	72.0	68.9	71.6	74.6
	Medium and Large	45.1	48.1	46.2	54.9	51.9	53.8	68.6	64.8	67.3	76.2	71.6	72.0
Economic Sector	AFFMS (1)	44.0	50.6	50.7	56.0	49.4	49.3	70.0	61.8	61.6	90.7	81.5	65.8
	IMS (2)	44.3	48.3	45.6	55.7	51.7	54.4	69.6	64.7	68.0	77.0	70.5	71.8
	TSCS (3)	42.5	43.2	42.3	57.5	56.8	57.7	71.8	71.0	72.2	80.0	79.1	74.5
	TSS (4)	47.6	49.3	41.3	52.4	50.7	58.7	65.5	63.3	73.3	74.9	71.1	78.3

Source: Own calculations. Results based on results from transition matrices for Mexican real hourly wage (quintiles) from 1987 to 2008. Notes: (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply, (3) Transport, Storage and Communications Sector and (4) Trade and Services Sector. Including Financial Services.

Table A3.3.2. Wage immobility and mobility indices in the *North Region*, 1987-2008

North Region		Immobility Index			Bibby-Prals Index			Shorrocks-Prals Index			Determinant Index		
		1987-88	1997-98	2007-08	1987-88	1997-98	2007-08	1987-88	1997-98	2007-08	1987-88	1997-98	2007-08
Age	16 to 25	40.4	45.9	37.5	59.6	54.1	62.5	74.5	67.7	78.2	85.5	75.1	81.7
	26 to 45	39.6	49.5	43.8	60.4	60.5	56.2	75.6	63.2	70.3	89.3	71.7	74.8
	46 to 65	39.1	50.5	44.6	60.9	49.5	55.4	76.2	61.9	69.2	80.6	73.8	75.6
Education	Low	36.5	44.1	38.6	63.5	55.9	61.4	79.4	69.8	76.8	92.1	75.1	82.7
	Medium	32.9	46.1	39.0	67.1	53.9	61.0	83.9	67.4	76.2	91.8	75.0	79.7
	High	36.5	46.8	43.3	63.5	53.2	56.7	79.3	66.5	70.8	92.4	74.7	75.2
Firm Size	Micro	32.6	41.8	39.8	67.4	58.2	60.2	84.3	72.8	75.3	85.1	78.1	79.3
	Small	47.9	49.0	45.6	52.1	51.0	54.4	65.2	63.7	68.0	70.0	70.7	72.8
	Medium and Large	36.4	47.7	44.8	63.6	52.3	55.2	79.4	65.4	69.0	89.3	75.9	74.9
Economic Sector	AFFMS (1)	51.0	50.2	40.1	49.0	49.8	59.9	61.3	62.2	74.9	95.4	71.3	77.6
	IMS (2)	38.3	49.0	43.7	61.7	51.0	56.3	77.1	63.7	70.3	85.4	74.7	74.8
	TSCS (3)	36.0	50.9	41.1	64.0	49.1	58.9	80.0	61.4	73.6	86.4	65.8	77.2
	TSS (4)	43.2	50.0	43.8	56.8	50.0	56.2	71.0	62.6	70.3	80.7	72.3	75.8

Source: Own calculations. Results based on results from transition matrices for Mexican real hourly wage (quintiles) from 1987 to 2008. Notes: (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply, (3) Transport, Storage and Communications Sector and (4) Trade and Services Sector. Including Financial Services.

Table A3.3.3. Wage immobility and mobility indices in the *Centre Region*, 1987-2008

Center Region		Immobility Index			Bibby-Prais Index			Shorrocks-Prais Index			Determinant Index		
		1987-88	1997-98	2007-08	1987-88	1997-98	2007-08	1987-88	1997-98	2007-08	1987-88	1997-98	2007-08
Age	16 to 25	43.0	43.6	34.4	57.0	56.4	65.6	71.3	70.5	82.0	80.0	76.0	86.0
	26 to 45	44.2	44.4	40.7	55.8	55.6	59.3	69.7	69.5	74.1	83.7	77.4	78.2
	46 to 65	43.1	44.5	40.4	56.9	55.5	59.6	71.1	69.4	74.5	84.3	77.7	79.2
Education	Low	40.4	38.9	35.0	59.6	61.1	65.0	74.5	76.4	81.3	82.2	81.7	85.1
	Medium	40.9	42.0	37.2	59.1	58.0	62.8	73.8	72.5	78.5	82.5	79.1	81.5
	High	38.9	40.6	37.6	61.1	59.4	62.4	76.3	74.3	78.0	81.3	81.6	83.4
Firm Size	Micro	35.5	37.6	36.7	64.5	62.4	63.3	80.7	78.1	79.1	88.3	84.2	82.2
	Small	43.3	43.5	40.0	56.7	58.5	60.0	70.9	70.7	75.0	76.0	76.5	79.7
	Medium and Large	41.4	43.2	40.1	58.6	56.8	59.9	73.3	71.1	74.9	86.0	77.1	80.2
Sector	AFFMS (1)	49.2	49.9	40.3	50.8	50.1	59.7	63.4	62.6	74.6	80.2	73.4	84.9
	IMS (2)	42.4	45.5	39.6	57.6	54.5	60.4	72.0	68.2	75.5	82.2	75.1	79.2
	TSCS (3)	29.4	41.5	35.6	70.6	58.5	64.4	88.3	73.2	80.5	85.1	88.2	82.5
	TSS (4)	46.3	46.1	40.3	53.7	53.9	59.7	67.2	67.4	74.7	80.6	75.5	79.6

Source: Own calculations. Results based on results from transition matrices for Mexican real hourly wage (quintiles) from 1987 to 2008. Notes: (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply, (3) Transport, Storage and Communications Sector and (4) Trade and Services Sector. Including Financial Services.

Table A3.3.4. Wage immobility and mobility indices in the *Capital Region*, 1987-2008

Capital Region		Immobility Index			Bibby-Prais Index			Shorrocks-Prais Index			Determinant Index		
		1987-88	1997-98	2007-08	1987-88	1997-98	2007-08	1987-88	1997-98	2007-08	1987-88	1997-98	2007-08
Age	16 to 25	40.4	38.2	34.6	59.6	61.8	65.4	74.5	77.3	81.7	87.3	84.7	85.8
	26 to 45	41.7	39.1	36.1	58.3	60.9	64.0	72.9	76.1	79.9	82.1	84.0	84.5
	46 to 65	41.9	37.7	35.8	58.1	62.3	64.2	72.6	77.9	80.2	81.8	86.9	86.1
Education	Low	41.2	33.7	28.8	58.8	66.3	71.2	73.4	82.9	89.0	82.1	89.0	89.6
	Medium	35.4	37.9	33.6	64.6	62.1	66.4	80.8	77.6	83.0	88.7	82.5	85.4
	High	32.5	36.5	35.8	67.6	63.5	64.2	84.4	79.4	80.3	90.3	85.2	85.2
Firm Size	Micro	37.3	32.3	29.9	62.7	67.7	70.1	78.3	84.6	87.6	85.7	90.1	92.1
	Small	34.6	33.9	37.3	65.4	66.1	62.7	81.8	82.6	78.4	88.4	88.0	81.9
	Medium and Large	35.9	38.2	37.0	64.1	61.8	63.0	80.2	77.2	78.8	87.1	83.9	85.0
Sector	AFFMS (1)	15.0	10.0	34.7	85.0	90.0	65.3	106.3	112.5	81.7	100.0	100.0	
	IMS (2)	36.4	38.1	39.5	63.6	61.9	60.5	79.5	77.4	75.6	86.3	90.1	80.0
	TSCS (3)	28.7	39.6	32.0	71.3	60.4	68.0	89.1	75.5	85.0	81.3	82.8	89.0
	TSS (4)	43.5	41.1	35.8	56.5	58.9	64.2	70.6	73.6	80.3	84.3	80.6	85.4

Source: Own calculations. Results based on results from transition matrices for Mexican real hourly wage (quintiles) from 1987 to 2008. Notes: (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply, (3) Transport, Storage and Communications Sector and (4) Trade and Services Sector. Including Financial Services.

Table A3.3.5. Wage immobility and mobility indices in the *South Region*, 1987-2008

South Region		Immobility index			Bibby-Prais Index			Shorrocks-Prais Index			Determinant Index		
		1987-88	1997-98	2007-08	1987-88	1997-98	2007-08	1987-88	1997-98	2007-08	1987-88	1997-98	2007-08
Age	16 to 25	44.1	42.2	38.8	55.9	57.8	61.2	69.9	72.2	76.4	75.9	78.6	82.7
	26 to 45	42.4	50.7	44.0	57.6	49.3	56.0	72.0	61.7	70.0	72.1	70.6	76.7
	46 to 65	42.1	47.3	42.6	57.9	52.7	57.4	72.4	65.9	71.8	74.8	79.5	79.1
Education	Low	36.2	42.1	37.3	63.8	57.9	62.7	79.7	72.3	78.3	79.1	79.8	84.4
	Medium	40.2	45.4	38.0	59.8	54.6	62.0	74.7	68.2	77.5	86.8	76.8	82.7
	High	42.2	46.7	42.3	57.8	53.3	57.7	72.2	66.6	72.2	81.9	74.3	79.0
Firm size	Micro	30.2	38.0	43.2	69.8	62.0	56.8	87.3	77.5	71.0	76.3	81.5	78.1
	Small	54.4	41.4	44.9	45.6	58.6	55.1	57.1	73.3	68.9	60.9	79.4	76.6
	Medium and Large	41.3	48.6	43.4	58.7	51.4	56.6	73.4	64.3	70.7	87.2	72.3	77.3
Economic sector	AFFMS (1)	20.0	43.1	31.6	80.0	56.9	68.4	100.0	71.1	85.5	100.0	74.6	81.5
	IMS (2)	39.3	49.6	41.6	60.7	50.4	58.4	75.9	63.0	72.9	88.2	68.9	81.1
	TSCS (3)	33.4	47.7	33.1	66.6	52.3	66.9	83.2	65.4	83.7	78.0	78.6	91.0
	TSS (4)	46.1	50.0	44.8	53.9	50.0	55.2	67.4	62.5	69.0	79.0	72.2	75.6

Source: Own calculations. Results based on results from transition matrices for Mexican real hourly wage (quintiles) from 1987 to 2008. *Notes:* (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply, (3) Transport, Storage and Communications Sector and (4) Trade and Services Sector. Including Financial Services.

Annex 3.4. Decomposition of inequality for regions in Mexico, 1987-2008

Table A3.4.1. Decomposition of inequality change into pro-poor growth (P) and mobility (R) components for *Border Region*, 1987-2008

Years	Base Gini (1)	Final Gini (2)	Gini change (3): (2)-(1)	Percentage (4): 100 x (3)/(1)	R comp. (5)	P comp. (6)
Annual Change						
1987-1988	0.355	0.341	-0.014 (0.004)	-4.00	0.134 (0.006)	0.148 (0.007)
1988-1989	0.360	0.359	-0.002 (0.004)	-0.40	0.323 (0.007)	0.325 (0.007)
1989-1990	0.381	0.389	0.008 (0.005)	2.00	0.341 (0.008)	0.334 (0.008)
1990-1991	0.407	0.409	0.003 (0.005)	0.60	0.420 (0.009)	0.417 (0.008)
1991-1992	0.417	0.346	-0.071 (0.006)	-17.10	0.332 (0.010)	0.403 (0.009)
1992-1993	0.400	0.413	0.014 (0.004)	3.40	0.418 (0.010)	0.405 (0.009)
1993-1994	0.414	0.420	0.006 (0.005)	1.40	0.417 (0.008)	0.411 (0.008)
1994-1995	0.432	0.440	0.009 (0.005)	2.00	0.396 (0.008)	0.387 (0.009)
1995-1996	0.436	0.437	0.000 (0.006)	0.10	0.437 (0.010)	0.436 (0.010)
1996-1997	0.454	0.453	0.000 (0.007)	-0.10	0.476 (0.011)	0.477 (0.010)
1997-1998	0.466	0.451	-0.016 (0.003)	-3.40	0.106 (0.005)	0.122 (0.006)
1998-1999	0.415	0.399	-0.017 (0.005)	-4.00	0.391 (0.008)	0.408 (0.008)
1999-2000	0.392	0.397	0.006 (0.004)	1.50	0.369 (0.008)	0.363 (0.008)
2000-2001	0.391	0.375	-0.016 (0.004)	-4.10	0.371 (0.008)	0.387 (0.008)
2001-2002	0.388	0.396	0.008 (0.004)	2.00	0.401 (0.008)	0.393 (0.008)
2002-2003	0.362	0.345	-0.017 (0.011)	-4.70	0.342 (0.014)	0.359 (0.014)
2003-2004	0.322	0.341	0.019 (0.009)	5.80	0.388 (0.014)	0.370 (0.015)
2004-2005	0.322	0.345	0.023 (0.009)	7.10	0.401 (0.013)	0.378 (0.014)
2005-2006	0.318	0.366	0.048 (0.059)	15.00	0.268 (0.058)	0.220 (0.057)
2006-2007	0.386	0.334	-0.052 (0.042)	-13.50	0.300 (0.061)	0.352 (0.057)
2007-2008	0.394	0.392	-0.002 (0.004)	-0.50	0.209 (0.011)	0.211 (0.011)

Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008. Notes: (a) Change in inequality $\Delta(v) = \Delta(2)$; (b) Reranking component (mobility), R(2); (c) Progressivity component (pro-poor), P(2). In parenthesis are the standard errors obtained through bootstrapping.

Table A3.4.2. Decomposition of inequality change into pro-poor growth (P) and mobility (R) components for North Region, 1987-2008

Years	Base Gini (1)	Final Gini (2)	Gini change (3): (2)-(1)	Percentage (4): 100 x (3)/(1)	R comp. (5)	P comp. (6)
Annual Change						
1987-1988	0.316	0.313	-0.003 (0.008)	-0.90	0.132 (0.011)	0.135 (0.012)
1988-1989	0.346	0.350	0.003 (0.015)	0.90	0.367 (0.020)	0.364 (0.023)
1989-1990	0.361	0.380	0.019 (0.009)	5.30	0.323 (0.024)	0.304 (0.024)
1990-1991	0.358	0.384	0.027 (0.013)	7.50	0.337 (0.027)	0.311 (0.026)
1991-1992	0.364	0.467	0.103 (0.023)	28.30	0.441 (0.030)	0.338 (0.030)
1992-1993	0.442	0.408	-0.014 (0.006)	-3.20	0.426 (0.012)	0.439 (0.012)
1993-1994	0.402	0.410	0.008 (0.006)	2.00	0.375 (0.012)	0.367 (0.012)
1994-1995	0.413	0.440	0.027 (0.006)	6.40	0.420 (0.012)	0.393 (0.011)
1995-1996	0.407	0.439	0.032 (0.009)	7.80	0.369 (0.016)	0.337 (0.016)
1996-1997	0.437	0.380	-0.058 (0.010)	-13.20	0.402 (0.013)	0.460 (0.016)
1997-1998	0.467	0.448	-0.020 (0.004)	-4.20	0.100 (0.005)	0.119 (0.005)
1998-1999	0.435	0.420	-0.015 (0.006)	-3.50	0.423 (0.013)	0.439 (0.013)
1999-2000	0.427	0.425	-0.002 (0.005)	-0.50	0.405 (0.008)	0.407 (0.009)
2000-2001	0.420	0.396	-0.025 (0.004)	-5.80	0.394 (0.010)	0.418 (0.011)
2001-2002	0.419	0.401	-0.018 (0.004)	-4.30	0.380 (0.012)	0.398 (0.013)
2002-2003	0.377	0.375	-0.002 (0.016)	-0.60	0.351 (0.017)	0.354 (0.021)
2003-2004	0.386	0.426	0.040 (0.010)	10.30	0.385 (0.013)	0.345 (0.015)
2004-2005	0.388	0.426	0.037 (0.011)	9.60	0.382 (0.014)	0.344 (0.015)
2005-2006	0.417	0.354	-0.064 (0.045)	-15.20	0.356 (0.053)	0.420 (0.059)
2006-2007	0.431	0.419	-0.012 (0.076)	-2.80	0.370 (0.044)	0.382 (0.092)
2007-2008	0.432	0.426	-0.006 (0.003)	-1.40	0.160 (0.007)	0.166 (0.007)

Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008. Notes: (a) Change in inequality $\Delta(v) = \Delta(2)$; (b) Reranking component (mobility), R(2); (c) Progressivity component (pro-poor), P(2). In parenthesis are the standard errors obtained through bootstrapping.

Table A3.4.3. Decomposition of inequality change into pro-poor growth (P) and mobility (R) components for Centre Region, 1987-2008

Years	Base Gini (1)	Final Gini (2)	Gini change (3): (2)-(1)	Percentage (4): 100 x (3)/(1)	R comp. (5)	P comp. (6)
Annual Change						
1987-1988	0.334	0.315	-0.020 (0.004)	-5.90	0.106 (0.009)	0.126 (0.009)
1988-1989	0.340	0.346	0.006 (0.006)	1.70	0.327 (0.008)	0.321 (0.009)
1989-1990	0.361	0.371	0.010 (0.005)	2.70	0.372 (0.011)	0.362 (0.010)
1990-1991	0.356	0.377	0.021 (0.005)	6.00	0.373 (0.011)	0.351 (0.010)
1991-1992	0.351	0.311	-0.041 (0.011)	-11.50	0.294 (0.014)	0.334 (0.015)
1992-1993	0.415	0.387	-0.028 (0.008)	-6.80	0.370 (0.014)	0.399 (0.013)
1993-1994	0.398	0.392	-0.005 (0.006)	-1.30	0.381 (0.009)	0.386 (0.009)
1994-1995	0.393	0.427	0.034 (0.005)	8.60	0.412 (0.010)	0.378 (0.010)
1995-1996	0.429	0.446	0.018 (0.009)	4.20	0.425 (0.013)	0.407 (0.014)
1996-1997	0.446	0.434	-0.012 (0.007)	-2.70	0.441 (0.009)	0.453 (0.010)
1997-1998	0.434	0.427	-0.007 (0.003)	-1.50	0.138 (0.005)	0.145 (0.005)
1998-1999	0.421	0.401	-0.020 (0.005)	-4.80	0.365 (0.010)	0.385 (0.011)
1999-2000	0.415	0.420	0.005 (0.004)	1.30	0.390 (0.008)	0.385 (0.008)
2000-2001	0.420	0.394	-0.026 (0.005)	-6.20	0.396 (0.010)	0.422 (0.010)
2001-2002	0.424	0.398	-0.026 (0.005)	-6.00	0.411 (0.009)	0.437 (0.009)
2002-2003	0.416	0.408	-0.008 (0.016)	-1.90	0.411 (0.019)	0.419 (0.020)
2003-2004	0.372	0.365	-0.008 (0.007)	-2.00	0.351 (0.011)	0.359 (0.011)
2004-2005	0.379	0.361	-0.018 (0.007)	-4.70	0.347 (0.013)	0.365 (0.012)
2005-2006	0.415	0.381	-0.033 (0.088)	-8.00	0.396 (0.091)	0.429 (0.128)
2006-2007	0.347	0.351	0.005 (0.072)	1.40	0.367 (0.078)	0.363 (0.086)
2007-2008	0.420	0.424	0.004 (0.003)	0.90	0.238 (0.007)	0.234 (0.007)

Source: Own calculations of Jenkins and Van Kern decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008. Notes: (a) Change in inequality $\Delta(v) = \Delta(2)$; (b) Reranking component (mobility), R(2); (c) Progressivity component (pro-poor), P(2). In parenthesis are the standard errors obtained through bootstrapping.

Table A3.4.4. Decomposition of inequality change into pro-poor growth (P) and mobility (R) components for *Capital Region*, 1987-2008

Years	Base Gini (1)	Final Gini (2)	Gini change (3): (2)-(1)	Percentage (4): 100 x (3)/(1)	R comp. (5)	P comp. (6)
Annual Change						
1987-1988	0.342	0.319	-0.023 (0.005)	-6.70	0.135 (0.010)	0.158 80.009
1988-1989	0.379	0.407	0.029 (0.010)	7.60	0.345 (0.017)	0.316 (0.017)
1989-1990	0.428	0.412	-0.015 (0.007)	-3.60	0.427 (0.012)	0.442 (0.012)
1990-1991	0.416	0.410	-0.006 (0.010)	-1.50	0.403 (0.019)	0.409 (0.018)
1991-1992	0.413	0.405	-0.009 (0.022)	-2.10	0.314 (0.025)	0.323 (0.026)
1992-1993	0.384	0.336	-0.048 (0.019)	-12.60	0.334 (0.025)	0.382 (0.027)
1993-1994	0.410	0.387	-0.023 (0.022)	-5.50	0.384 (0.027)	0.407 (0.031)
1994-1995	0.456	0.474	0.018 (0.046)	4.00	0.410 (0.045)	0.391 (0.040)
1995-1996	0.374	0.361	-0.014 (0.021)	-3.60	0.308 (0.041)	0.321 (0.041)
1996-1997	0.405	0.457	0.053 (0.067)	13.10	0.567 (0.099)	0.514 (0.122)
1997-1998	0.426	0.397	-0.029 (0.005)	-6.80	0.136 (0.009)	0.165 (0.011)
1998-1999	0.451	0.443	-0.008 (0.072)	-1.80	0.390 (0.083)	0.398 (0.064)
1999-2000	0.425	0.463	0.039 (0.044)	9.10	0.396 (0.039)	0.358 (0.045)
2000-2001	0.411	0.387	-0.025 (0.035)	-6.10	0.431 (0.046)	0.455 (0.053)
2001-2002	0.391	0.383	-0.007 (0.022)	-1.90	0.454 (0.044)	0.462 (0.043)
2002-2003	0.403	0.406	0.003 (0.058)	0.60	0.416 (0.047)	0.414 (0.051)
2003-2004	0.347	0.425	0.078 (0.043)	22.60	0.264 (0.040)	0.185 (0.059)
2004-2005	0.350	0.433	0.083 (0.048)	23.80	0.273 (0.048)	0.190 (0.069)
2005-2006	0.326	0.388	0.062 (0.114)	18.90	0.410 (0.296)	0.348 (0.204)
2006-2007	0.405	0.466	0.061 (0.023)	15.10	0.378 (0.117)	0.317 (0.130)
2007-2008	0.468	0.452	-0.017 (0.007)	-3.60	0.258 (0.019)	0.275 (0.019)

Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008. *Notes:* (a) Change in inequality $\Delta(v) = \Delta(2)$; (b) Reranking component (mobility), R(2); (c) Progressivity component (pro-poor), P(2). In parenthesis are the standard errors obtained through bootstrapping.

Table A3.4.5. Decomposition of inequality change into pro-poor growth (P) and mobility (R) components for South Region, 1987-2008

Years	Base Gini (1)	Final Gini (2)	Gini change (3): (2)-(1)	Percentage (4): 100 x (3)/(1)	R comp. (5)	P comp. (6)
Annual Change						
1987-1988	0.384	0.353	-0.031 (0.010)	-8.00	0.087 (0.014)	0.118 (0.016)
1988-1989	0.408	0.329	-0.079 (0.011)	-19.40	0.360 (0.019)	0.439 (0.021)
1989-1990	0.405	0.338	-0.067 (0.024)	-16.50	0.302 (0.042)	0.369 (0.040)
1990-1991	0.382	0.410	0.028 (0.012)	7.40	0.431 (0.021)	0.403 (0.023)
1991-1992	0.417	0.388	-0.029 (0.012)	-7.00	0.390 (0.019)	0.419 (0.020)
1992-1993	0.406	0.403	-0.003 (0.005)	-0.80	0.426 (0.010)	0.429 (0.011)
1993-1994	0.448	0.435	-0.013 (0.006)	-2.90	0.391 (0.011)	0.404 (0.011)
1994-1995	0.447	0.469	0.022 (0.006)	4.90	0.434 (0.014)	0.412 (0.014)
1995-1996	0.468	0.462	-0.006 (0.007)	-1.40	0.370 (0.014)	0.376 (0.015)
1996-1997	0.434	0.481	0.047 (0.007)	10.90	0.466 (0.016)	0.419 (0.019)
1997-1998	0.464	0.446	-0.017 (0.003)	-3.80	0.103 (0.006)	0.120 (0.008)
1998-1999	0.479	0.465	-0.014 (0.005)	-2.90	0.413 (0.012)	0.427 (0.013)
1999-2000	0.466	0.457	-0.009 (0.004)	-2.00	0.419 (0.011)	0.428 (0.010)
2000-2001	0.461	0.433	-0.028 (0.004)	-6.20	0.443 (0.010)	0.471 (0.010)
2001-2002	0.450	0.415	-0.036 (0.0049)	-7.90	0.364 (0.009)	0.400 (0.009)
2002-2003	0.462	0.426	-0.036 (0.014)	-7.80	0.430 (0.017)	0.466 (0.018)
2003-2004	0.418	0.420	0.002 (0.0089)	0.40	0.486 (0.015)	0.484 (0.016)
2004-2005	0.424	0.422	-0.003 (0.008)	-0.60	0.492 (0.017)	0.495 (0.019)
2005-2006	0.456	0.407	-0.049 (0.061)	-10.70	0.395 (0.078)	0.444 (0.092)
2006-2007	0.501	0.367	-0.134 (0.053)	-26.70	0.340 (0.057)	0.474 (0.064)
2007-2008	0.464	0.452	-0.012 (0.005)	-2.60	0.168 (0.010)	0.180 (0.011)

Source: Own calculations of Jenkins and Van Kern decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008. Notes: (a) Change in inequality $\Delta(v) = \Delta(2)$; (b) Reranking component (mobility), R(2); (c) Progressivity component (pro-poor), P(2). In parenthesis are the standard errors obtained through bootstrapping.

Annex 3.5. Subgroup decomposition of inequality for regions in Mexico, 1987-2008

Table A3.5.1. Subgroup decomposition of inequality change into pro-poor growth (P) and mobility (R) components for Border Region, 1987-2008

Border Region	Initial	Final	Change in	Reranking ^b	Progressivity ^c	Initial	Final	Change in	Reranking ^b	Progressivity ^c	Initial	Final	Change in	Reranking ^b	Progressivity ^c	
	Gini	Gini	Gini ^a	(R)	(P)	Gini	Gini	Gini ^a	(R)	(P)	Gini	Gini	Gini ^a	(R)	(P)	
	1987-1988					1997-1998					2007-2008					
A g e	16 to 25	0.302	0.294	-0.008 (0.225)	0.116 (0.000)	0.124 (0.000)	0.350	0.308	-0.042 (0.020)	0.116 (0.000)	0.159 (0.000)	0.327	0.301	-0.026 (0.970)	0.164 (0.000)	0.190 (0.000)
	26 to 45	0.359	0.358	-0.001 (0.819)	0.162 (0.000)	0.163 (0.000)	0.454	0.450	-0.004 (0.991)	0.102 (0.000)	0.105 (0.000)	0.387	0.387	0.000 (0.700)	0.199 (0.000)	0.199 (0.000)
	46 to 65	0.361	0.304	-0.058 (0.642)	0.080 (0.000)	0.138 (0.000)	0.547	0.499	-0.048 (0.000)	0.101 (0.000)	0.148 (0.000)	0.427	0.431	0.004 (0.904)	0.219 (0.000)	0.216 (0.000)
E d u c a t i o n	Low	0.305	0.266	-0.039 (0.214)	0.110 (0.000)	0.149 (0.000)	0.336	0.310	-0.026 (0.269)	0.102 (0.000)	0.127 (0.000)	0.274	0.26	-0.013 (0.118)	0.141 (0.000)	0.155 (0.000)
	Medium	0.301	0.293	-0.008 (0.225)	0.134 (0.000)	0.142 (0.000)	0.332	0.336	0.004 (0.589)	0.107 (0.000)	0.103 (0.000)	0.33	0.316	-0.014 (0.822)	0.159 (0.000)	0.173 (0.000)
	High	0.338	0.336	-0.002 (0.360)	0.189 (0.000)	0.191 (0.000)	0.440	0.423	-0.017 (0.518)	0.131 (0.000)	0.148 (0.000)	0.42	0.409	-0.010 (0.973)	0.245 (0.000)	0.255 (0.000)
F i r z m e	Micro	0.389	0.290	-0.099 (0.139)	0.100 (0.000)	0.199 (0.000)	0.375	0.326	-0.049 (0.349)	0.107 (0.000)	0.155 (0.000)	0.347	0.326	-0.021 (0.887)	0.152 (0.000)	0.174 (0.000)
	Small	0.357	0.367	0.010 (0.249)	0.233 (0.000)	0.223 (0.000)	0.460	0.423	-0.037 (0.276)	0.096 (0.000)	0.133 (0.000)	0.398	0.394	-0.004 (0.948)	0.168 (0.000)	0.172 (0.000)
	Medium and Large	0.315	0.318	0.003 (0.151)	0.130 (0.000)	0.127 (0.000)	0.448	0.437	-0.011 (0.424)	0.103 (0.000)	0.114 (0.000)	0.403	0.4	-0.004 (0.282)	0.230 (0.000)	0.233 (0.000)
E c o n o m i c	AFMS (1)	0.329	0.209	-0.120 (0.645)	0.092 (0.007)	0.212 (0.000)	0.441	0.405	-0.036 (0.832)	0.056 (0.053)	0.091 (0.049)	0.326	0.449	0.124 (0.156)	0.184 (0.094)	0.060 (0.439)
	IMS (2)	0.291	0.305	0.014 (0.006)	0.145 (0.000)	0.130 (0.000)	0.386	0.383	-0.002 (0.068)	0.097 (0.000)	0.099 (0.000)	0.383	0.368	-0.015 (0.630)	0.221 (0.000)	0.236 (0.000)
	TSCS (3)	0.308	0.277	-0.031 (0.160)	0.094 (0.000)	0.125 (0.000)	0.422	0.380	-0.042 (0.989)	0.092 (0.000)	0.135 (0.000)	0.35	0.364	0.034 (0.329)	0.273 (0.000)	0.240 (0.000)
	TSS (4)	0.393	0.369	-0.024 (0.090)	0.127 (0.000)	0.150 (0.000)	0.484	0.474	-0.010 (0.780)	0.094 (0.000)	0.104 (0.000)	0.409	0.407	-0.002 (0.957)	0.200 (0.000)	0.202 (0.000)

Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

Notes: (a) Change in inequality $\Delta(v) = \Delta(2)$; (b) Re-ranking component (mobility), R(2); (c) Progressivity component (pro-poor), P(2). (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply, (3) Transport, Storage and Communications Sector, (4) Trade and Services Sector. Including Financial Services. N is number of individual in each panel, 1987-1988, 1997-1998 and 2007-2008. In parenthesis are the standard errors obtained through bootstrapping.

Table A3.5.2. Subgroup decomposition of inequality change into pro-poor growth (P) and mobility (R) components for North Region, 1987-2008

North Region	Initial	Final	Change in	Re-ranking ^b	Progressivity ^c	Initial	Final	Change in	Re-ranking ^b	Progressivity ^c	Initial	Final	Change in	Re-ranking ^b	Progressivity ^c	
	Gini	Gini	Gini ^a	(R)	(P)	Gini	Gini	Gini ^a	(R)	(P)	Gini	Gini	Gini ^a	(R)	(P)	
	1987-1988					1997-1998					2007-2008					
Agriculture	16 to 25	0.303	0.306	0.003 (0.364)	0.110 (0.000)	0.107 (0.000)	0.349	0.343	-0.006 (0.518)	0.127 (0.000)	0.133 (0.000)	0.369	0.299	-0.070 (0.104)	0.173 (0.000)	0.243 (0.000)
	26 to 45	0.317	0.302	-0.015 (0.655)	0.159 (0.000)	0.174 (0.000)	0.414	0.399	-0.015 (0.267)	0.105 (0.000)	0.120 (0.000)	0.413	0.421	0.009 (0.539)	0.165 (0.000)	0.156 (0.000)
	46 to 65	0.238	0.315	0.077 (0.662)	0.121 (0.000)	0.044 (0.000)	0.518	0.518	0.000 (0.567)	0.165 (0.000)	0.165 (0.000)	0.456	0.451	-0.004 (0.861)	0.168 (0.000)	0.172 (0.000)
Education	Low	0.269	0.220	-0.049 (0.818)	0.119 (0.000)	0.168 (0.000)	0.354	0.342	-0.012 (0.490)	0.097 (0.000)	0.109 (0.000)	0.307	0.297	-0.010 (0.796)	0.150 (0.000)	0.159 (0.000)
	Medium	0.269	0.334	0.065 (0.897)	0.253 (0.000)	0.188 (0.000)	0.359	0.372	0.012 (0.959)	0.124 (0.000)	0.112 (0.000)	0.311	0.321	0.010 (0.159)	0.152 (0.000)	0.143 (0.000)
	High	0.244	0.251	0.008 (0.924)	0.120 (0.000)	0.112 (0.000)	0.404	0.398	-0.006 (0.251)	0.145 (0.000)	0.151 (0.000)	0.43	0.427	-0.003 (0.478)	0.181 (0.000)	0.184 (0.000)
Finance	Micro	0.420	0.290	-0.130 (0.634)	0.102 (0.000)	0.232 (0.000)	0.294	0.281	-0.013 (0.602)	0.134 (0.000)	0.148 (0.000)	0.39	0.348	-0.042 (0.071)	0.146 (0.000)	0.188 (0.000)
	Small	0.227	0.139	-0.088 (0.005)	0.145 (0.000)	0.233 (0.000)	0.319	0.434	0.115 (0.380)	0.315 (0.009)	0.200 (0.098)	0.443	0.405	-0.039 (0.686)	0.130 (0.000)	0.169 (0.000)
	Medium and Large	0.279	0.279	0.000 (0.263)	0.139 (0.000)	0.139 (0.000)	0.410	0.400	-0.010 (0.373)	0.117 (0.000)	0.127 (0.000)	0.436	0.427	-0.009 (0.644)	0.165 (0.000)	0.174 (0.000)
Economic	AFFMS (1)	0.270	0.184	-0.085 (0.875)	0.095 (0.293)	0.180 (0.192)	0.410	0.383	-0.027 (0.192)	0.201 (0.000)	0.228 (0.002)	0.284	0.413	0.128 (0.713)	0.163 (0.006)	0.035 (0.072)
	IMS (2)	0.278	0.315	0.037 (0.346)	0.158 (0.000)	0.120 (0.000)	0.406	0.400	-0.006 (0.591)	0.090 (0.000)	0.097 (0.000)	0.368	0.373	0.004 (0.917)	0.120 (0.000)	0.115 (0.000)
	TSCS (3)	0.126	0.270	0.144 (0.766)	0.369 (0.000)	0.225 (0.000)	0.461	0.424	-0.037 (0.273)	0.066 (0.001)	0.103 (0.001)	0.43	0.401	-0.029 (0.427)	0.194 (0.000)	0.224 (0.000)
	TSS (4)	0.347	0.323	-0.023 (0.232)	0.086 (0.000)	0.109 (0.000)	0.447	0.437	-0.011 (0.411)	0.099 (0.000)	0.109 (0.000)	0.436	0.432	-0.004 (0.697)	0.161 (0.000)	0.165 (0.000)

Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

Notes: (a) Change in inequality $\Delta(v) = \Delta(2)$; (b) Re-ranking component (mobility), R(2); (c) Progressivity component (pro-poor), P(2). (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply, (3) Transport, Storage and Communications Sector, (4) Trade and Services Sector. Including Financial Services. N is number of individual in each panel, 1987-1988, 1997-1998 and 2007-2008. In parenthesis are the standard errors obtained through bootstrapping.

Table A3.5.3. Subgroup decomposition of inequality change into pro-poor growth (P) and mobility (R) components for Centre Region, 1987-2008

Center Region	Initial Gini	Final Gini	Change in Gini ^a	Re-ranking ^b (R)	Progressivity ^c (P)	Initial Gini	Final Gini	Change in Gini ^a	Re-ranking ^b (R)	Progressivity ^c (P)	Initial Gini	Final Gini	Change in Gini ^a	Re-ranking ^b (R)	Progressivity ^c (P)	
	1987-1988					1997-1998					2007-2008					
Ages																
16 to 25	0.291	0.269	-0.023 (0.607)	0.104 (0.000)	0.127 (0.000)	0.331	0.334	0.003 (0.802)	0.117 (0.000)	0.114 (0.000)	0.302	0.333	0.031 (0.884)	0.277 (0.000)	0.246 (0.000)	
26 to 45	0.338	0.317	-0.022 (0.665)	0.115 (0.000)	0.137 (0.000)	0.407	0.404	-0.003 (0.469)	0.133 (0.000)	0.137 (0.000)	0.414	0.411	-0.002 (0.950)	0.226 (0.000)	0.228 (0.000)	
46 to 65	0.324	0.306	-0.018 (0.670)	0.095 (0.000)	0.113 (0.000)	0.427	0.434	0.007 (0.864)	0.124 (0.000)	0.117 (0.000)	0.478	0.475	-0.003 (0.470)	0.250 (0.000)	0.252 (0.000)	
Educational																
Low	0.270	0.284	0.014 (0.753)	0.134 (0.000)	0.120 (0.000)	0.308	0.284	-0.024 (0.439)	0.129 (0.000)	0.153 (0.000)	0.29	0.286	-0.004 (0.888)	0.208 (0.000)	0.211 (0.000)	
Medium	0.297	0.260	-0.037 (0.521)	0.132 (0.000)	0.170 (0.000)	0.308	0.313	0.004 (0.990)	0.105 (0.000)	0.101 (0.000)	0.331	0.308	-0.023 (0.306)	0.213 (0.000)	0.236 (0.000)	
High	0.284	0.271	-0.013 (0.413)	0.117 (0.000)	0.130 (0.000)	0.400	0.393	-0.007 (0.679)	0.161 (0.000)	0.168 (0.000)	0.454	0.459	0.005 (0.975)	0.260 (0.000)	0.255 (0.000)	
Family size																
Micro	0.293	0.309	0.015 (0.038)	0.209 (0.000)	0.194 (0.000)	0.309	0.303	-0.006 (0.761)	0.139 (0.000)	0.145 (0.000)	0.316	0.321	0.005 (0.429)	0.221 (0.000)	0.216 (0.000)	
Small	0.254	0.277	0.022 (0.294)	0.130 (0.000)	0.107 (0.000)	0.379	0.357	-0.022 (0.343)	0.080 (0.000)	0.102 (0.000)	0.405	0.406	0.000 (0.437)	0.206 (0.000)	0.205 (0.000)	
Medium and Large	0.304	0.274	-0.030 (0.370)	0.107 (0.000)	0.137 (0.000)	0.386	0.381	-0.005 (0.312)	0.142 (0.000)	0.146 (0.000)	0.431	0.431	0.000 (0.398)	0.222 (0.000)	0.222 (0.000)	
Economic																
AFFMS (1)	0.365	0.327	-0.039 (0.770)	0.150 (0.236)	0.189 (0.097)	0.341	0.462	0.121 (0.766)	0.086 (0.020)	-0.035 (0.045)	0.587	0.311	-0.276 (0.001)	0.089 (0.000)	0.365 (0.000)	
IMS (2)	0.284	0.277	-0.007 (0.003)	0.117 (0.000)	0.125 (0.000)	0.365	0.376	0.011 (0.313)	0.108 (0.000)	0.098 (0.000)	0.353	0.35	-0.002 (0.482)	0.227 (0.000)	0.230 (0.000)	
TSCS (3)	0.252	0.260	0.008 (0.958)	0.153 (0.000)	0.145 (0.000)	0.296	0.298	0.002 (0.037)	0.104 (0.000)	0.102 (0.000)	0.445	0.442	-0.003 (0.829)	0.246 (0.000)	0.248 (0.000)	
TSS (4)	0.358	0.334	-0.024 (0.898)	0.096 (0.000)	0.120 (0.000)	0.440	0.431	-0.009 (0.994)	0.120 (0.000)	0.129 (0.000)	0.439	0.445	0.006 (0.904)	0.236 (0.000)	0.230 (0.000)	

Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

Notes: (a) Change in inequality $\Delta(v) = \Delta(2)$; (b) Re-ranking component (mobility), R(2); (c) Progressivity component (pro-poor), P(2). (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply, (3) Transport, Storage and Communications Sector, (4) Trade and Services Sector. Including Financial Services. N is number of individual in each panel, 1987-1988, 1997-1998 and 2007-2008. In parenthesis are the standard errors obtained through bootstrapping.

Table A3.5.4. Subgroup decomposition of inequality change into pro-poor growth (P) and mobility (R) components for Capital Region, 1987-2008

Capital Region	Initial	Final	Change in	Reranking ^b	Progressivity ^c	Initial	Final	Change in	Reranking ^b	Progressivity ^c	Initial	Final	Change in	Reranking ^b	Progressivity ^c	
	Gini	Gini	Gini ^a	(R)	(P)	Gini	Gini	Gini ^a	(R)	(P)	Gini	Gini	Gini ^a	(R)	(P)	
	1987-1988					1997-1998					2007-2008					
A g e	16 to 25	0.308	0.273	-0.034 (0.558)	0.110 (0.000)	0.145 (0.000)	0.349	0.343	-0.006 (0.201)	0.155 (0.000)	0.161 (0.000)	0.318	0.347	0.029 (0.455)	0.285 (0.000)	0.256 (0.000)
	26 to 45	0.334	0.313	-0.021 (0.746)	0.122 (0.000)	0.142 (0.000)	0.383	0.386	0.002 (0.268)	0.127 (0.000)	0.125 (0.000)	0.454	0.438	-0.016 (0.706)	0.251 (0.000)	0.267 (0.000)
	46 to 65	0.369	0.370	0.001 (0.038)	0.225 (0.000)	0.223 (0.000)	0.476	0.376	-0.100 (0.353)	0.134 (0.007)	0.234 (0.007)	0.518	0.507	-0.011 (0.832)	0.254 (0.000)	0.265 (0.000)
E d u c a t i o n	Low	0.286	0.251	-0.035 (0.969)	0.079 (0.000)	0.115 (0.000)	0.265	0.276	0.011 (0.639)	0.112 (0.000)	0.102 (0.000)	0.294	0.327	0.033 (0.569)	0.274 (0.000)	0.240 (0.000)
	Medium	0.299	0.217	-0.082 (0.182)	0.127 (0.000)	0.209 (0.000)	0.308	0.313	0.005 (0.309)	0.157 (0.000)	0.152 (0.000)	0.313	0.315	0.002 (0.716)	0.194 (0.000)	0.192 (0.000)
	High	0.303	0.314	0.011 (0.532)	0.224 (0.000)	0.213 (0.000)	0.401	0.367	-0.034 (0.783)	0.150 (0.000)	0.184 (0.000)	0.495	0.498	0.003 (0.901)	0.294 (0.000)	0.290 (0.000)
F i r z e	Micro	0.446	0.322	-0.124 (0.468)	0.078 (0.000)	0.202 (0.000)	0.265	0.399	0.134 (0.439)	0.202 (0.000)	0.068 (0.000)	0.319	0.3	-0.018 (0.000)	0.243 (0.000)	0.261 (0.000)
	Small	0.240	0.318	0.079 (0.933)	0.116 (0.000)	0.038 (0.028)	0.408	0.352	-0.056 (0.600)	0.060 (0.001)	0.116 (0.004)	0.376	0.406	0.030 (0.885)	0.228 (0.000)	0.198 (0.000)
	Medium and Large	0.310	0.295	-0.015 (0.900)	0.160 (0.000)	0.174 (0.000)	0.389	0.344	-0.044 (0.801)	0.142 (0.000)	0.187 (0.000)	0.492	0.495	0.003 (0.534)	0.260 (0.000)	0.257 (0.000)
E c o n o m i c	AFFMS (1)	0.190	0.188	-0.002 (0.486)	0.193 (0.115)	0.195 (0.412)	0.132	0.088	-0.043 (0.259)	0.177 (0.000)	0.220 (0.000)	0.092	0.2	0.108 (0.000)	0.000 (0.232)	-0.108 (0.002)
	IMS (2)	0.325	0.304	-0.022 (0.707)	0.195 (0.000)	0.217 (0.000)	0.338	0.345	0.007 (0.259)	0.108 (0.000)	0.101 (0.000)	0.479	0.416	-0.063 (0.345)	0.377 (0.000)	0.440 (0.000)
	TSCS (3)	0.252	0.232	-0.020 (0.663)	0.105 (0.000)	0.124 (0.000)	0.585	0.264	-0.321 (0.423)	0.060 (0.008)	0.381 (0.015)	0.403	0.408	0.006 (0.528)	0.118 (0.000)	0.112 (0.000)
	TSS (4)	0.345	0.328	-0.018 (0.26)	0.119 (0.000)	0.137 (0.000)	0.401	0.396	-0.005 (0.533)	0.144 (0.000)	0.149 (0.000)	0.459	0.473	0.014 (0.703)	0.231 (0.000)	0.217 (0.000)

Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

Notes: (a) Change in inequality $\Delta(v) = \Delta(2)$; (b) Re-ranking component (mobility), R(2); (c) Progressivity component (pro-poor), P(2). (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply, (3) Transport, Storage and Communications Sector, (4) Trade and Services Sector. Including Financial Services. N is number of individual in each panel, 1987-1988, 1997-1998 and 2007-2008. In parenthesis are the standard errors obtained through bootstrapping.

Table A3.5.5. Subgroup decomposition of inequality change into pro-poor growth (P) and mobility (R) components for South Region, 1987-2008

South Region	Initial Gini	Final Gini	Change in Gini ^a	Reranking ^b (R)	Progressivity ^c (P)	Initial Gini	Final Gini	Change in Gini ^a	Reranking ^b (R)	Progressivity ^c (P)	Initial Gini	Final Gini	Change in Gini ^a	Reranking ^b (R)	Progressivity ^c (P)	
	1987-1988					1997-1998					2007-2008					
Age	16 to 25	0.310	0.311	0.001 (0.600)	0.116 (0.000)	0.114 (0.000)	0.373	0.360	-0.014 (0.489)	0.088 (0.000)	0.101 (0.000)	0.347	0.376	0.028 (0.277)	0.213 (0.000)	0.185 (0.000)
	26 to 45	0.383	0.378	-0.005 (0.304)	0.098 (0.000)	0.103 (0.000)	0.433	0.424	-0.009 (0.807)	0.102 (0.000)	0.112 (0.000)	0.415	0.427	0.012 (0.559)	0.159 (0.000)	0.148 (0.000)
	46 to 65	0.369	0.308	-0.061 (0.368)	0.037 (0.000)	0.099 (0.000)	0.491	0.471	-0.020 (0.501)	0.107 (0.000)	0.127 (0.000)	0.541	0.492	-0.049 (0.187)	0.168 (0.000)	0.218 (0.000)
Education	Low	0.250	0.265	0.015 (0.734)	0.112 (0.000)	0.098 (0.000)	0.336	0.336	0.000 (0.529)	0.104 (0.000)	0.104 (0.000)	0.297	0.315	0.018 (0.733)	0.150 (0.000)	0.132 (0.000)
	Medium	0.235	0.205	-0.030 (0.554)	0.107 (0.000)	0.137 (0.000)	0.314	0.372	0.058 (0.412)	0.102 (0.000)	0.044 (0.000)	0.329	0.301	-0.028 (0.587)	0.149 (0.000)	0.178 (0.000)
	High	0.425	0.355	-0.070 (0.865)	0.068 (0.000)	0.137 (0.000)	0.405	0.388	-0.017 (0.651)	0.123 (0.000)	0.140 (0.000)	0.463	0.46	-0.004 (0.832)	0.200 (0.000)	0.203 (0.000)
Firm Size	Micro	0.264	0.266	0.022 (0.758)	0.119 (0.000)	0.097 (0.001)	0.273	0.279	0.006 (0.480)	0.146 (0.000)	0.140 (0.000)	0.324	0.363	0.039 (0.959)	0.145 (0.000)	0.105 (0.000)
	Small	0.164	0.185	0.021 (0.985)	0.001 (0.121)	-0.020 (0.118)	0.309	0.320	0.011 (0.822)	0.154 (0.000)	0.143 (0.000)	0.478	0.487	0.009 (0.698)	0.130 (0.000)	0.121 (0.000)
	Medium and Large	0.377	0.325	-0.052 (0.855)	0.098 (0.000)	0.150 (0.000)	0.402	0.386	-0.017 (0.287)	0.123 (0.000)	0.139 (0.000)	0.445	0.414	-0.030 (0.817)	0.200 (0.000)	0.231 (0.000)
Economic Sector	AFFMS (1)	0.208	0.073	-0.135 (0.051)	0.000 (0.262)	0.135 (0.000)	0.439	0.450	0.010 (0.965)	0.078 (0.060)	0.068 (0.264)	0.481	0.374	-0.107 (0.579)	0.285 (0.056)	0.392 (0.018)
	IMS (2)	0.331	0.308	-0.024 (0.423)	0.138 (0.000)	0.161 (0.000)	0.391	0.355	-0.035 (0.205)	0.090 (0.000)	0.125 (0.000)	0.366	0.422	0.056 (0.660)	0.194 (0.000)	0.138 (0.000)
	TSCS (3)	0.333	0.320	-0.013 (0.397)	0.074 (0.000)	0.086 (0.000)	0.442	0.379	-0.064 (0.898)	0.110 (0.000)	0.174 (0.006)	0.393	0.448	-0.054 (0.550)	0.235 (0.000)	0.181 (0.000)
	TSS (4)	0.425	0.374	-0.050 (0.585)	0.064 (0.000)	0.114 (0.000)	0.457	0.447	-0.010 (0.713)	0.095 (0.000)	0.105 (0.000)	0.477	0.453	-0.024 (0.695)	0.152 (0.000)	0.177 (0.000)

Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008.

Notes: (a) Change in inequality $\Delta(v) = \Delta(2)$; (b) Re-ranking component (mobility), R(2); (c) Progressivity component (pro-poor), P(2). (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply, (3) Transport, Storage and Communications Sector, (4) Trade and Services Sector. Including Financial Services. N is number of individual in each panel, 1987-1988, 1997-1998 and 2007-2008. In parenthesis are the standard errors obtained through bootstrapping.

Annex 3.6. Subgroup components expressed as percentage of initial S-Gini for regions in Mexico, 1987-2008

Table A3.6.1. Subgroup components expressed as percentage of initial S-Gini for *Border Region*

Border Region		Change in	Reranking ^b	Progressivity ^c	Change in	Reranking ^b	Progressivity ^c	Change in	Reranking ^b	Progressivity ^c
		Gini ^a	(R)	(P)	Gini ^a	(R)	(P)	Gini ^a	(R)	(P)
		1987-1988			1997-1998			2007-2008		
A g e	16 to 25	-2.6	38.5	41.1	12.0	33.3	45.3	-8.0	50.2	58.1
	26 to 45	-0.2	45.1	45.3	-0.9	22.5	23.4	-0.1	51.4	51.5
	46 to 65	-16	22.2	38.2	-8.7	18.4	27.1	0.8	51.3	50.5
E d u c a t i o n	Low	-12.7	36	48.7	-7.6	30.3	37.9	-4.8	51.7	56.5
	Medium	-2.6	44.6	47.2	1.3	32.2	30.9	-4.2	48.3	52.5
	High	-0.6	56.1	56.7	-3.8	29.8	33.7	-2.5	58.3	60.7
F S r z m e	Micro	-25.4	25.7	51.1	-13.0	26.5	41.5	-8.1	44	50.1
	Small	2.8	65.3	62.5	-8.1	20.9	28.9	-1.0	42.3	43.3
	Medium and Large	1.0	41.3	40.3	-2.5	23.1	25.5	-0.9	57	57.9
E c o n o m i c	AFFMS (1)	-36.5	28	64.5	-8.1	12.7	20.7	38.0	56.6	18.5
	IMS (2)	5.0	49.8	44.8	-0.6	25.1	25.7	-3.9	57.7	61.6
	TSCS (3)	-10.0	30.6	40.6	-10.0	21.8	31.8	9.6	78	68.4
	TSS (4)	-6.0	32.2	38.2	-2.1	19.4	21.5	-0.5	48.9	49.4

Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008. Notes: (a) Change in inequality $\Delta(v) = \Delta(2)$; (b) Re-ranking component (mobility), R(2); (c) Progressivity component (pro-poor), P(2). (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply, (3) Transport, Storage and Communications Sector, (4) Trade and Services Sector. Including Financial Services.

Table A3.6.2. Subgroup components expressed as percentage of initial S-Gini for *North Region*

North Region		Change in	Reranking ^b	Progressivity ^c	Change in	Reranking ^b	Progressivity ^c	Change in	Reranking ^b	Progressivity ^c
		Gini ^a	(R)	(P)	Gini ^a	(R)	(P)	Gini ^a	(R)	(P)
		1987-1988			1997-1998			2007-2008		
A g e	16 to 25	0.9	36.4	35.4	-1.8	36.4	38.1	-19	46.9	66
	26 to 45	-4.6	50.2	54.8	-3.6	25.3	28.9	2.1	40	37.9
	46 to 65	32.3	50.6	18.4	0.1	31.9	31.9	-1	36.8	37.8
E d u c a t i o n	Low	-18.3	44.2	62.5	-3.3	27.5	30.9	-3.1	48.7	51.8
	Medium	24.2	94	69.8	3.4	34.6	31.2	3.1	48.9	45.8
	High	3.2	49.1	46	-1.5	35.9	37.4	-0.7	42.1	42.9
F S r z m e	Micro	-31	24.2	55.2	-4.5	45.7	50.2	-10.8	37.5	48.3
	Small	-38.8	63.8	102.6	36	98.7	62.6	-8.7	29.3	38
	Medium and Large	0.1	49.9	49.8	-2.5	28.5	31	-2.1	37.9	40
E c o n o m i c	AFFMS (1)	-31.7	35.2	66.9	-6.6	49	55.6	45.1	57.5	12.3
	IMS (2)	13.4	56.8	43.4	-1.5	22.2	23.8	1.2	32.5	31.3
	TSCS (3)	114.4	293	149	-8	14.3	22.3	-6.8	45.2	52
	TSS (4)	-6.7	24.8	31.5	-2.4	22.1	24.4	-0.9	36.9	37.8

Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008. Notes: (a) Change in inequality $\Delta(v) = \Delta(2)$; (b) Re-ranking component (mobility), R(2); (c) Progressivity component (pro-poor), P(2). (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply, (3) Transport, Storage and Communications Sector, (4) Trade and Services Sector. Including Financial Services.

Table A3.6.3. Subgroup components expressed as percentage of initial S-Gini for *Centre Region*

Center Region		Change in	Reranking ^b	Progressivity ^c	Change in	Reranking ^b	Progressivity ^c	Change in	Reranking ^b	Progressivity ^c
		Gini ^a	(R)	(P)	Gini ^a	(R)	(P)	Gini ^a	(R)	(P)
		1987-1988			1997-1998			2007-2008		
Age	16 to 25	-7.8	35.8	43.6	1	35.3	34.3	10.3	91.8	81.5
	26 to 45	-6.4	34.1	40.5	-0.8	32.8	33.6	-0.5	54.7	55.1
	46 to 65	-5.5	29.3	34.8	1.6	29	27.4	-0.5	52.2	52.8
Education	Low	5.1	49.6	44.5	-7.8	41.8	49.6	-1.3	71.6	72.9
	Medium	-12.6	44.5	57.1	1.4	34.1	32.8	-7	64.2	71.3
	High	-4.4	41.3	45.8	-1.7	40.2	41.9	1.1	57.3	56.2
Firm Size	Micro	5.3	71.3	66.1	-1.9	45.1	47	1.6	70	68.4
	Small	8.8	51	42.2	-5.8	21	26.9	0.1	50.7	50.6
	Medium and Large	-9.9	35.2	45	-1.3	36.7	38	0	51.6	51.6
Economic Sector	AFFMS (1)	-10.5	41.2	51.7	35.4	25.1	-10.3	-47	15.1	62.1
	IMS (2)	-2.6	41.2	43.8	3	29.7	26.7	-0.7	64.3	65
	TSCS (3)	3.2	60.8	57.6	0.7	35.3	34.6	-0.6	55.2	55.8
	TSS (4)	-6.6	27	33.6	-2	27.4	29.4	1.4	53.7	52.3

Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008. Notes: (a) Change in inequality $\Delta(v) = \Delta(2)$; (b) Re-ranking component (mobility), R(2); (c) Progressivity component (pro-poor), P(2). (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply, (3) Transport, Storage and Communications Sector, (4) Trade and Services Sector. Including Financial Services.

Table A3.6.4. Subgroup components expressed as percentage of initial S-Gini for *Capital Region*

Capital Region		Change in	Reranking ^b	Progressivity ^c	Change in	Reranking ^b	Progressivity ^c	Change in	Reranking ^b	Progressivity ^c
		Gini ^a	(R)	(P)	Gini ^a	(R)	(P)	Gini ^a	(R)	(P)
		1987-1988			1997-1998			2007-2008		
Age	16 to 25	-11.1	35.9	47.1	-1.7	44.4	46.1	9	89.4	80.4
	26 to 45	-6.2	36.5	42.6	0.6	33.2	32.5	-3.6	55.2	58.8
	46 to 65	0.3	60.9	60.5	-21.1	28.2	49.2	-2.1	49.2	51.2
Education	Low	-12.3	27.8	40.1	4.0	42.4	38.4	11.3	93.2	81.9
	Medium	-27.4	42.6	70	1.7	51.2	49.5	0.6	62	61.3
	High	3.6	74	70.4	-8.5	37.3	45.8	0.7	59.4	58.7
Firm Size	Micro	-27.8	17.5	45.3	50.6	76.1	25.5	-5.8	76.3	82.1
	Small	32.8	48.4	15.7	-13.8	14.6	28.4	8	60.5	52.5
	Medium and Large	-4.7	51.5	56.2	-11.4	36.6	48.1	0.7	52.9	52.3
Economic Sector	AFFMS (1)	-0.8	101.8	102.7	-32.9	134.2	167.1	116.7	0	-116.7
	IMS (2)	-6.7	59	66.6	2.2	32.1	30	-13.1	78.7	91.9
	TSCS (3)	-7.8	41.6	49.4	-54.8	10.3	65.1	1.4	29.2	27.8
	TSS (4)	-5.1	34.4	39.5	-1.3	35.9	37.2	3.1	50.4	47.3

Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008. Notes: (a) Change in inequality $\Delta(v) = \Delta(2)$; (b) Re-ranking component (mobility), R(2); (c) Progressivity component (pro-poor), P(2). (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply, (3) Transport, Storage and Communications Sector, (4) Trade and Services Sector. Including Financial Services.

Table A3.6.5. Subgroup components expressed as percentage of initial S-Gini for South Region

South Region	Change in Gini ^a	Reranking ^b (R)	Progressivity ^c (P)	Change in Gini ^a	Reranking ^b (R)	Progressivity ^c (P)	Change in Gini ^a	Reranking ^b (R)	Progressivity ^c (P)	
	1987-1988			1997-1998			2007-2008			
Agriculture	16 to 25	0.4	37.3	36.9	-3.6	23.4	27.1	8.2	51.4	53.2
	26 to 45	-1.3	25.6	26.9	-2.1	23.6	25.7	2.8	38.4	35.5
	46 to 65	-16.6	10.1	26.7	-4.1	21.8	25.9	-9.1	31.1	40.2
Education	Low	5.9	45	39	0.1	31	30.9	6.1	50.4	44.4
	Medium	-12.7	45.6	58.3	18.5	32.6	14.1	-8.8	45.4	54.1
	High	-16.4	15.9	32.4	-4.2	30.4	34.6	-0.8	43	43.8
Finance	Micro	8.3	44.9	36.6	2.3	53.4	51.2	12	44.6	32.5
	Small	12.7	0.6	-12.1	3.5	49.7	46.2	1.8	27.3	25.4
	Medium and Large	-13.7	26	39.7	-4.1	30.5	34.6	-6.8	45	51.9
Construction	AP ¹	-64.7	0	64.7	2.4	17.7	15.4	-22.2	59.2	81.4
	CME ²	-7.1	41.5	48.7	-9	23	32	15.2	53	37.8
	TC ³	-3.8	22.1	26	-14.4	24.9	39.3	13.7	59.8	46.1
	TS ⁴	-11.9	15	26.9	-2.1	20.8	22.9	-5.1	32	37.1

Source: Own calculations of Jenkins and Van Kerm decomposition. Results based on data panel ENEU-ENOE surveys from 1987 to 2008. Notes: (a) Change in inequality $\Delta(v) = \Delta(2)$; (b) Re-ranking component (mobility), R(2); (c) Progressivity component (pro-poor), P(2). (1) Agricultural, Forestry, Fishing and Mining Sector, (2) Industry and manufacturing sector. Including Construction, Manufacture and Electricity, Gas Steam, Air conditioning and Water Supply, (3) Transport, Storage and Communications Sector, (4) Trade and Services Sector. Including Financial Services.

Wage inequality and economic growth in Mexican regions

4.1. Introduction

Since the pioneering contribution by Kuznets (1955), suggesting a non-linear relationship between inequality and growth (inequality first increases and later decreases during the process of economic development), there has been a growing interest in analysing the relationship between both variables. However, theoretical papers as well as empirical applications have produced controversial results. While a considerable part of the literature has shown that inequality is detrimental to growth, more recent studies have challenged this result and found a positive effect of inequality on growth. A first group of authors defend that in more egalitarian societies there is less demand for redistribution, and therefore less tax pressure, stimulating a greater accumulation of capital and higher growth (Persson and Tabellini, 1994). A second argument in this line is related to political instability (Alesina and Perotti, 1996). In particular, greater levels of inequality imply a distortion in the functioning of markets and a reduction in labour productivity. In contrast, the authors who defend a positive relationship between inequality and growth base their arguments on the effects of inequality on the accumulation of factors of production. If the saving rate of the rich is higher than that of the poor, the reduction of inequality will imply a reduction of aggregate savings, and therefore of capital accumulation and growth (Fields, 1989 and Campanale, 2007). Besides, agglomeration economies produce higher returns to high-skilled workers and consequently produce simultaneously higher inequality and higher economic growth (Borjas *et al.*, 1992; Wheaton and Lewis, 2002, Glaeser and Maré, 2001). If one can think that both variables are influenced by the same factors, it is likely to happen that they are mutually caused.

The recent meta-analysis by de Dominicis *et al.* (2008) has permitted them to conclude that, although policy conclusions are clearly different, it would be misleading to simply speak of a positive or negative relationship between income inequality and economic growth when looking at the available studies. Differences in estimation methods, data quality and sample coverage substantially affect the

magnitude of the estimated effect on income inequality on economic growth. For this reason, they propose to focus research on determining the impact of income inequality on economic growth using single-country data at the regional level as most of the factors explaining the bulk of differences between studies will not exist: data-related issues or structural and institutional issues. However, the international evidence using this approach is scarce: Partridge (2005), Frank (2009) and Fallah and Partridge (2007) for the US and Perugini and Martino (2008), Barrios and Strobl (2009) for the EU-15 countries, Castelló (2010) for OECD countries focusing on groups of countries with distinct income levels, Herzer and Vollmer (2011) for a sample of 46 countries and Székely and Hilgert (1999) for 18 Latin American countries but to our knowledge, there are few similar studies for single country Rooth and Stenberg (2011) for Swedish regions and in developing countries we find studies for Argentina of the Cañadas (2008), Araujo, *et al.* (2009) and Azzoni (2001) for Brazil.

The objective of this chapter is to provide evidence on the association between inequality and growth across 32 Mexican states for a period of 10 years (1998-2008) using several measures of inequality and different econometric specifications. Moreover, I would like to determine whether other factors simultaneously influence inequality and growth. For example, previous growth rates may influence both present inequality and subsequent growth; as it has been found in the regional convergence literature.

The Mexican case is particularly interesting in this context for several reasons. First, because in the three last decades, the labour structure of Mexico has suffered different political, economic and demographic changes affecting both inequality and regional economic growth. Second, because the inequality trends have been substantially different to the ones observed in other developing countries.

After a critical period of economic adjustment characterized by the debt crisis in the 1980's, Mexico enjoyed a period of economic growth. In the mid-1980s, Mexico was in an initial stage to implement new trade liberalization policies and export promotion that was expected to increase the country's productivity and competitiveness. During that period, trade barriers were reduced through the various rounds of negotiations under the GATT and WTO, and Mexico also experienced a radical reduction in the size of the public sector, in the strength of the unions, but also a massive increase in the rate of underemployment and in workers in the informal sector (Gong *et al.*, 2004; Meza, 2005). From 1989 to 1994, average GDP growth was about 3.9% per year,¹³⁸ but growth ended abruptly in 1995, when GDP fell by 6.2% in the aftermath of the so-called "Peso Crisis". After the crisis of 1995, the GDP

¹³⁸ World Bank (1997).

contracted by around 8%, the economy quickly recovered but not with significant levels of growth, i.e. from 1996 to 2000 Mexico's per capita GDP grew at a rate of 4% per year and between 2001 and 2006 the growth grew at only 1% per year.¹³⁹

Under this macroeconomic framework, there is overwhelming evidence that since the mid-1980s Mexico has faced increasing inequality not only in economic but also in social terms, although it seems to have decreased from 2000 onwards. The inequality increase observed during the 1990s was a common feature of several OECD industrialized countries¹⁴⁰, but not in most developing countries (Autor *et al.*, 2005 and 2008; Arellano *et al.*, 2001; Acemoglu, 2003; Morley, 2000; Bandeira and García, 2002; Ferreira, *et al.*, 2008 and Cornia, 2010)¹⁴¹.

The remainder of the chapter is structured as follows. Section 4.2 discusses the data sources. Section 4.3 the methodology and the econometric model to be estimated. Section 4.4 displays the results about the influence of wage inequality on economic growth in a regional perspective. Finally, Section 4.5 concludes.

4.2. Data sources

The dataset used in this chapter comes from the National Survey of Labour and Employment (ENOE) and the National Urban Employment Survey (ENEU), carried out by the National Institute of Statistics and Geography of Mexico (INEGI), from 1987 to 2008.

¹³⁹ The introduction of trade liberalisation has generated important changes in the Mexican economy. However, the research has shown that there are different (positive or negative) outcomes. For instance, the apparently NAFTA did not break down the divergent pattern in regional per-capita output observed after the initial stage of the reforms; the degree to which trade will reduce regional inequality in a given country is mediated by the geographic distribution of its endowments; the trade openness has indeed increased regional inequality in Mexico, favouring in particular states located in the north of Mexico. Whereas, it seems that human capital policies can have a greater effect in closing disparities among regions in the Mexican context, some policies cannot be dismissed given that building local capacities requires a great deal of time and a coordinated and well-focused regional policy. In all cases, the findings show that there is increasing polarization between the Mexican states. See in particular Jordaan and Rodriguez, (2012), González (2007), Rodríguez-Oreggia (2005) and Chiquiar (2005) for a review of these arguments and Rodríguez-Oreggia (2007) for a review of the polarization between the Mexican states, richer states becoming richer and experiencing higher growth.

¹⁴⁰ There is evidence that inequality measures are sensitive to the sample of workers examined and the earnings measure Handcock, *et al.* (2000), and Lemieux (2002, 2006).

¹⁴¹ These contrasts with the slight increases or even declines in other countries such as the Netherlands, Sweden or Belgium, US, UK, Germany, Canada and some countries in Latin America.

In order to describe the evolution of inequality in Mexico, in the rest of the analysis, I use micro data from the ENEU-ENOE over the period 1998-2008. The size of the sample is 1,391,438 observations in urban aggregate of 32 metropolitan areas. Our basic sample consists of workers between 15 and 65 years are that working regularly full-time and the hours measured using usual hours worked in the principal job. I chose not to consider the self-employed and seasonal or unpaid workers in order to focus on the formal or mainstream labour market and to avoid problems with dealing retained earnings.

The scarce availability of sub-national data at Mexico level has so far strongly influenced research on the causes and effects of regional inequality. This means that analyses covering 32 states¹⁴² can be carried out, providing a number of observations (in our case, regions) sufficient to allow econometric analysis. I built regional measures of wage inequality using hourly wages (derived from monthly earnings and weekly-hours multiplied by 4.3¹⁴³). For individuals who report their wages as a multiple of the minimum wage, I assign the mean of the interval¹⁴⁴. Wages were deflated by consumer price index (CPI) to the second quarter with 2002 as the base year. The regional CPI disaggregates indexes in six geographical regions that include 46 cities classified by locality size (small, medium and big). This structure allow for at least one representative city in each state¹⁴⁵.

In view of the high variability of outcomes highlighted by the literature with respect to the measure employed and the geographical scope, I considered also regional population, regional GDP (current¹⁴⁶), population density, employment sectoral structure, level of qualification (as a proxy of human capital), educational inequality, measures of labour market performances (labour force participation, unemployment and informal labour rates). Geographic information as the coastal strip and the distance in Kilometres to Mexico D.F from the capital of each state to Mexico City are used to represent proximity among markets. Distance to the most important markets is a key variable for the new economic geography. This strand of the literature assumes that once trade is introduced, a shift in the

¹⁴² Aguascalientes, Baja California, Baja California Sur, Campeche, Coahuila de Zaragoza, Colima, Chiapas, Chihuahua, Distrito Federal, Durango, Guanajuato, Guerrero, Hidalgo, Jalisco, México, Michoacán de Ocampo, Morelos, Nayarit, Nuevo León, Oaxaca, Puebla, Querétaro Arteaga, Quintana Roo, San Luis Potosí, Sinaloa, Sonora, Tabasco Tamaulipas, Tlaxcala, Veracruz, Yucatán, Zacatecas.

¹⁴³ The definition of earnings in the publicly available version of the surveys refers to monthly “equivalent” earnings from the main job after taxes and Social Security contributions, including overtime premia and bonuses. For those paid by the week, the survey transforms weekly earnings into monthly. Similar adjustments are used for workers paid by the day or every two weeks.

¹⁴⁴ During the period, the population that does not declare incomes is less than one percent.

¹⁴⁵ The NCPI is calculated since 1969 and it has changed four times of base year in 1978, 1980, 1994 and 2002. In order this study I use the base to 2002 that correspond a weighting for consume of population structure in 2000. The NCPI, is calculated and published on a monthly basis by the Central Bank (Bank of Mexico). The index gathers the prices of family shopping basket, prices of goods and services www.banxico.org.mx.

¹⁴⁶ The regional GDP in constant prices is only available for 2005-2009.

relevant market occurs¹⁴⁷. The data sources for each of the variables are shown in Table A4.1.1 (see Annex 4.1).

4.3. Methodology

4.3.1. Measuring inequality

A substantial and growing literature has developed different measures or indexes to proxy economic inequality. Some authors have used the Gini coefficient or other measures or relationships drawn from Lorenz curves; while others authors have chosen to use different indicators of dispersion, such as an entropy index or axiomatic derivations of inequality indexes; and still others advocate the use of normative measures derived from social welfare functions¹⁴⁸.

However, the most commonly-used inequality index is still the Gini coefficient (G), which ranges from 0 (perfect equality) to 1 (perfect inequality). It is the ratio of the area enclosed by the Lorenz curve (L) and the perfect equality line to the total area below that line, the Gini coefficient is twice the area defined between p and $\theta(p)$, where $\theta(p)$ is the Lorenz curve and shows the income value (Y) below a fraction $0 \leq p \leq 1$:¹⁴⁹

$$G(Y) = 1 - 2 \int_0^1 L(p; Y) dp \quad (4.1)$$

When compared to other measures, the Gini coefficient is most sensitive to income differences about the middle of the distribution (more precisely, around the mode). This index is usually completed by using other Lorenz based measures such as the Mehran and the Piesch index, which are more sensitive to the differences between low income and top income individuals, respectively.

A different family of inequality indices can be derived taking into account the considerations summarized by Cowell and Kuga (1981). This family is known as Generalized Entropy indexes (E_a)

¹⁴⁷ In the Mexican case the relevant market should be Mexico City during ISI, and the border with the US during GATT and especially since the implementation of NAFTA (Hanson, 1997; Hanson and Harrison, 1999 and Krugman and Livas, 1996).

¹⁴⁸ The extent of this work is indicated by the recent publication of two handbooks, the *Handbook of Income Distribution* edited by Atkinson and Bourguignon (2000), much of which addresses measurement issues, and the *Handbook on Income Inequality Measurement* edited by Silber (1999), devoted entirely to the subject. See also, Cowell (2000) and Lambert (2001) for an excellent survey.

¹⁴⁹ Yitzhaki (1998) reviews other alternative formulae.

and given an appropriate normalization and using the standard population principle (Dalton, 1920), they can be calculated as follows:¹⁵⁰

$$E_{\alpha}(Y) = \frac{1}{\alpha^2 - \alpha} \int \left(\left(\frac{y_i}{\mu Y} \right)^{\alpha} - 1 \right) f(y_i) dy \quad (4.2)$$

where α is the order of the index, y_i is income share that is individual i 's total income share as a proportion of total income for the entire regional population and μY is the mean income. The more positive (negative) α is, the more sensitive (E_{α}) is to income differences at the top (bottom) of the distribution; E_0 is equivalent to the mean logarithmic deviation¹⁵¹, E_1 corresponds to the Theil index¹⁵² and E_2 is half the square of the coefficient of variation.¹⁵³

Atkinson index explicitly manifests value-judgements in a parameter ε representing the degree of inequality aversion. The Atkinson class of measures has the general formula:

$$A_{\varepsilon} = 1 - \left[\frac{1}{n} \sum_{i=1}^n \left[\frac{y_i}{\bar{y}} \right]^{1-\varepsilon} \right]^{\frac{1}{1-\varepsilon}} \quad (4.3)$$

where ε is an inequality aversion parameter, $0 < \varepsilon < \infty$; the higher the value of ε the more society is concerned about inequality (Atkinson, 1970). The Atkinson class of measures range from 0 to 1, with zero representing no inequality. Setting $\alpha = 1 - \varepsilon$, the GE class becomes ordinally equivalent to the Atkinson class, for values of $\alpha < 1$ (Cowell and Jenkins, 1995)¹⁵⁴. The more positive $\varepsilon > 0$ (the 'inequality aversion parameter') is, the more sensitive in different parts of the income distribution therefore the most commonly used values of ε are: A(0.5), A(1) and A(2).

¹⁵⁰ Using an analogy with the entropy concept in information theory Theil (1967) opened up and explored a new area to inequality measurement and for the axiomatic approach to inequality measurement. The entropy concept is the expected information in the distribution. Theil's application of this to income distribution replaced the concept of event probabilities by income share.

¹⁵¹ This inequality index is an example of the concept of conditional entropy that allows the comparison distribution and has been applied to the measurement of distributional change (see Cowell, 1980).

¹⁵² The most commonly used values of α , are: 0, 1 and 2. A value of $\alpha = 0$ gives more weight to distances between wages in the lower tail, $\alpha = 1$ applies equal weights across the distribution, while a value of $\alpha = 2$ gives proportionately more weight to gaps in the upper tail (see Litchfield, 2003).

¹⁵³ For more details of these measures, see Chapter 1.

¹⁵⁴ Atkinson proposes to define the index not according to the difference between actual social welfare and that you would have with equally distributed income but in terms of the difference between mean actual income and *equally distributed equivalent income*, i.e. income which, being equal for everyone, would provide same level of actual social welfare.

4.3.2. Methodology

The standard procedure for estimating the impact of inequality on growth is to assume a simple linear relationship, where the logarithmic difference of per capita income at the beginning and the end of the time period is regressed on a number of explanatory variables potentially explaining differences in growth rates of countries, including a measure of income inequality. Specifically

$$\ln y_{i,t} - \ln y_{i,t-\tau} = \alpha + \beta \cdot \ln y_{i,t-\tau} + \gamma \cdot \text{Ineq}_{i,t-\tau} + v_{i,t} \quad t = 1998, \dots, 2008 \quad (4.4)$$

where $\ln y_{i,t}$ is the logarithm of real GDP per capita in region i at time t , $\text{Ineq}_{i,t-\tau}$ represents an inequality measure (Gini index, Mehran and Piesch measures, Generalized entropy index and Atkinson class), and $v_{i,t}$ an error term that varies across regions and periods. In this model, the coefficient β will be related to the convergence rate across economies while the coefficient γ will permit to assess the impact of within regional inequality on growth. As previously mentioned, studies based on cross-country regressions typically report a negative and significant relationship between initial income inequality and growth. The negative coefficient usually holds for different measures of inequality, samples of countries, and time periods.

One of the main critiques to this kind of regression is that cross-country estimates may be biased due to omitted variables. Factors such as technology, climate, institutions and any other country-specific variable may be important determinants of growth rates and may be correlated with the explanatory variables considered in the model. Despite one can include a list of control variables into the model, many other factors are typically unobservable. By that assuming those factors are constant over time and using longitudinal rather than cross-section data, the suggested specification results in a modified panel data version of the previous equation, where one can control for unobservable factors using fixed effects model. In particular, the modified model will adopt the following form:

$$\ln y_{i,08} - \ln y_{i,98} = \alpha + \beta \cdot \ln y_{i,98} + \gamma \cdot \text{Ineq}_{i,98} + \varphi X_{i,98} + \eta_{08} + \mu_i + \varepsilon_{i,08} \quad (4.5)$$

where $\ln y_{i,t}$ is the logarithm of real GDP per capita in region i at time t , τ is a 10-year span, $\text{Ineq}_{i,t-\tau}$ represents the different inequality measures in region i lagged 1 year, $X_{i,t-\tau}$ includes k explanatory

variables suggested in the literature as important determinants of the growth rates¹⁵⁵; β , γ and φ represent the parameters of interest that are estimated, η_t a time specific effect, μ_i a region specific effect, and $\varepsilon_{i,t}$ an error term that varies across regions and periods.

Nevertheless, panel data estimations have also a list of drawbacks: if most of the variation in the key variables is cross-sectional rather than within regions, fixed effect approaches could produce misleading results (Barro, 2000). That is, if the underlying causal factors in the growth process are persistent, the long-run cross-sectional effects will be subsumed into the country fixed effects, which means the explanatory variable coefficients would be much less informative (Rodríguez-Pose and Tselios, 2010). Consequently, OLS cross-sectional models capture how persistent cross-sectional differences in inequality affect long-run growth rates, which is more relevant to understanding growth disparities, while panel techniques capture how time-series changes in inequality within a region affect changes in its growth rate over a short period. Therefore, the two methods are complementary and may reflect different responses.

Consequently, both cross section and panel data alternatives will be considered. The econometric estimation of panel data system has to deal with similar problems: the measurement with error of the endogenous variable, the inclusion of the lagged endogenous variable as a regressor, the potential endogeneity of growth and, last, the potential existence of spatial spillovers. The inclusion of additional explanatory variables at the regional level will permit to provide an assessment of the second of our research hypothesis. However, the choice between various different techniques to estimate the panel data model is governed by assumptions about the error term and its correlation with the explanatory variables. Most panel data growth studies use the fixed rather than the random effects estimator. However, as highlighted by Temple (1999) this approach is not correct to analyse the effect of variables that are fairly constant over time, or that will affect growth only in the long run as it could be the case for inequality. An additional problem with both the fixed and random effects estimator is that our specification contains a lagged regressor undermining the strict exogeneity assumption of the explanatory variables, so the use of the GMM estimator initially developed by Arellano and Bond (1991) and improved by more recent contributions that take into account problems related to panel dimension is strictly recommended. The idea of this estimator is to take first differences to eliminate the source of inconsistency and use the levels of the explanatory variable lagged as instruments.

¹⁵⁵ Logarithm of GDP per capita, educational attainment, educational inequality, labor force, unemployment and informal labor rates, coastal localization of the region, distance to DF and occupation by economic sector. A more detailed description of each variable and its sources is included in Table A4.1.1 in the Annex 4.1.

4.4. Empirical results

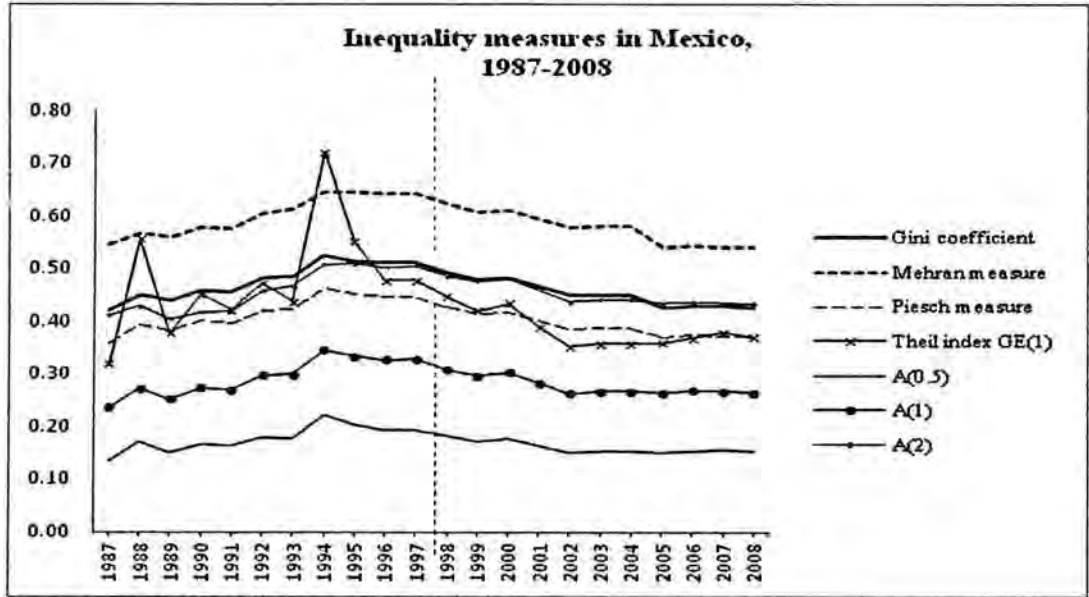
4.4.1. *The evolution of wage inequality in Mexican regions*

Mexico has experienced a significant process of divergence in regional wage. Since the mid-eighties, wage differentials across Mexico's regions tended to widen. During the nineties the NAFTA had a heterogeneous impact in the several regions – i.e. not all regions within Mexico are equally linked to the international (global) economy. While the degree of regional exposure to globalization appears to be an important determinant of the differences in the evolution of state-specific wage profiles, it is important to note that Mexico's regions exhibit large differences in natural resource endowments, infrastructure, regional policies and historically-determined agglomerations of population.

Figure 4.1 shows the evolution of the different inequality measures considered in this chapter. From this figure, we can conclude that there is a general trend of inequality to follow an inverted 'U' pattern, with a sharp decline since 1997. If we focus on the Gini index, a major increase in inequality took place in the country since 1994 (when the value of the Gini index was 0.52). After the Mexico crisis, the level of inequality has declined slightly. If we now look at the General Entropy indices, for extreme values of the sensitivity parameter the volatility of the index is higher, probably due to top coding problems; however, focusing on levels we can see that $GE(-1)$, $GE(0)$ and $GE(1)$ follow a pattern close to the Gini index.

Table 4.1 shows different measures of inequality for 32 states in Mexico, for the period 1998-2008. We can identify important differences in the inequality indexes among regions over the period. In 1998 the Gini coefficient was 0.49 and this coefficient by regions ranges between 0.42 and 0.54. Chiapas, D.F., Guerrero, Jalisco, Nuevo Leon, Oaxaca, San Luis Potosi, Tlaxcala, Veracruz Yucatan and Zacatecas showed Gini coefficient values of 0.50 or over. Maps 4.1a to 4.1b (in the Annex 4.2) show the changes among regions between 1998 and 2008. The evolution of disparities between 1998 and 2008 among regions indeed shows a clear downward trend, the Mehran measure decreasing from 0.62 to 0.53 on average; the Piesch from 0.42 to 0.36; the Generalized entropy indices in values (-1, 0, 1 and 2) decline from 0.45 to 0.37, 0.36 to 0.30, 0.44 to 0.36 and 1.89 to 0.81, respectively.

Figure 4.1. Inequality measures in Mexico, 1987-2008



Source: Own elaboration from ENEU-ENOE 1987-2008

The Atkinson class with three different values of the inequality aversion (0.5, 1 and 2) significantly falls over the period (from 0.18 to 0.15, 0.30 to 0.26 and 0.47 to 0.42, respectively). However, the magnitude of the drop clearly increases with aversion to inequality which means that it is mostly through movements in the lower end of the distribution what inequalities reduce. In other words, the poorest regions are becoming richer rather than the richest ones becoming poorer. The fact that regional disparities decline when considering the regions as a whole does not prevent disparities to increase within an important number of regions (e.g. those that are at the border).

Table 4.1. Descriptive statistics of main variable by region

	lgdppc				Gini coefficient				Mehran				Pesch				Generalized Entropy Index				Atkinson class					
	2008		1998		2008		1998		2008		1998		2008		1998		2008		1998		2008		1998		2008	
	GE(0)	GE(1)	GE(-1)	GE(0)	GE(1)	GE(-1)	GE(0)	GE(1)	GE(-1)	GE(0)	GE(1)	GE(-1)	GE(0)	GE(1)	GE(-1)	A(0.5)	A(1)	A(2)	A(0.5)	A(1)	A(2)	A(0.5)	A(1)	A(2)		
AguaCalientes	4.16	4.45	0.48	0.40	0.61	0.51	0.41	0.35	0.43	0.33	0.34	0.27	0.41	0.31	0.95	0.48	0.17	0.13	0.29	0.24	0.46	0.46	0.40			
Baja California	4.32	4.40	0.42	0.37	0.53	0.47	0.37	0.32	0.29	0.26	0.27	0.23	0.33	0.28	0.62	0.57	0.14	0.12	0.24	0.21	0.37	0.37	0.34			
Baja California Sur	4.29	4.55	0.47	0.45	0.59	0.45	0.40	0.39	0.43	0.41	0.35	0.40	0.46	0.46	0.79	1.39	0.17	0.17	0.29	0.29	0.46	0.46	0.45			
Campeche	4.39	5.17	0.49	0.44	0.62	0.56	0.43	0.38	0.49	0.44	0.39	0.33	0.43	0.38	0.74	0.66	0.19	0.16	0.32	0.28	0.50	0.47	0.47			
Coahuila	4.34	4.57	0.49	0.43	0.62	0.53	0.43	0.37	0.48	0.37	0.36	0.30	0.45	0.36	0.99	0.70	0.18	0.15	0.31	0.26	0.49	0.43	0.43			
Colima	3.99	4.20	0.49	0.42	0.62	0.53	0.42	0.36	0.45	0.37	0.36	0.29	0.45	0.32	1.38	0.48	0.18	0.14	0.30	0.25	0.47	0.42	0.42			
Chiapas	3.08	3.32	0.53	0.47	0.67	0.59	0.46	0.40	0.67	0.51	0.46	0.37	0.47	0.44	0.78	1.47	0.21	0.18	0.37	0.31	0.57	0.50	0.50			
Chihuahua	4.35	4.59	0.43	0.41	0.54	0.50	0.37	0.36	0.30	0.29	0.28	0.28	0.34	0.40	0.58	1.21	0.14	0.15	0.25	0.24	0.38	0.37	0.37			
Distrito Federal	4.87	5.25	0.51	0.44	0.63	0.53	0.44	0.38	0.48	0.39	0.39	0.32	0.47	0.37	0.90	0.67	0.19	0.16	0.33	0.27	0.49	0.49	0.44			
Durango	3.80	4.11	0.50	0.42	0.63	0.55	0.43	0.36	0.46	0.36	0.37	0.29	0.46	0.32	1.40	0.52	0.18	0.14	0.31	0.25	0.48	0.42	0.42			
Guanajuato	3.61	3.98	0.45	0.35	0.57	0.44	0.39	0.30	0.32	0.22	0.29	0.21	0.36	0.27	0.88	0.58	0.15	0.11	0.25	0.19	0.39	0.31	0.31			
Guerrero	3.32	3.65	0.51	0.43	0.63	0.55	0.44	0.38	0.45	0.43	0.37	0.33	0.48	0.42	1.50	1.33	0.19	0.17	0.31	0.28	0.47	0.46	0.46			
Hidalgo	3.44	3.82	0.49	0.45	0.64	0.57	0.42	0.39	0.48	0.44	0.36	0.34	0.38	0.37	0.57	0.59	0.17	0.16	0.30	0.29	0.49	0.47	0.47			
Jalisco	3.94	4.22	0.50	0.40	0.64	0.50	0.43	0.35	0.42	0.31	0.34	0.27	0.41	0.32	0.86	0.56	0.17	0.13	0.29	0.23	0.45	0.39	0.43			
México	3.72	3.94	0.48	0.38	0.61	0.49	0.41	0.33	0.39	0.31	0.33	0.25	0.39	0.32	0.75	0.94	0.16	0.13	0.28	0.22	0.44	0.38	0.38			
Michoacán	3.35	3.76	0.44	0.42	0.58	0.54	0.37	0.37	0.32	0.37	0.26	0.30	0.30	0.30	0.57	0.74	0.13	0.15	0.23	0.26	0.39	0.43	0.43			
Morelos	3.82	4.04	0.46	0.38	0.58	0.49	0.39	0.33	0.34	0.29	0.30	0.25	0.36	0.29	0.66	0.50	0.15	0.12	0.26	0.22	0.40	0.36	0.36			
Nayarit	3.45	3.80	0.49	0.41	0.64	0.54	0.42	0.35	0.48	0.39	0.34	0.29	0.41	0.31	1.25	0.48	0.17	0.14	0.29	0.25	0.49	0.44	0.44			
Nuevo León	4.58	4.97	0.50	0.42	0.62	0.52	0.44	0.37	0.45	0.35	0.39	0.29	0.47	0.35	0.93	0.64	0.19	0.15	0.32	0.25	0.48	0.41	0.41			
Oaxaca	3.04	3.53	0.54	0.43	0.68	0.55	0.46	0.37	0.65	0.44	0.42	0.32	0.51	0.34	1.70	0.52	0.20	0.15	0.35	0.27	0.56	0.47	0.47			
Puebla	3.66	3.90	0.44	0.40	0.58	0.51	0.37	0.34	0.35	0.33	0.28	0.27	0.31	0.30	0.47	0.47	0.14	0.13	0.25	0.23	0.41	0.40	0.40			
Queretaro	4.20	4.44	0.49	0.39	0.62	0.50	0.43	0.34	0.48	0.29	0.37	0.25	0.43	0.30	0.82	0.48	0.18	0.13	0.31	0.22	0.49	0.36	0.36			
Quintana Roo	4.47	4.65	0.46	0.43	0.57	0.53	0.40	0.38	0.36	0.34	0.33	0.31	0.49	0.42	2.20	1.20	0.18	0.16	0.28	0.27	0.42	0.40	0.40			
San Luis Potosí	3.64	4.05	0.55	0.42	0.66	0.53	0.49	0.36	0.38	0.36	0.30	0.29	1.07	0.33	31.21	0.53	0.28	0.14	0.39	0.25	0.54	0.42	0.42			
Sinaloa	3.67	4.03	0.49	0.41	0.62	0.53	0.42	0.36	0.46	0.34	0.36	0.28	0.42	0.33	0.81	0.58	0.18	0.14	0.30	0.25	0.48	0.40	0.40			
Sonora	4.11	4.48	0.48	0.42	0.60	0.52	0.42	0.36	0.43	0.35	0.36	0.29	0.44	0.37	0.90	0.91	0.18	0.15	0.30	0.25	0.46	0.41	0.41			
Tabasco	3.51	4.31	0.49	0.44	0.64	0.57	0.42	0.38	0.52	0.42	0.38	0.33	0.39	0.35	0.55	0.53	0.18	0.16	0.32	0.28	0.51	0.46	0.46			
Tamaulipas	4.04	4.46	0.48	0.48	0.60	0.59	0.42	0.42	0.45	0.48	0.36	0.39	0.43	0.51	0.97	1.75	0.18	0.20	0.30	0.32	0.48	0.49	0.49			
Tlaxcala	3.32	3.52	0.51	0.42	0.65	0.53	0.44	0.36	0.56	0.39	0.36	0.30	0.39	0.34	0.67	0.61	0.17	0.14	0.30	0.26	0.53	0.44	0.44			
Vermuz	3.49	3.82	0.51	0.40	0.64	0.51	0.44	0.34	0.52	0.33	0.40	0.27	0.46	0.31	0.93	0.50	0.19	0.13	0.33	0.24	0.51	0.40	0.40			
Yucatán	3.73	4.09	0.51	0.45	0.64	0.56	0.45	0.39	0.52	0.39	0.41	0.33	0.47	0.39	0.94	0.68	0.20	0.16	0.33	0.28	0.51	0.44	0.44			
Zacatecas	3.36	3.83	0.51	0.47	0.65	0.59	0.44	0.42	0.50	0.48	0.39	0.39	0.45	0.53	1.04	2.39	0.19	0.20	0.32	0.32	0.50	0.50	0.49			

Source: Own calculations. For full definition of the variables, see Table A4.1.1 in the Annex 4.1.

Notes: lgdppc: Natural logarithm of real GDP per capita

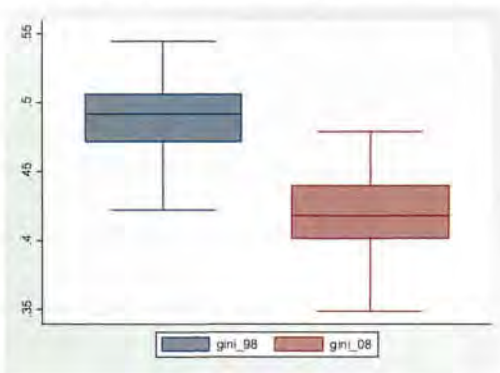
Inequality measures Gini index (Gini), Mehran and Pesch measures, Entropy Generalized GE (-1, 0, 1, 2), Atkinson class A (0.5, 1, 2)

The trends in the average of the distribution of earnings in Mexico differ from the trends in the distribution at the upper and the lower tails. For example, Mehran and the Piesch measures which are more sensitive to the differences between low income and top income individuals, respectively, or the Generalized entropy indexes and Atkinson class show important differences in values of inequality among regions (see Table 4.1 and also Maps 4.2a-4.8b in the Annex 4.2).

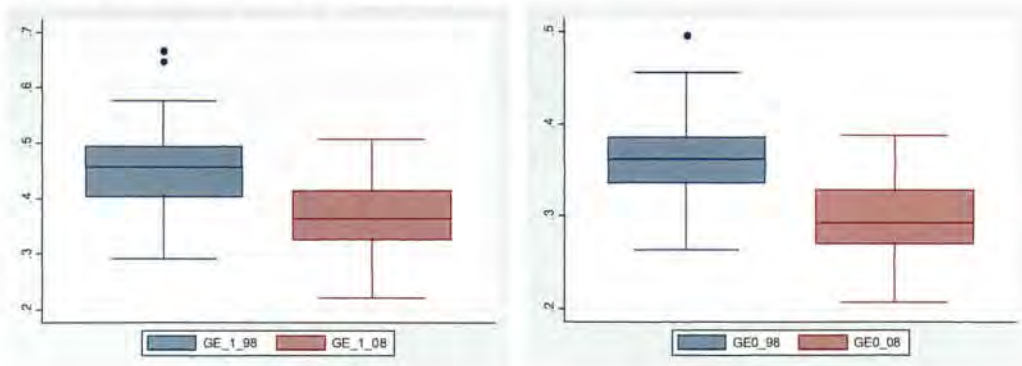
In order to appreciate regional differences in the levels and regional dispersion of wage inequality, I have also drawn box plots for three inequality measures (Figures 4.2a, 4.2b and 4.2c). From these figures, period differences are clear-cut in terms of both levels and (within) regional inequality.

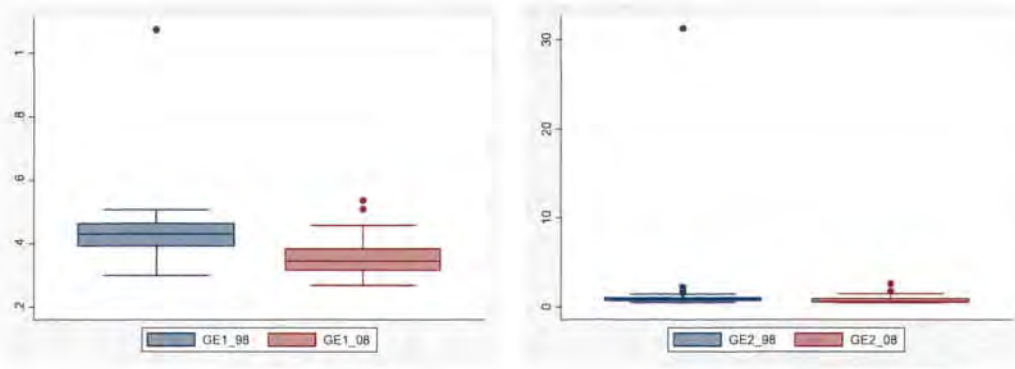
Figure 4.2. Box plots of inequality measures
(Within regional inequality evolution in Mexico)

(a) Gini index 1998-2008

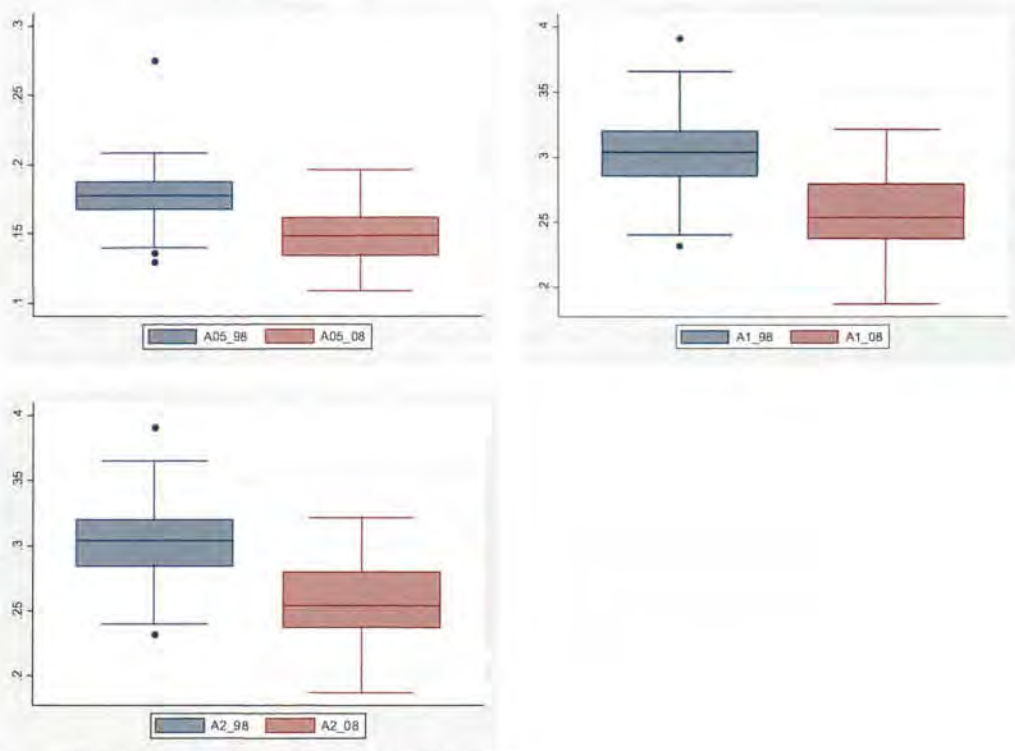


(b) Generalized entropy 1998-2008





(c) Atkinson class 1998-2008

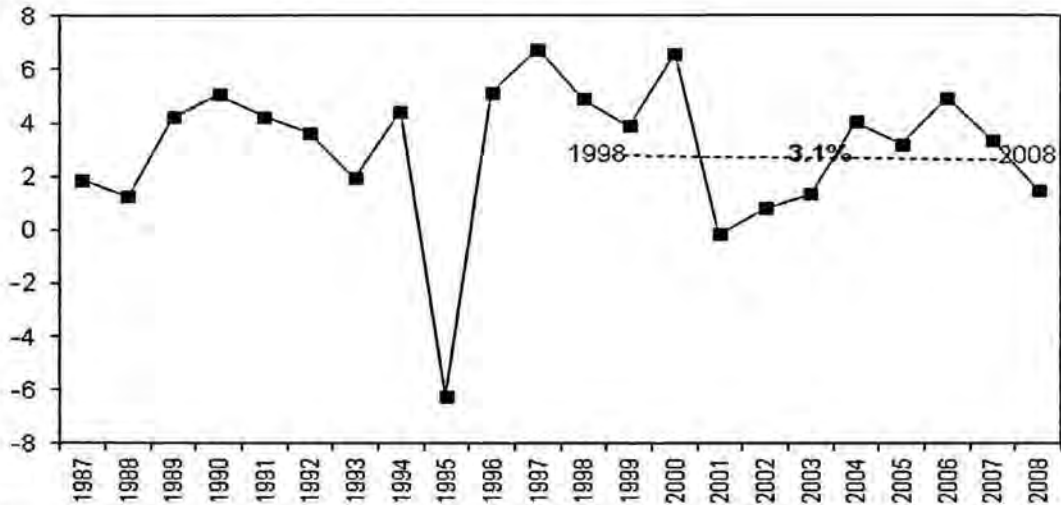


Source: Own elaboration from ENEU-ENOE 1987-2008

Figure 4.3 shows the economic fluctuations over two decades. Economic instability (with volatility and negative growth rates) has been part of the Mexican economy. After the severe recession in 1995, the economy recovered quite quickly in 1996, maintaining relatively high growth rates during the rest of the decade. Nevertheless, from 2000 to 2003 Mexico experienced other recession and after that slight positive growth rates until 2006. Finally, in 2007-2008, an economic slowdown and the average rate growth from 1998 to 2008 (3.1%) can be observed in the graph, which, according to INEGI's official

figures,¹⁵⁶ continued and worsened during the next years. Through the analysis carried out in this chapter, I review the changes in economic growth and inequality measures at the regional level.

Figure 4.3. Annual rate of growth GDP for Mexico, 1987-2008 (percentages)



Source: Own elaboration from System of National Accounts: Mexico 1987-2008

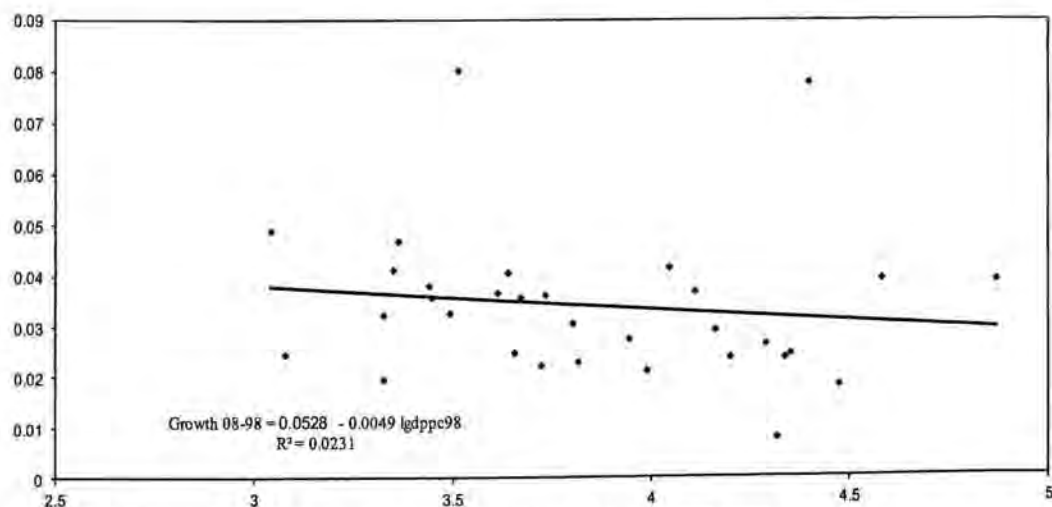
In an initial assessment, Figure 4.4 plots the real per capita growth rate from 1998 to 2008 against initial level of per capita income in the regions of Mexico. The regression results show the rate of convergence is equal to -0.0049 that represents a slow cross-regional convergence process for the whole period (at about 0.5% per year)¹⁵⁷. The low explanatory power of the estimation suggests that additional structural variables can influence the growth performance of regions.

Figure 4.5 shows the relationship between the average real per capita growth rate between 1998 and 2008 on the 1998 Gini. A positive inequality/growth relationship is found. Over 15% of the variation in growth over the 10-year span can be explained by the 1998 Gini. However, although outliers do seem to produce this pattern, the results should be cautiously interpreted because omitted variables could explain this relationship.

¹⁵⁶ Mexican National Accounts are available through INEGI's webpage at <http://dgcnesyp.inegi.org.mx/bdiesi/bdie.html>.

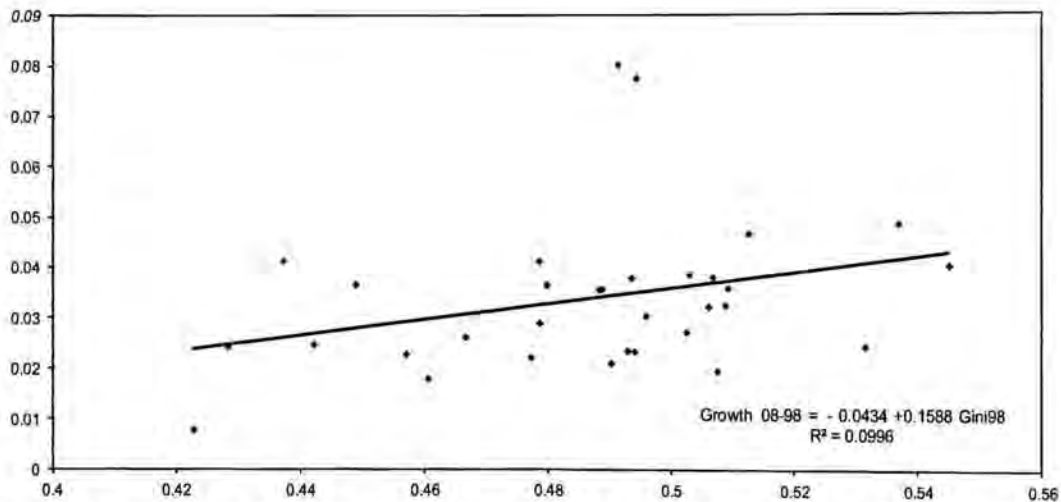
¹⁵⁷ A negative sign of the beta coefficient indicates that regions with a lower initial level of per capita income grow faster than regions with a higher initial level of per capita income.

Figure 4.4. Beta-convergence in real GDPpc between 1998 and 2008



Source: Own elaboration from System of National Accounts: Mexico 1987-2008

Figure 4.5. Cross-state scatter plot of inequality. Gini coefficient and Growth, 1998-2008



Source: Own elaboration from ENEU-ENOE 1987-2008 and System of National Accounts: Mexico 1987-2008

4.4.2. The relationship between inequality and growth

In order to assess whether inequality matters for a regional growth in Mexico and to determine whether these inequalities are more relevant for growth than other control variables, I use cross-section and panel data analysis in order to capture different responses to the growth model and to better justify the

results. I estimate pooled OLS, Fixed Effects (FEs), and Fixed Effects with instrumental variables models. First, OLS models assume that there is no correlation between the explanatory variables and the composite error. Second, I gauge the relation between inequality and growth without control variables and in a further step with control variables.

Following the work of Forbes (2000) and Partridge (2005), I estimate the FEs model in which the coefficients can be interpreted as short/medium-run or time-series effects, as they reflect within-region time-series variation (in our case, ten years). FEs with instrumental variables models eliminate any omitted-variable bias that may occur, in the event of unobserved regional characteristics that affect growth and are correlated with the included explanatory variables. I use one lag in the income per capita (explanatory variable) and one lag of the rest of explanatory variables. Table 4.2 displays the cross-sectional regression results for models (1 to 10) using income per capita and different inequality measures for the whole of the population as independent variables. This table reports OLS estimations with and without control variables, which reflect unconditional and conditional responses to the growth model, respectively. For all regressions positive coefficients are found for the inequality measures at the beginning of the period. When I estimate without controls, the coefficients of GE(1) and GE(2) are not significant, and using some controls, the coefficients of inequality measures are still statistically significant in most cases. So, following this approach, inequality at the beginning of the period positively affects average regional economic growth over the period. This implies that states with greater overall economic inequality subsequently experiences greater economic growth, which is inconsistent with results from cross-national studies (e.g., Guerrero, *et al.*, 2009). However, these results could be caused by omitted factors that are correlated with both economic growth and initial-period inequality. Thus, in Table 4.3 I add regional dummy variables to capture omitted regional fixed effects and I also introduced additional control variables related to human capital, employment by economic sector and unemployment rate to capture miss effects. In this case, the other coefficients reflect the influence of within-regional variation of the independent variables on per capita income growth, where cross-regional effects are reflected in the regional dummy coefficients. These results suggest the elasticity coefficient on the lagged income per capita is negative indicating convergence. The findings also show a positive, significant, and robust to the inclusion of control variables (qualified workers, construction employment and the unemployment rate) on regional economic growth. Hence the current educational endowment of a region in Mexico seems to matter more for economic growth than its relative wealth. However, the magnitude and statistical significance of the different inequality coefficients are not relevant in this model.

Table 4.2. Cross-sectional analysis: OLS results

	Without controls variables										With controls variables									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
lgtppc_9808																				
lgtppc_98	-0.00175 [0.00638]	0.000882 [0.00672]	-0.00311 [0.00624]	-0.000101 [0.00638]	-0.00292 [0.0061]	-0.0047 [0.00627]	-0.00475 [0.00632]	-0.0042 [0.00613]	-0.00299 [0.00609]	-0.0004 [0.00649]	0.00158 [0.00750]	0.00355 [0.00766]	0.000615 [0.00749]	0.0035 [0.00769]	0.001 [0.00737]	-4.74E-05 [0.00778]	0.000192 [0.00790]	7.80E-05 [0.00755]	0.000898 [0.00735]	0.00309 [0.00758]
Gini_98	0.150** [0.0726]										0.134* [0.0692]									
Mehran_98		0.159** [0.071]									0.144* [0.0713]									
Piesch_98			0.134* [0.071]								0.119* [0.0655]									
GE(-1)_98				0.0584* [0.033]							0.0532* [0.0307]									
GE(0)_98					0.0971* [0.0479]						0.0898** [0.0430]									
GE(1)_98						0.0142 [0.00966]					0.0156* [0.00785]									
GE(2)_98							0.000177 [0.000118]				0.000308** [0.000132]									
A(0.5)_98								0.138* [0.072]									0.130** [0.0575]			
A(1)_98									0.141* [0.0691]										0.130** [0.0622]	
A(2)_98										0.110* [0.0573]										0.100* [0.0533]
Constant	-0.0323 [0.0509]	-0.0675 [0.0612]	-0.0106 [0.0446]	0.00779 [0.0335]	0.0102 [0.0315]	0.0457* [0.0252]	0.0518** [0.024]	0.0255 [0.0287]	0.00283 [0.0341]	-0.0163 [0.043]	-0.0391 [0.0494]	-0.0703 [0.0613]	-0.0204 [0.0432]	-0.00478 [0.0361]	-0.00346 [0.0339]	0.0258 [0.0317]	0.031 [0.0310]	0.00918 [0.0325]	-0.00998 [0.0358]	-0.0263 [0.0435]
R-squared	0.102	0.131	0.084	0.128	0.128	0.038	0.027	0.081	0.131	0.143	0.159	0.181	0.145	0.184	0.188	0.116	0.11	0.15	0.189	0.196
Observations	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32

Source: Own calculations. For full definition of the variables, see Table A4.1.1 in the Annex 4.1.

Notes: lgtppc: Natural logarithm of real GDP per capita

Inequality measures Gini index (Gini), Mehran and Piesch measures, Entropy Generalized GE (-1, 0, 1, 2), Atkinson class A (0.5, 1, 2)

Including controls (coast, distance to DF, agriculture, manufacturing, construction, trade, transportation and communications, services, qualified and no qualified workers,

education inequality (Theil index), part time share, unemployment rate and the share of informality)

Robust standard errors in brackets *** p<0.01, ** p<0.05, * p<0.1

Table 4.3. Fixed-effects (within) regression

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
dlgdppc9808										
lag1lgdppc	-0.0609* [0.0335]	-0.0651* [0.0348]	-0.0601* [0.0327]	-0.0707** [0.0308]	-0.0669** [0.031]	-0.0735** [0.03]	-0.0794*** [0.0294]	-0.0683** [0.0306]	-0.0667** [0.0309]	-0.0688** [0.0308]
Gini	0.125 [0.114]									
Mehran		0.0741 [0.102]								
Piesch			0.152 [0.119]							
GE (-1)				0.0429 [0.0508]						
GE (0)					0.0919 [0.0794]					
GE (1)						0.0303 [0.0386]				
GE (2)							-0.000299 [0.00149]			
A (0.5)								0.173 [0.149]		
A (1)									0.132 [0.11]	
A (2)										0.0917 [0.0875]
Qualified workers	0.308** [0.124]	0.306** [0.124]	0.309** [0.124]	0.312** [0.124]	0.312** [0.124]	0.307** [0.124]	0.307** [0.124]	0.310** [0.124]	0.311** [0.124]	0.310** [0.124]
Employment (sector)	0.543** [0.22]	0.539** [0.222]	0.540** [0.219]	0.510** [0.217]	0.511** [0.217]	0.504** [0.217]	0.506** [0.218]	0.510** [0.217]	0.513** [0.217]	0.515** [0.217]
Unemployment rate	0.0241** [0.00959]	0.0246** [0.00958]	0.0238** [0.0096]	0.0240** [0.00963]	0.0234** [0.00965]	0.0245** [0.00959]	0.0250** [0.00957]	0.0236** [0.00962]	0.0233** [0.00965]	0.0236** [0.00965]
Constant	0.0297 [0.152]	0.0609 [0.166]	0.0237 [0.143]	0.108 [0.113]	0.0817 [0.117]	0.127 [0.104]	0.162* [0.0965]	0.0901 [0.112]	0.0744 [0.119]	0.0784 [0.123]
R-within	0.063	0.062	0.065	0.062	0.064	0.062	0.06	0.064	0.064	0.063
Observations	352	352	352	352	352	352	352	352	352	352

Source: Own calculations. For full definition of the variables, see Table A4.1.1 in the Annex 4.1.

Notes: lgdppc: Natural logarithm of real GDP per capita

Inequality measures Gini index (Gini), Mehran and Piesch measures, Entropy Generalized GE (-1, 0, 1, 2), Atkinson class A (0.5, 1, 2)

Standard errors in brackets *** p<0.01, ** p<0.05, * p<0.1

One important concern in this analysis is the existence of endogeneity in the determination of the inequality measures and per capita GDP. To assess the relationship between the income distribution and growth in per capita income, I use Instrumental Variable (IV) regressions in order to address the endogeneity problem. The results of the OLS regressions may also be biased due to reverse causation and simultaneity bias. I extract the exogenous component of income distribution using the lagged inequality measure (one period) in each model (1 to 10)¹⁵⁸. The results in Table 4.4 show that the coefficient on the lagged income per capita is negative and significant, indicating convergence as in previous models. Moreover, a clear negative and statistically significant effect of the inequality measures on the per capita income growth rates, except when use the GE(1) and GE(2) inequality indexes, are also shown. On the one hand, the evidence pointing to differing effects of inequality measures on growth according to the part of the distribution or sensitivity of each index and on the other hand suggest that the mechanisms at work differ among regions. In a similar way, Castelló (2010) finds that using different inequality measures (Gini and the income percentiles ratios) income inequality have a negative influence on the per capita income growth rates in the less developed countries¹⁵⁹. The results of the educational variable show a positive and significant effect on growth in models 1-4 and 7 of table 4.4. The unemployment rate also has a positive coefficient but the effect is small in magnitude¹⁶⁰.

Table 4.5 reports estimates obtained using Arellano and Bond's GMM technique. All inequality measured have a positive effect on growth and some of them are also highly significant, except when using the Mehran measure. However these inequality measures show differences in magnitude thus indicating that inequality in different parts of the income distribution have different effects on growth and therefore that the profile of the inequality matters for economic growth. On the basis of the data and instrument set, it seems therefore that Theil index GE(1), GE(2) and Atkinson class A(0.5) are more efficient at capturing the effects of inequality on per capita income growth in following ten years.

¹⁵⁸ The right structure of time lags for estimating this model is also an issue, Banerjee and Duflo (2003) show that using long lags substantially reduces the number of changes in inequality and they use short lag periods in their study (5 year lag periods).

¹⁵⁹ For example, the negative effect of income inequality on growth in low and middle-income countries and high-income countries not belonging to OECD is identified with five countries in the sample (Mexico, Hungary, Poland Israel and Taiwan).

¹⁶⁰ In the case of the unemployment rate in the theoretical work of Hall (1991) and Caballero and Hammour (1994) point out that in the short-run unemployment and inactivity during recessions may stimulate growth. I introduced different variables in the model as the informal labour rate (an important element in the structure in the Mexican labour market), however this variable was not significant and not modified the results.

Table 4.4. Fixed-effects (within) IV regression

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
dlgdppc9808										
lag1lgdppc	-0.260*** [0.0645]	-0.257*** [0.0592]	-0.256*** [0.068]	-0.169*** [0.0459]	-0.219*** [0.0616]	-2.268 [16.4]	-0.0492 [0.0439]	-0.241*** [0.0844]	-0.208*** [0.0577]	-0.167*** [0.0449]
Gini	-1.263*** [0.375]									
Mehran		-0.971*** [0.263]								
Piesch			-1.440*** [0.465]							
GE (-1)				-0.477*** [0.163]						
GE (0)					-1.086*** [0.372]					
GE (1)						-12.45 [93.18]	0.0141 [0.0139]			
GE (2)										
A (0.5)								-2.680** [1.195]		
A (1)									-1.407*** [0.478]	
A (2)										-0.812*** [0.269]
Qualified workers	0.302** [0.151]	0.321** [0.144]	0.288* [0.156]	0.251* [0.145]	0.25 [0.163]	0.135 [2.635]	0.300** [0.142]	0.264 [0.184]	0.261 [0.159]	0.281* [0.144]
Employment (sector)	0.108 [0.288]	0.05 [0.28]	0.163 [0.293]	0.435* [0.252]	0.422 [0.284]	0.622 [4.067]	0.402 [0.267]	0.413 [0.323]	0.406 [0.278]	0.406 [0.253]
Unemployment rate	0.0340*** [0.012]	0.0302*** [0.0113]	0.0366*** [0.0127]	0.0358*** [0.0118]	0.0440*** [0.0143]	0.277 [1.898]	0.0249** [0.011]	0.0466*** [0.0174]	0.0427*** [0.0138]	0.0369*** [0.0119]
Constant	1.463*** [0.406]	1.442*** [0.366]	1.439*** [0.432]	0.723*** [0.224]	1.071*** [0.339]	13.36 [98.84]	0.0391 [0.158]	1.226** [0.499]	1.061*** [0.331]	0.870*** [0.262]
Observations	351	351	351	351	351	351	351	351	351	351
Hausman (IV) test	15.12 (0.009)	18.63 (0.002)	12.58 (0.027)	11.26 (0.046)	10.5 (0.062)	0.02 (0.900)	1.12 (0.952)	5.8 (0.326)	10.96 (0.052)	12.65 (0.026)

Source: Own calculations. For full definition of the variables, see Table A4.1.1 in the Annex 4.1.

Notes: lgdppc: Natural logarithm of real GDP per capita

Inequality measures Gini index (Gini), Mehran and Piesch measures, Entropy Generalized GE (-1, 0, 1, 2), Atkinson class A (0.5, 1, 2)

Instruments: L.gini L.Mehran L.Piesch L.GE(-1) L.GE(0) L.GE(1) L.GE(2) L.A(0.5) L.A(1) L.A(2)

Standard errors in brackets *** p<0.01, ** p<0.05, * p<0.1

Table 4.5. Instrumental variables (3SLS-GMM) regression

lqgdppc9808	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
lplibpc_98	0.0136 [-0.0101]	0.0162 [-0.0119]	0.00986 [-0.00919]	0.0155 [-0.0108]	0.00712 [-0.00827]	0.00275 [-0.0111]	0.00314 [-0.0101]	0.00432 [-0.00898]	0.00686 [-0.0083]	0.0139 [-0.0105]
Gini_98	0.610** [-0.3]									
Mehran_98		0.404 [-0.249]								
Piesch_98			0.706** [-0.317]							
GE(-1)_98				0.174** [-0.0857]						
GE(0)_98					0.338** [-0.139]					
GE(1)_98						0.283*** [-0.0848]				
GE(2)_98							0.00547*** [-0.00155]			
A (0.5)_98								0.895*** [-0.313]		
A (1)_98									0.481** [-0.205]	
A (2)_98										0.307* [-0.155]
Qualified workers_98	0.0353 [-0.0692]	0.0405 [-0.0743]	0.0386 [-0.0643]	0.0357 [-0.0669]	0.0313 [-0.0616]	0.0573 [-0.0522]	0.102* [-0.0505]	0.0329 [-0.0574]	0.0302 [-0.0631]	0.0305 [-0.0693]
Employment (sector)_98	0.141 [-0.185]	0.151 [-0.183]	0.132 [-0.185]	0.123 [-0.196]	0.129 [-0.182]	0.182 [-0.184]	0.212 [-0.187]	0.132 [-0.18]	0.13 [-0.183]	0.127 [-0.194]
Unemployment rate_98	-0.00656 [-0.00852]	-0.0073 [-0.00903]	-0.00574 [-0.00824]	-0.00728 [-0.00876]	-0.00496 [-0.00796]	0.00585 [-0.0111]	0.00616 [-0.0115]	-0.00247 [-0.00824]	-0.00511 [-0.00798]	-0.00749 [-0.00905]
Constant_98	-0.330** [-0.151]	-0.293* [-0.165]	-0.318** [-0.134]	-0.117** [-0.0559]	-0.128** [-0.0546]	-0.139** [-0.0638]	-0.0458 [-0.0479]	-0.158** [-0.0619]	-0.150** [-0.0628]	-0.174** [-0.0804]
R-squared	-0.69	-0.105	-1.103	-0.29	-0.583	-5.306	-3.475	-1.789	-0.551	-0.232
lplibpc_93	-0.0194 [-0.0125]	-0.0318** [-0.0133]	-0.0127 [-0.0124]	-0.0720** [-0.0333]	-0.0211 [-0.0212]	-0.0245 [-0.0574]	-1.03 [-2.408]	-0.0062 [-0.0115]	-0.014 [-0.0148]	-0.0352* [-0.0189]
Gini_93	0.195* [-0.112]									
Mehran_93		0.284** [-0.125]								
Piesch_93			0.16 [-0.107]							
GE(-1)_93				0.468*** [-0.161]						
GE(0)_93					0.299** [-0.132]					
GE(1)_93						0.175 [-0.19]				
GE(2)_93							2.093 [-2.106]			
A (0.5)_93								0.203 [-0.131]		
A (1)_93									0.282** [-0.124]	
A (2)_93										0.400*** [-0.136]
Constant_93	0.469*** [-0.0671]	0.568*** [-0.0894]	0.406*** [-0.0592]	0.535*** [-0.144]	0.339*** [-0.0866]	0.461** [-0.227]	3.9 [-9.344]	0.167*** [-0.0464]	0.274*** [-0.0622]	0.426*** [-0.0941]
R-squared	0.154	0.284	0.096	0.351	0.192	0.03	0.049	0.096	0.19	0.328
No. of States	28	28	28	28	28	28	28	28	28	28
No. of observations	351	351	351	351	351	351	351	351	351	351
AR(1)	(0.788)	(0.487)	(0.944)	(0.393)	(0.944)	(0.534)	(0.5439)	(0.598)	(0.918)	(0.406)
AR(2)	(0.351)	(0.343)	(0.355)	(0.585)	(0.447)	(0.446)	(0.415)	(0.419)	(0.439)	(0.459)
Hansen test	0.061	0.006	0.098	0.251	0.014	0.122	0.007	0.017	0.009	0.184
(p-value)	(0.804)	(0.936)	(0.753)	(0.616)	(0.905)	(0.726)	(0.93)	(0.894)	(0.921)	(0.667)
Diff-in-Sargan	2.914	1.786	3.464	3.871	4.503	5.544	6.173	5.084	4.423	3.549
(p-value)	(0.087)	(0.181)	(0.062)	(0.049)	(0.033)	(0.018)	(0.013)	(0.024)	(0.035)	(0.059)

Source: Own calculations. For full definition of the variables, see Table A4.1.1 in the Annex 4.1.

Notes: lqgdppc: Natural logarithm of real GDP per capita. Inequality measures Gini index (Gini), Mehran and Piesch measures, Entropy Generalized GE (-1, 0, 1, 2), Atkinson class A (0.5, 1, 2). Endogenous variables: dlplibpc9808 and Inequality measures (1998). Exogenous variables: lplibpc_98, qualif_98, oc_con_98, ltpar_98, lplibpc_93 and Inequality measures (1993). The standard errors were computed using weight matrix, robust. SEs in brackets *** p<0.01, ** p<0.05, * p<0.1.

This pattern of results follows what has already been found in the literature – i.e. the overall effect of inequality on growth is sensitive to the econometric technique used (see e.g. Panizza, 2002; Banerjee and Duflo, 2003). Methods that rely on the time-series variation in the data tend to indicate a positive effect of inequality on growth (e.g. Li and Zou, 1998; Forbes, 2000) while methods that rely on the cross-sectional information tend to indicate a negative effect (e.g. Persson and Tabellini, 1994). Partridge (1997) argues that the positive effects found in different parts of the distribution could affect economic growth through other channels besides the political process. He considers that in an ambiguous government policy context, this kind of economic growth relationship would be consistent with this explanation. He also stresses that the important differences found in the middle quintile suggest that a strong middle class could favour economic growth because it may indicate a more stable economic or social environment.

4.5. Final remarks

In this chapter, I have examined the link between different inequality measures and economic growth in Mexican regions using data from 1998 to 2008. Contrary to the findings of several studies, I have found evidence of a positive relationship between changes in inequality and changes in growth (not a common result for developing countries). I estimated different models OLS, FEs, FE-IV and IV-GMM yielding mixed evidence on the relationship between inequality and growth. In this sense, it seems that the combined impact of both income and educational distribution on growth is far from being well understood and is indeed complex. Overall, existing income and human capital inequality are likely to increase growth, but the magnitude of their impact is relatively small.

The differences among the results shown in the chapter are in line with those found in Partridge (1997) for the United States. First, the positive or negative effect can be attributed to differences in the estimation techniques, the variables used in the analysis, the source of the data used to measure inequality, the level of regional analysis and the differences within regions. Second, the positive and negative influences of inequality on growth are mostly associated with inequality in different parts of the income distribution. Many of the positive mechanisms can be linked to inequality at the upper end of the income distribution, while many of the negative mechanisms are associated with inequality further down the distribution. Third, the results support that Mexico has experimented important changes at the bottom and at the middle part of the distribution of incomes, however if

the growth is facilitated by an income distribution that is compressed in the lower part of the distribution, but not so at the top end, then we will have to consider reviewing, what happens with redistributive policies and their relation with the mobility incomes. Consequently, future research is needed to examine the relation of three elements *inequality-redistribution-growth* and pro-equality policies.

In order to obtain additional policy implications from the empirical relationship between inequality and income growth, a better understanding of this issue is warranted. Meriting further examination is whether advanced post-industrial economies have recently undergone a change in their inequality-economic growth relationship across countries than within countries perhaps by using subnational data from other nations. There should also be further study of whether the relative welfare of the middle class or the median voter plays a special role.

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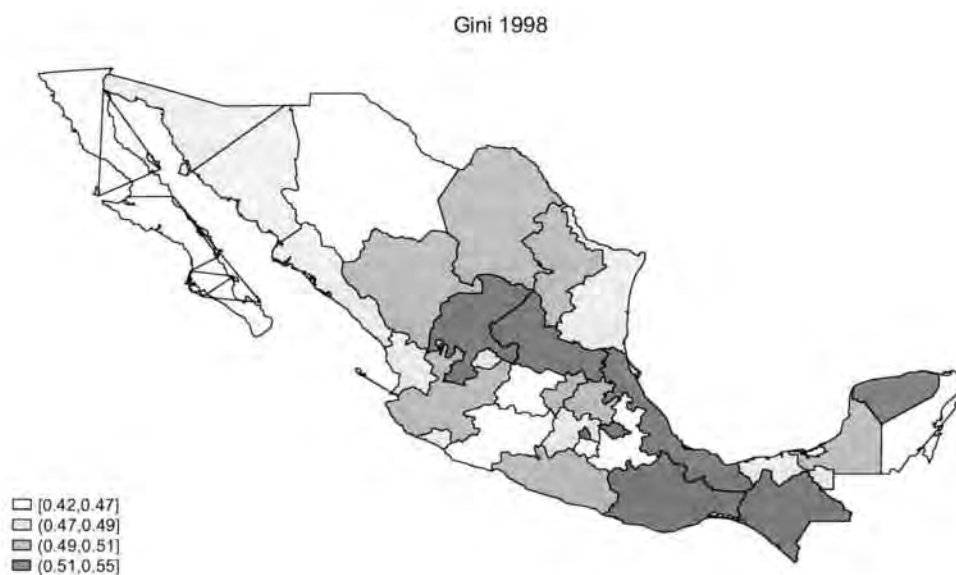
Annex 4.1. Description of variables

Table A4.1.1. List and abbreviation of variables used in Econometric Estimates

Variables	Description	Source	Variable
Regions	States: Aguascalientes, Baja California, Baja California Sur, Campeche, Coahuila de Zaragoza, Colima, Chiapas, Chihuahua, Distrito Federal, Durango, Guanajuato, Guerrero, Hidalgo, Jalisco, México, Michoacán de Ocampo, Morelos, Nayarit, Nuevo León, Oaxaca, Puebla, Querétaro, Arteaga, Quintana Roo, San Luis Potosí, Sinaloa, Sonora, Tabasco, Tamaulipas, Tlaxcala, Veracruz, Yucatán, Zacatecas.		reg
GDP	GDP per capita by region data are in 200X Mexican pesos	System of National Accounts (SCN-INEGI).	
Logarithm of GDP per capita	Represents the natural logarithm of real regional GDP per capita		lgdppc
Consumer Price Index (CPI)	CPI by region Base year 2002. Campeche, Durango, Morelos, Oaxaca, Querétaro and Tlaxcala Information are available since 1995. National average values of the corresponding group were assigned to these states.	Bank of Mexico	
Population	Population density	Conteo de Población y Vivienda, INEGI. Estimaciones de CONAPO. Encuesta Nacional de Dinámica Demográfica.	
Educational attainment	No qualified (No schooling or primary incomplete, primary and secondary levels) Qualified (Upper secondary and higher or tertiary levels)	Microdatos ENEU-ENOE	qualif No qualified
Educational inequality	Inequality in education (Theil index)	Microdatos ENEU-ENOE	
Labour force participation rate	Average rate by region	ENEU-ENOE	ltpart
Unemployment rate	Open unemployment (average rate) by region	ENEU-ENOE	ltparo
Informal labour rate	Average rate by region	ENEU-ENOE	ltoct_informal
Coastal localisation of the region	Dummy variable that takes the value of 1 when a region has a coastal strip and value 0 if not. Regions with coastal strip: Baja California, Baja California Sur, Campeche, Colima, Chiapas, Guerrero, Jalisco, Michoacán, Nayarit, Quintana Roo, Oaxaca, Sinaloa, Sonora, Tabasco, Tamaulipas, Veracruz, Yucatán.	Marco Geoestadístico INEGI	coast
Distance to DF	The distance in kilometers (Km) by road from the capital of each region to Mexico City.	Secretaría de Comunicaciones y Transporte	Dist_DF
Employment by economic sector	Employment in: (1) Agriculture, Forestry, Fishing and Mining Sector, (2) Industry and Manufacturing (including Electricity, Gas, Steam, Air conditioning and Water supply), (3) Construction, (4) Trade, (5) Transport, Storage and Communication Sector, (6) Services Sector (including Financial Services)	Microdatos ENEU-ENOE	OC_AGR OC_IND OC_CON OC_COM OC_TRA OC_SER
Inequality measures	Own calculations using real hourly wage. Inequality measures: Gini index, Mehran and Piesch measures, Entropy Generalized GE (-1, 0, 1, 2), Atkinson class A (0.5, 1, 2)	Microdatos ENEU-ENOE	Gini, Mehran, Piesch, GE(-1), GE(0), GE(1), GE(2), A(0.5), A(1), A(2)

Annex 4.2. Maps of inequality measures

Map 4.1a. Mexican states Gini index: 1998

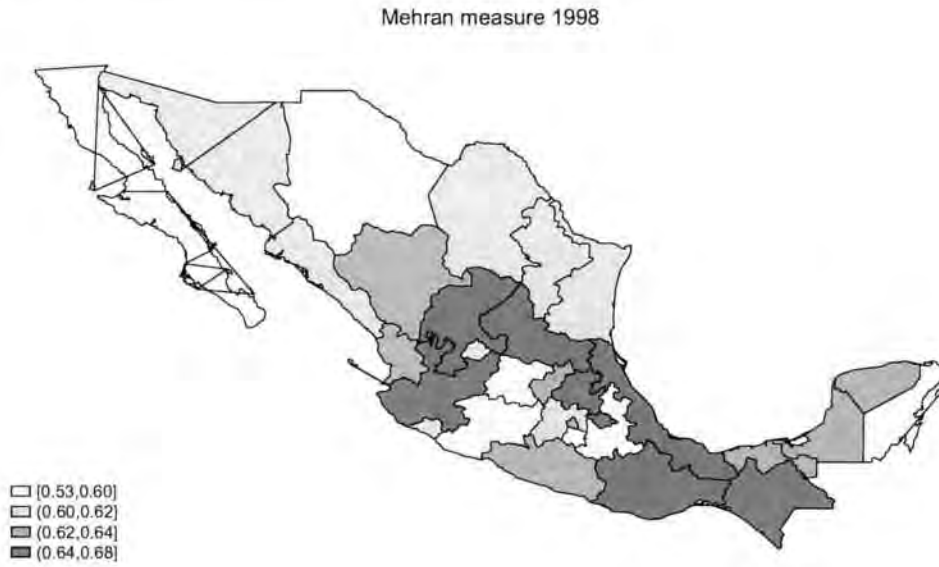


Map 4.1b. Mexican states Gini index: 2008

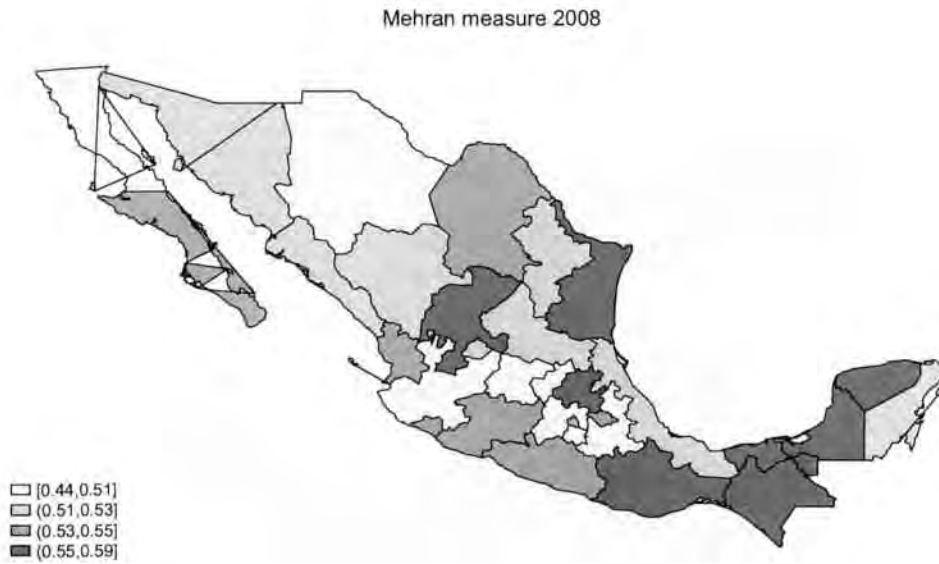


Source: Own elaboration from ENEU-ENOE 1998-2008

Map 4.2a. Mexican states Mehran measure: 1998

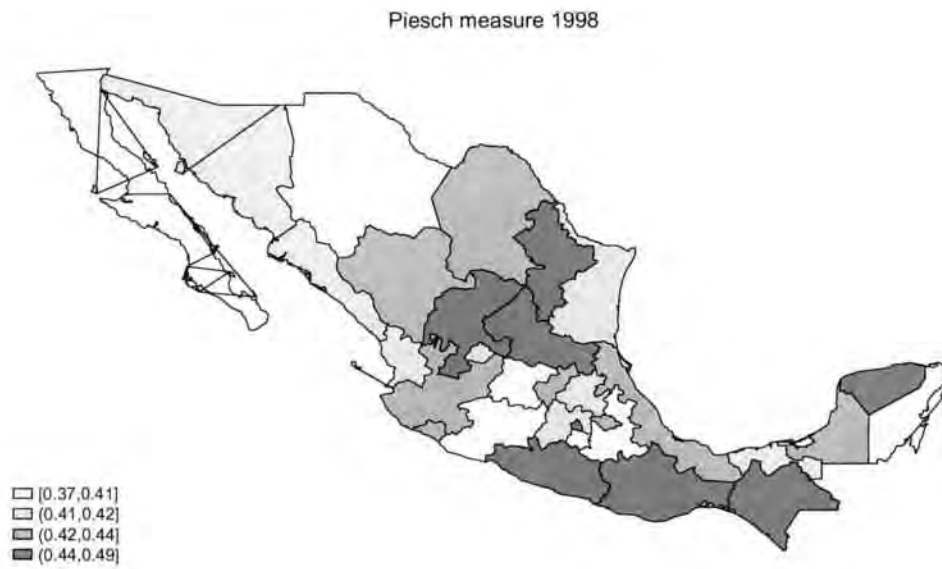


Map 4.2b. Mexican states Mehran measure: 2008

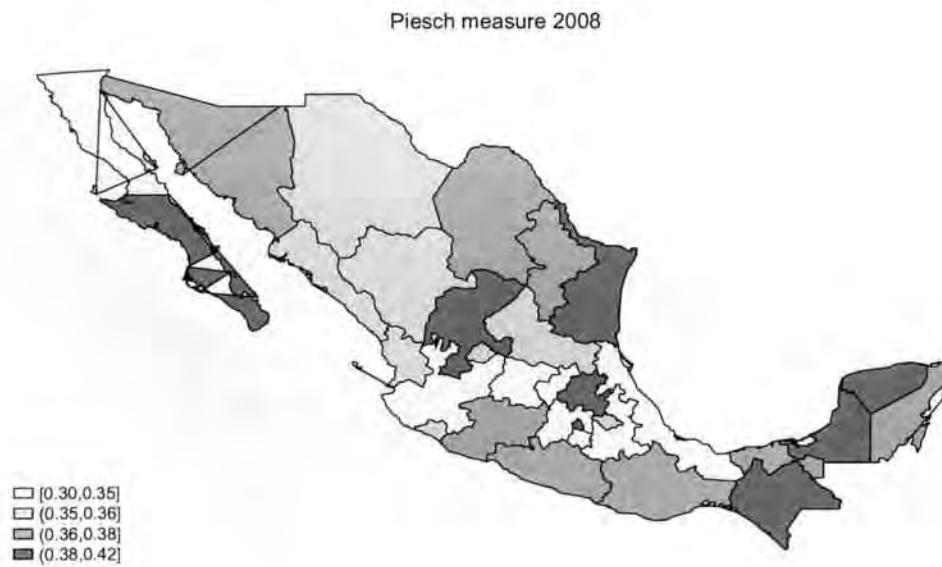


Source: Own elaboration from ENEU-ENOE 1998-2008

Map 4.3a. Mexican states Piesch measure: 1998

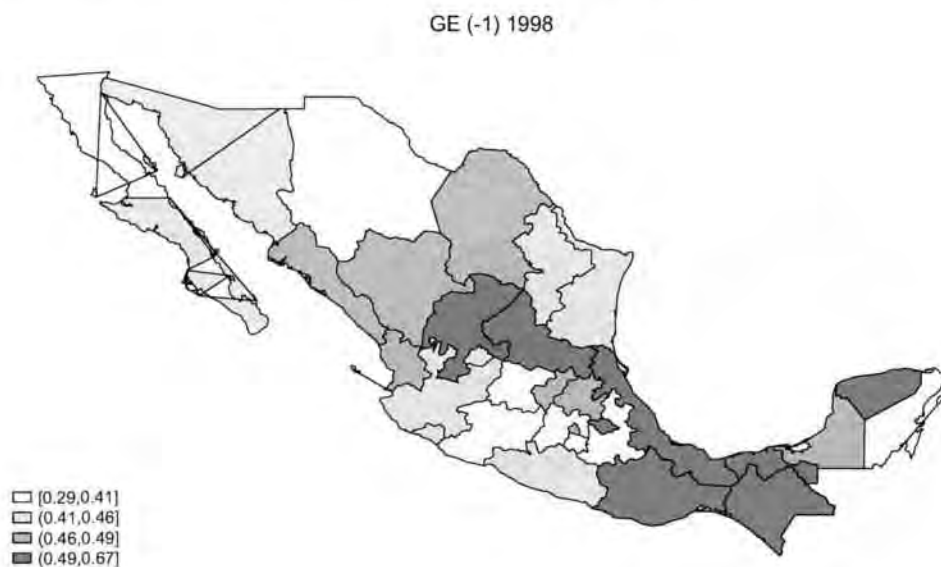


Map 4.3b. Mexican states Piesch measure: 2008

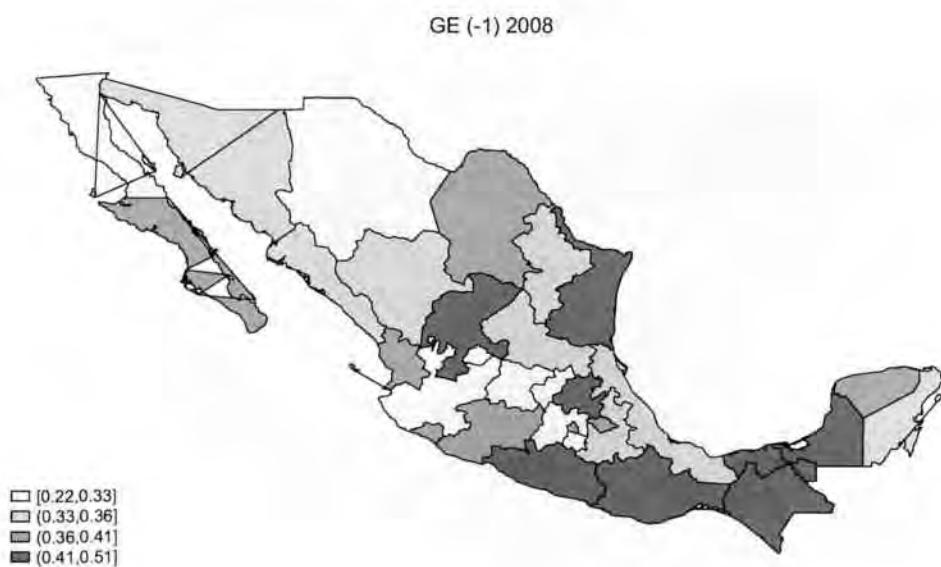


Source: Own elaboration from ENEU-ENOE 1998-2008

Map 4.4a. Mexican states Generalized entropy GE (-1): 1998



Map 4.4b. Mexican states Generalized entropy GE (-1): 2008



Source: Own elaboration from ENEU-ENOE 1998-2008

Map 4.5a. Mexican states Generalized entropy GE (1): 1998



Map 4.5b. Mexican states Generalized entropy GE (1): 2008

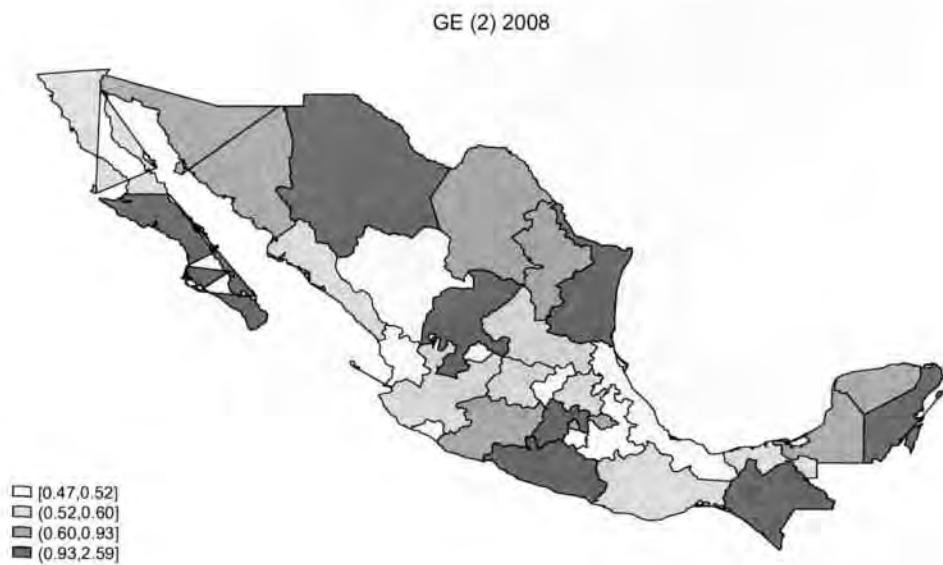


Source: Own elaboration from ENEU-ENOE 1998-2008

Map 4.6a. Mexican states Generalized entropy GE (2): 1998



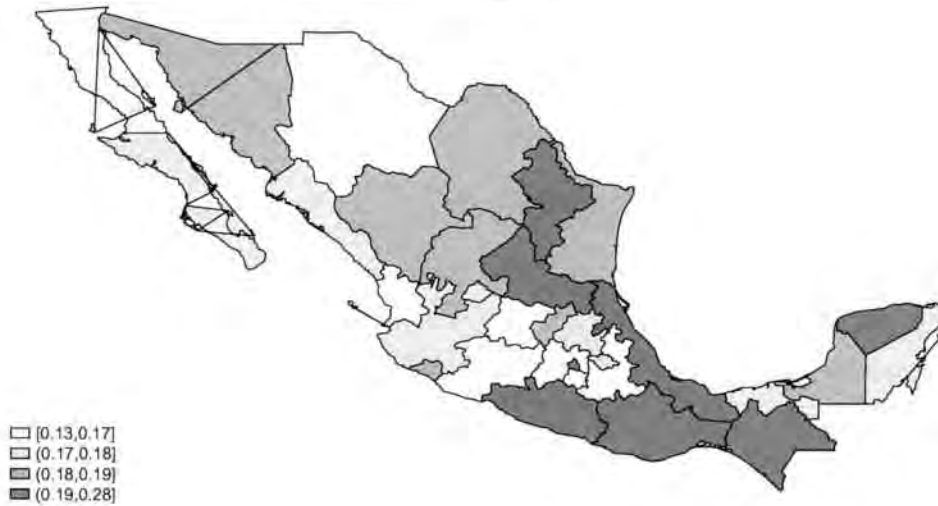
Map 4.6b. Mexican states Generalized entropy GE (2): 2008



Source: Own elaboration from ENEU-ENOE 1998-2008

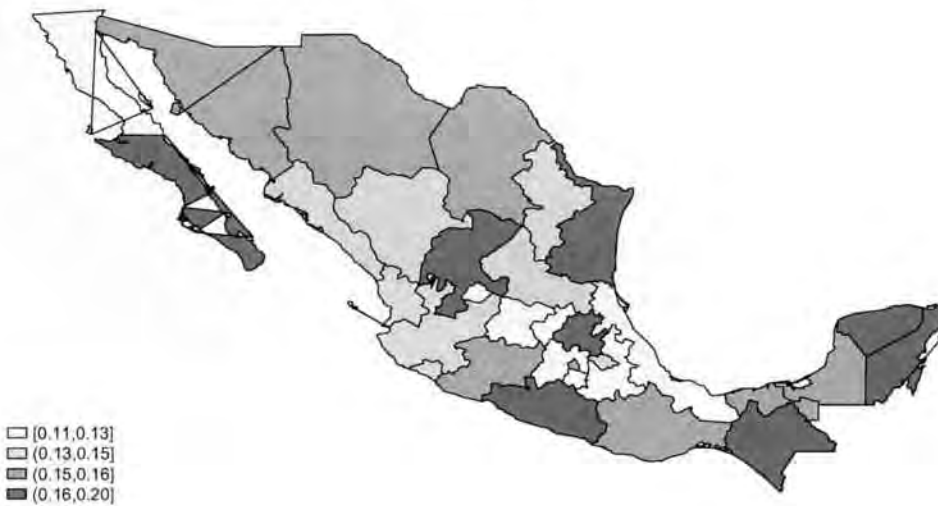
Map 4.7a. Mexican states Atkinson class A(0.5): 1998

A(0.5) 1998



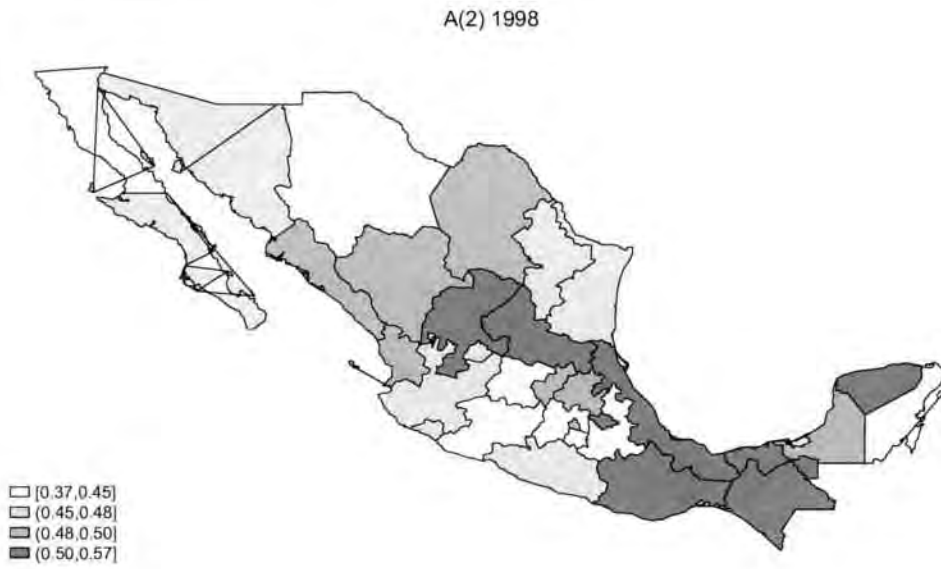
Map 4.7b. Mexican states Atkinson class A(0.5): 2008

A(0.5) 2008

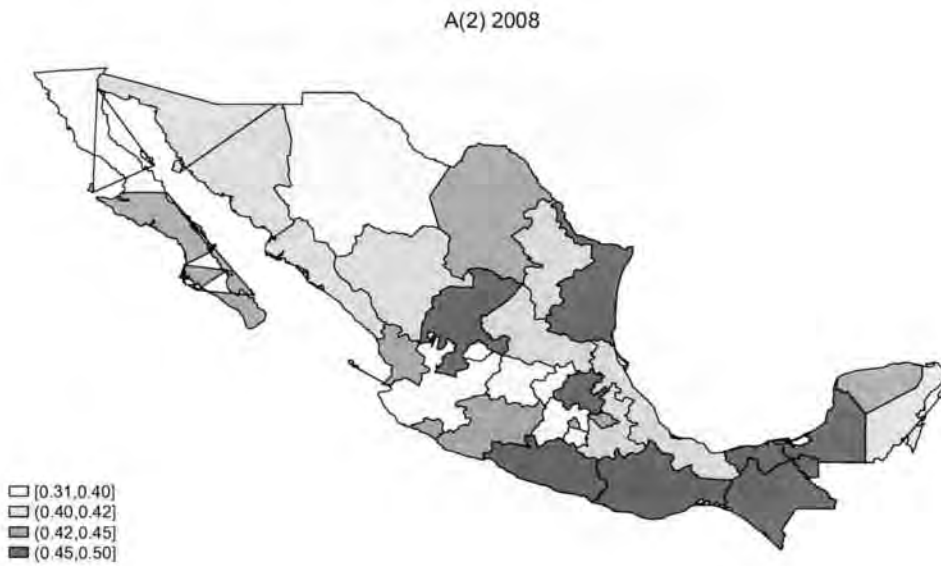


Source: Own elaboration from ENEU-ENOE 1998-2008

Map 4.8a. Mexican states Atkinson class A(2): 1998



Map 4.8a. Mexican states Atkinson class A(2): 2008



Source: Own elaboration from ENEU-ENOE 1998-2008

Chapter 5

Conclusions

The present conclusions are not only the summary of the main results of the different chapters of this dissertation, but it is also a reflection of my thoughts of the different topics analysed. In this final section, I develop the main findings of the dissertation, the new questions that had appeared and the future research I intend to carry out within this area of research.

5.1. Summary

This dissertation has analysed some of the different faces of inequality in Mexico. I started describing and reviewing different measures of inequality and the changes in different parts of the wage distribution. Whereas, in several inequality international studies Mexico has been considered an outlier since inequality decreased in the last decade (i.e. results showed by the OECD), my findings show significant differences that indicate that this trend cannot be generalized to the entire population in Mexico and that trends are different when distinct parts of the distribution of wages or different socio-economic and demographic groups are analysed.

In this sense, this finding led me to ask different questions (proposed in the Chapter 1) trying to go beyond of the measurement of the inequality, to review other possibilities and approaches of analysis to understand the changes of the inequality according to different groups, variables, and the prevalence of inequality in time. As well as why the analysis of wage inequality is an important issue that has begun again to put on the public agenda and international discussion.

Several researchers coincide that differences in measurements of inequality depends on what you mean by earnings and how the individuals do not benefit from reductions in inequality unless those

reductions directly affect their level of welfare and appreciation of those limits imposed by ethical consideration.

5.2. The main results

The main results in can be summarized as follows:

According to the results in **Chapters 1 and 2**, Mexico is an outlier in the literature concerning the relationship between the changes over time of wage inequality and schooling premia distribution.

The decomposition of the changes in the wage distribution for the period 1987–2008 displays different results of trends in earnings inequality, the increase of wage inequality between 1987 and 1994. And as opposed to many developed countries, wage inequality in Mexico has been falling for the period after 1994.

My estimates suggest that changes both in individuals' attributes and in the returns to these attributes contributed in different direction to the observed increase or decrease in wage inequality over time. Besides the contributions of both changes are variable in magnitude as per the different portions of the wage distribution are considered. The arguments put forward concerning the importance of that rising education leads to lesser wage inequality. The analysis indicates that, contrary to this, that in Mexico increases in educational levels do not necessarily translate into a more equal wage distribution.

Even though the levels of educational enlarged very rapidly and educational inequality is the variable that accounts for by far the largest share of wage inequality in Mexico. There can be substantial heterogeneity among workers of each type of level education.

The marginal contribution of education to the explanation of inequality in Mexico is almost equal to the joint contribution of other relevant variables such as occupation, economic sector, firm size and urban areas. It is worth pointing out that the difference between the marginal contributions has been increasing over time, indicating that, as the economy progresses, education becomes even more important in determining the choices of sectors, occupations and firm size.

In general terms, the returns of education are positive in workers with secondary, upper secondary and higher or tertiary levels of education and in the category at below primary school level are negative, that is, there are differences in the returns of education in different points of the distribution.

The gap among the return to levels of education has increased, with most of the increased gap coming from a decline in the returns to lower skill groups. As against there was a shift in demand toward highly skilled labour that was not met by an increase in supply. Although the average schooling improved the inequality of the distribution of education deteriorated and the wage profile, which is related to the returns to schooling, became much steeper. Even though, the returns to education in Mexico from 1987 to 1997 increase for higher levels of education and in the upper tail of the conditional wages distribution, there was a reversal to this trend after 1997, especially for the upper secondary and tertiary education.

The obtained results suggest that the evolution of wage inequality is not only the result of changes in the distribution of education. There may be multiple reasons for this situation: the education system, the minimum wage, the demography of the firms could all play a role. In light of this evidence, I have analyzed the structure and evolution of the rates of returns to education and other controls that are important in the wage structure.

In sum, the evidence points up to significant differences in terms of the characteristics of workers at different points of the distribution and transient effects by years. Educational levels gender, experience, occupation, economic sector, firm size and urban areas are important factors that affected the wage distribution over time. The increase in wage inequality between 1987 and 2008, especially at the bottom of the distribution, can be explained by a declining real wage. Inequality differs not only among these different groups but also within groups of workers.

Whilst the above evidence is far from providing a total conclusive assessment of the complex elements to explain the changes inequality in Mexico, it provides additional evidence, consistent with other studies. Moreover, this analysis coincides with different changes in the political and economic structure between 1987 and 2008.

In **Chapter 3** I examined the relationship between wage mobility and inequality in Mexico from 1987 to 2008. Wage mobility is often regarded as reflecting opportunities for improvement and

reduction of the wage variability among individuals, in particular, as the net effect of intra-distributional changes. The analysis focuses on the mobility associated with different trends in wage inequality in Mexico over two decades. The results of the analysis permit me to conclude that:

First, contrary to other developing countries in Mexico the inequality decreases are associated with substantial progressivity. The year-to-year wage gains are not equally distributed across all individuals, but tend to be higher for the poorest individuals. If we keep the base period social weights as reference, mobility is clearly welfare improving.

Second, the progressivity effect is more than offset by rerankings; in particular in the North and the Capital regions. Thence, after adjusting the social weights according to the new wage ordering, the net effect in these regions is related to an increase in inequality.

Third, in absolute values, the progressivity component has been similar over the analysed period, but this result clearly changes in the second decade. We can also highlight the different situation of two particular regions: first, in the South region the progressivity component was larger than the rest of regions and experienced a small decrease in inequality, however in this region a higher inequality prevails; Second, in contrast, in the Capital region the reranking component was larger than the progressivity component; thence this region has experienced larger inequality increases.

Fourth, when progressivity is considered in relation to the inequality level, that is, when measuring the percentage reduction of inequality that progressivity would imply in the absence of rerankings, the picture is favourable only in some periods and regions. For example in the Border region for the 1991-1992 and the 2006-2007 periods; in the North region for 1996-1997 and 2005-2006; in the Centre region or 1991-1992; in the Capital region for 1992-1993 period and in the South region from 1988 to 1990 and from 2005 to 2007.

Fifth, the obtained results have also shown that there is a high mobility in terms of wages, but also that there are some individuals in the bottom three-quintiles that have experienced a clear improvement in the economic ladder. Specifically, I have analysed year-to-year transition probabilities between quintiles as well as the probabilities of moving in and out of the wage distribution, so focusing on the short-term dynamics due to data limitations. In this context, the main findings concerning relative wage mobility in Mexico in these three different periods are the following: first, wage growth over each period was progressive ($P > 0$ in each case); second, wage

growth in Mexico was pro-poor in the three periods, but the inequality-reducing effect in some regions was offset by the effect of reranking and, as a result, overall reduction in cross-sectional inequality was only modest. Notwithstanding, there are also relevant differences by regions, age groups, education levels, firm size and economic sector. As previously explained, these differences are in line with the described changes in the structure of the Mexican Economy and the relevance of trade liberalization in these different subperiods. Moreover, the relative wage mobility in Mexico and its regions is roughly of the same magnitude for year-to-year mobility and for the relative and absolute mobility is slightly higher than in developed countries in some years. The obtained results for the five different regions show that the relationship between the components of reranking (mobility) and progressivity ($R > P$ or $R < P$) in some groups were greater only by a small amount and, as it happens, during the three periods, the components offset each other almost exactly (and inequality hardly changed).

Last, the obtained results suggest, on the one hand, that the wage growth was pro-poor and, hence, generated an inequality reduction, but this was offset by changes in the wage pecking order that have a disequalizing impact. So, the decrease in cross-section inequality is reflective of wage reranking and, therefore, low wages appear not to be a transitory phenomenon, but a permanent one. And, on the other hand, the increases in inequality in different periods have been associated with an upward trend in reranking wages. So, the obtained results support the hypothesis that wage growth in Mexico and their regions was not strongly pro-poor over the period.

Chapter 4 examines the link between different inequality measures and economic growth in Mexican regions using data from 1998 to 2008.

Contrary to the findings of several studies, this paper finds evidence of a positive relationship between changes in inequality and changes in growth (not common results for developing countries). I estimated different models OLS, FEs, FE-IV and IV-GMM and found negative and positive outcomes in the relationship between inequality and growth. Moreover, the combined impact of both income and educational distribution on growth is far from being well understood and is indeed complex. Overall, existing income and human capital inequality are likely to increase growth, but the magnitude of their impact is relatively small.

The main results consist in three points:

First, the positive or negative effect can be attributed to differences in the estimation techniques, the variables used in the analysis, the source of the data used to measure inequality, the level of regional analysis and the differences within regions.

Second, the positive and negative influences of inequality on growth are mostly associated with inequality in different parts of the income distribution. Many of the positive mechanisms can be linked to inequality at the upper end of the income distribution, while many of the negative mechanisms are associated with inequality further down the distribution.

Third, the results support that Mexico has experimented important changes at the bottom and at the middle part of the distribution of incomes, however if the growth is facilitated by an income distribution that is compressed in the lower part of the distribution, but not so at the top end, then we will have to consider reviewing, what happens with redistributive policies and their relation with the mobility incomes.

5.3. Contributions

It is not surprising that the literature on inequality and mobility is very rich and that the empirical evidence is mixed. The substantial progress on analytical measurement methods has been made and that other developments should receive greater priority, with the exception of further work on mobility measurement as that subject is much less mature.

The connections between education and inequality, examining education acquisition and inequality the labour market return to education, and the contribution of increased education demand and supply to patterns of change in wage inequalities. All of these show that education and inequality are closely linked. Under certain circumstances education can provide a route out of disadvantage by enabling people from poorer backgrounds to escape the poverty. In other circumstances education reinforces already existent inequalities and can result in increased inequality.

It is overwhelming documented that the rising wage inequality in Mexico has been a constant phenomenon in Mexico over the last two decades and, to varying degrees. Moreover the rise in the pay-off to skill is an important part of the reason for the rise in inequality.

In my view, the rate of return of education tends to either fall or remain constant and for those at the top of the wage distributions are reduce. The evidence suggests that there are declining returns to invest in human capital. Consequently, we can observe is whether changes in bottom (or in top) wages represent differences in transitory or permanent wage.

I also introduce the firm size in the analysis considering the evidence on the way in which employers influence level of earnings, and hence the earnings distribution. There is overwhelming evidence that the firms in many countries pay observationally equivalent workers different wages (particularly at the top end of the distribution) Firms also have different wage-setting practices to respond to the economical structure in Mexico and the relation to international economic changes.

I also investigate the relationship between wage mobility and inequality in short and long term and review the changes in regions and different subgroups. However, the mobility is not a one-dimensional phenomenon, since one type of mobility (regression towards the mean) may be inequality reducing, while another type of mobility (relative movements uncorrelated with incomes) contributes to an increase in inequality. Whether a change in the pattern of income mobility can produce an increase in social welfare while at the same time reducing long-period inequality and increasing short-period inequality is also problematic.

The empirical literature that investigates the effect of inequality on growth has traditionally relied on estimating a single coefficient on inequality (Gini coefficient), linearly, in a growth regression. Based on data for rich and/or poor countries, alternative papers have reported widely divergent effects of inequality on economic growth. Moreover, these findings appear generally sensitive to several aspects of the analysis, notably to the econometric method employed and the data considered. I introduce different measure of inequality that reinforce the idea of the effects of the wage dispersion in different parts of the distribution,

A complex and multi-dimensional effect of inequality on growth. The theoretical literature suggests that inequality can both facilitate and retard growth. Furthermore, most mechanisms can be linked to inequality at the top end of the distribution while many of the detrimental effects can be traced to

bottom-end inequality, or to high overall inequality. The ultimate effect of inequality on the economy will therefore depend on the relative strengths of the positive and negative influences that are identified. In theory, this balance will be affected by the overall level of inequality in a country, together with the strength of its institutions. Additionally, different levels of inequality may be conducive to growth at different levels of development.

There are a number of reasons why persistently high inequality is a concern. Higher inequality may be ethically objectionable in its own right, and the possibility that greater inequality may generate certain inefficiencies that could actually reduce the future rate of the economic growth. The reason why persistent inequality may be undesirable in developing economies is related to the fact that, even for a given growth rate, inequality tends to reduce the growth elasticity of poverty reduction. Other things equal, one percentage point of growth leads to a smaller reduction in poverty in a very unequal country than in a less unequal one. And if inequality rises during the growth process, things are worse yet.

Finally, I introduce novel techniques to analyse the inequality and mobility in Mexico across the employment surveys in a long period.

5.4. Policy implications

Even though this dissertation is concerned to the relationship between inequality education, wage mobility and growth in different regions over the two decades, Mexico had experienced several reforms and set in motion important changes in public policies and social programs (see Table 5.1). However, the effects of the changes are not translated in positive effects to reduce the disparities among individuals (i.e. gaps of wage between groups, reduction of poverty, improve the levels of education and necessities among others).

First, the public policies face to *old problems, new approaches*. Several dilemmas of the wage policy can be analysed when the policymakers try to explain the deepening wage inequality. For instance, the abandon of the idea the general wage increases and the maintenance of living standards through preserving 'real wages'. These differences all occurred within a weak institutional framework and promoted a coordinate approach to wage determination. How

incorporate the inequality issue in a coherent policy framework (related to salaries and transfers), the relative fair on the wage structure or preserve egalitarian principles in the process of wage determination and the link with the market fluctuations in the labour market.

Second, the public policies give partial solutions in the short periods and in the case of Mexico are related to specific vulnerable groups or policies extremely focalized –i.e. Social Programs to reduce inequality in short-run. Moreover, many of the reforms did over the period has been further away the changes in the labour markets and the regional change. In this sense, the success or failure of different policies cannot be evaluated in an isolated way -i.e. the Active Labour Market Policies (ALMPs).

While many developing countries find that declining inequality can accelerate economic growth in some regions or reducing the inequality induce pro-poor growth, I found that in Mexico this has not happened.

The policy decisions and measures undertaken so far alleviate the problem of inequality and to eliminate its consequences, not least in terms of wages have clearly not been enough.

5.5. Limitations and future research

Last it is worth recognising the limitations of this dissertation but, at the same time, to indicate interesting directions for future research and some extensions of my previous analysis.

Amongst the challenges facing researchers, one can think of using improved measures of income from capital and wealth, that will have to rely on more robust data for a wider range of poor nations. More comparable data in the LIS style for the fast-growing low or middle income countries- including China and India, for instance- would greatly widen the scope of inquiry and add to our basis for assessing the impacts of trade and global economic change inequality in a comparable format.

Wealth inequality is high and contributes significantly to inequality in wage and consumption, although higher wealth inequality is not always an indicator of greater inequality in well-being. In particular, welfare state policies can improve the well-being of low income groups observed wealth

inequality in places where it would otherwise not be expected. More research is needed to better illuminate such connections between public policy and wealth inequality.

Work on the causes and consequences of changes in different parts of the distribution. Among the plausible driver of inequality, it would be interesting to see whether variables such as immigration, inflation, product market competition, social norms or demographic structure of labour force have significant and different effects on the distribution.

Studies that analyse the consequences of inequality, top income data are particularly well-suited to analysing elite-driven outcomes, such as campaign contributions or industrial innovation. However, it may also be worth considering how top incomes affect factors such as trust, happiness, average working hours, residential segregation, and political polarization.

The data in Mexico not allows analysing of intergenerational inequality or mobility. Comparing among regions that have broadly similar degrees of wage mobility, cross-sectional comparisons provided a good indication of differences in lifetime inequality. If an increase in cross-sectional inequality in a region is associated with an increase in wage mobility, lifetime inequality increases by less than cross-sectional inequality. In contradiction, additional mobility can produce changes that, from the cross-sectional perspective, appear to increase inequality while at the same time reducing lifetime inequality. The extra mobility has a sufficiently egalitarian element which can generate a reduction in lifetime earnings inequality. Hence, when discussing the effects of changes in mobility, it is very important to distinguish precisely which type of mobility is affected.

Our contribution should be reinforced with measures bearing some relation to low pay, for example, minimum wages, income support for low-earning families, social benefits, or active labour market policies but at the same time this kind of analysis it would be limited to an specific periods of time and the availability of data.

Very little is known about the cross-national importance of family background. Future research can benefit from a better understanding of longitudinal income processes and the association between lifetime income and annual income at different life-cycle stages..

Inequality and redistribution is other important issue: The possibility of reranking of individuals when moving from the pre- to post-tax income distribution, 'unequal treatment of unequal's which is the contrary to the vertical intended by the form of the tax function. It can be distinguished from

horizontal inequity, which may be said to refer to the 'unequal treatment of equals'. In a cross-sectional context, there is no reason why the ranking of individuals should be different when using pre-tax and post-tax income. However, reranking can occur in a life cycle framework if marginal tax rates vary with income, because of the variability in incomes from year to year.

While Mexico has experienced different trends (increase or decrease) of wage inequality for two decades, we have seen there is only a small upward trend in inequality of marketable wealth. More research is needed to establish the reason for this contrast, but possible explanations include the omission of pension wealth or the effects of increased incentive for low or vulnerable groups and shifts in demography (can play a major role in long-term inequality trends) the relationship between migration and inequality involves.

The measurement of the distribution of wage and living standards among households or individuals is a demanding task that poses conceptual and practical problems, from the choice of the focal variable to its precise definition from the decision about the reference unit or the equivalence the scale to the understanding the of the impact of sampling and non-sampling errors.

Another important limitation of our analysis is that (in Chapter 2 and 3) we did not include the rural areas in which exist high levels of poverty and inequality.

Another interesting research agenda for the future would be to study the connection between today's distribution of land and wealth and income inequality by region. I have focused on inequality in the income distribution, but there are other ways in which inequality may affect economic growth; for example inequality of opportunities in society and inequality created by the rule of law or the democratic system may have major implications on growth.

I should mention that other variables like trade or institutional elements as unions or minimum wage had been overwhelming studied concluding –i.e. that examination of the impact of Mexican trade reform on the structure of wages using information at the firm level and the relation with the relative use of skilled labour cannot be explained by the Stolper-Samuelson-Type effect.

Finally, the current debated of inequality seems to be *to and fro*. The trends move in opposite directions even in less wealthy countries (such as Mexico, Korea among others). This remains one

of the most important challenges for understanding how wage or income inequality may affect other aspects of life in the poor and rich countries.

After all the above in this dissertation, I can say: *And now, where to?*

5.6. References

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Table 5.1. Policy-oriented perspectives. Mexico, 1987-2008

Period 1987-1994	Period 1994-2001	Period 2001-2008
<p>➤ Aftermath 1985 with the GATT come into effect deepening of tariff reductions and elimination of high trade barriers in several key industries. Law to Promote Mexican Investment and to Regulate Foreign Investment (EOI) of the economy, particularly in an export-orientation (EOI) of the economy, particularly in a manufacturing sector.</p> <p>➤ A policy of building agreements (pacts) between the main groups. Economic Solidarity Pact (PSE) and after the Pact for Economic Stability and Growth (PECE).</p> <p>➤ Privatization program (State-owned enterprises, banks and financial liberalization).</p> <p>➤ Removal of regulations, tax reforms, changes in landholding arrangements in rural areas, and generally greatly reducing the role of the state in economic activity.</p> <p>➤ Increase in the minimum wage, the rate of depreciation of the currency, and key public sector prices for goods such as electricity and gasoline.</p> <p>➤ Important fiscal and trade regime reforms.</p> <p>➤ An effort to restore price stability. Control over inflation, financial deficit as well as the attraction of foreign investment.</p> <p>➤ A nominal anchor exchange rate policy</p> <p>➤ Promotion to several programs regarding labour issues as: the National Employment System (SNE), the Project on Modernization of the Labour Market (PMMT), The Program for Capacitating Small and Medium Firms (PCMO), and the Program of Integral Quality and Modernization (CIMO). Most of these policies are part of the National Agreement for Increasing Productivity and Quality (ANEPC), signed in May of 1992.</p> <p>➤ And overall shift toward flexible specialization in industrial relations.</p> <p>➤ The economic growth was relatively low and the relatively rapid rate of growth of the labour force was taken into account.</p> <p>➤ Deterioration in the current account was associated with a fall in domestic savings. Investment, however, held fairly constant as a percentage of GDP.</p> <p>➤ In December 1993, was enacted in accordance with NAFTA.</p>	<p>➤ 1994 NAFTA comes into force.</p> <p>➤ After the outburst of the crisis, the government unveiled the Action Program to Reinforce the Unity Agreement to Overcome the Economic Emergency (PAAUSEE).</p> <p>➤ The austerity plan included an increase in the value-added tax, budget cuts, increases in electricity and gasoline prices to decrease demand and government subsidies, and tighter monetary policy.</p> <p>➤ New pact (1995), the Alliance for Economic Recovery (APRE). Fixed rates of increase for wages and prices.</p> <p>➤ Slow growth of exports and a rapid growth of imports and a deteriorating current account balance.</p> <p>➤ The generation of employment in Mexico associated with inferior jobs in terms of quality, productivity and real wages (exception of automobile production).</p> <p>➤ Deterioration of labour market conditions.</p> <p>➤ Private consumption and retail sales fell significantly.</p> <p>➤ An aggregate level, the real wage level in all the groups and sectors and the total economy are still far below those of 1980, in spite of a slight improvement since 1989.</p> <p>➤ Labour flexibilization induced by the fall of real wages, modifications in collective contracts and agreements on increments in productivity.</p> <p>➤ Flexibilization and apparent modernization of industrial organization acquires several facets: a) increasing international integration and penetration by transnational corporations, intrafirm trade, and economics scale b) A strategy have imposed radical change in the relationship workers-entrepreneur-government, aimed to control industrial trade unions.</p> <p>➤ Adoption a floating exchange rate regime.</p> <p>➤ Devaluation resulted in a decline in real income, hurting the poorest segments of the population and also the newly emerging middle class.</p> <p>➤ US and the IMF assisted the Mexican government by putting together an emergency financial support package.</p> <p>➤ Adoption tight monetary and fiscal policies to reduce inflation and absorb some of the costs of the banking sector crisis.</p>	<p>➤ Real GDP growth dropped from 6.6% in 2000 to a contraction of 0.2% in 2001</p> <p>➤ Manufacturing (export-oriented) employment in dynamic regions decrease (North and Centre regions).</p> <p>➤ The formal sector of the economy contracted after the downturn while the number of jobs in the informal market increased (low-paying jobs and without health or retirement benefits).</p> <p>➤ Increases the social problems, high levels of poverty.</p> <p>➤ Increase in the unemployment rate, being more severe in urban areas.</p> <p>➤ Private consumption continued to lag afterwards and consumer confidence remained weak.</p> <p>➤ Oil production in Mexico is declining. However The Mexican government follows depending on oil revenues, which provide 30% to 40% of the government's fiscal revenues.</p> <p>➤ In 2008, the government enacted new legislation that sought to reform the country's oil sector. The reforms permit Pemex to create incentive-based service contracts with private companies.</p> <p>➤ Minimum wage stable and not binding.</p> <p>➤ Social security reforms.</p> <p>➤ Education reforms</p> <p>➤ Target cash transfer programs</p>

Source: Author compilation based on Dussel (1990), Krueger and Tornell (1999) and Lustig (2010).