

The Dynamics of Income Inequality in Mexico since NAFTA

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Abstract: This paper reviews the pattern of income inequality in Mexico since 1994. It shows that in the past few years there has been an important reduction of income inequality in Mexico, which has almost reverted the sharp increase in inequality observed between 1984 and 1994. Using a Gini decomposition exercise we conclude that labor income, transfers and remittances have all played an important role in this process. We also argue that the equalizing effect of labor income and the reduction of wage inequality in Mexico can be explained as the combination of a late outcome of trade liberalization (as predicted by standard theories of trade) and a structural change in Mexico's workforce composition in terms of education and experience. In general, we conclude that the recent reduction of inequality in Mexico is due to the interaction of both, the market and the State.

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1. Introduction

Mexico has long been characterized as a highly unequal country. This is a fact recognized at least since Alexander von Humboldt wrote at the beginning of the nineteenth century that the region then known as the *New Spain* was “the country of inequality”. Sadly, this is still true today. For example, in a relatively recent study, Corbacho and Schwartz (2002) pointed out that “Mexico’s income inequality is significantly more pronounced than the Latin American average, which is the region with the highest degree of inequality in the world”. On the other hand, a recent report by the UNDP (2005) showed that Mexico is one of the 20 countries with the highest degree of inequality in the world.

Looking at the long-run trend in income inequality in Mexico leaves little room to be optimistic about this aspect of the Mexican economy. Figure 1 shows data on Mexico’s Gini coefficient from 1950 to 2004.² The graph shows that while Mexico achieved an important reduction in inequality during the 1960s and 1970s, periods of very rapid economic growth, Mexico has experienced very little progress in its income distribution since the 1980s.



² Data are not fully comparable, since Mexico’s households surveys have changed over time. Therefore, specific data points should be taken with a grain of salt. However, the general trends are compatible with what has been found in other studies using shorter time spans (see data in Corbacho and Schwartz, 2002).

This situation, however, could have started to change in recent years. In this paper we provide evidence on the reduction in income inequality that has taken place in Mexico since 1994 and we discuss some of the likely sources of such process. The recent trend in inequality in Mexico is important for at least two reasons: first, because it has almost completely reverted the widely documented increase in inequality that occurred in the 1984-1994 period; and second, because this reduction seems to be the outcome of two important structural changes in the Mexican economy: on the one hand, a reduction in labor income and wage inequality that could be associated to the openness of the economy and, on the other, to the role of better-targeted social programs such as *Progresas/Oportunidades*. Therefore, this suggests that both actors, the market and the State, could have contributed to the recent dynamics of inequality in Mexico. A third, although not quite positive, contributing factor to the recent reduction in inequality seems to have been the growing flow of remittances that many millions of Mexicans living abroad send to their families that were left behind in Mexico.

The fact that both trade openness and social policy could partially explain the reduction in income inequality in Mexico cannot be underestimated. In fact, income inequality is diminishing in several Latin American countries and it is possible that similar factors could also be at play in many of these other countries.³ This could lead not only to an appropriate evaluation of the new social policies that are being implemented in the region, but also to a reconsideration of the role that globalization and trade liberalization may have on inequality in middle-income countries.⁴ Besides this introduction, the rest of the paper is as follows: Section 2 provides an overview of macroeconomic conditions in Mexico during the past decades. Section 3 shows estimates of income inequality in Mexico using alternative definitions of income. In Section 4 we perform a Gini-decomposition analysis to investigate the contribution of different income sources to the evolution of inequality in Mexico. Section 5 discusses the role of income labor and wage inequality in explaining the dynamics of inequality. Finally, Section 6 concludes.

³ See, for example, Ferreira et al. (2007) and Barros (2008) for the Brazilian case; Gasparini and Cruces (2008) for Argentina; and Eberhard and Engel (2008) who show that Chile has recently experienced a important reduction in wage inequality.

⁴ See Goldberg and Pavcnik (2007) for a recent survey on this issue.

2. An Overview of Mexico's Economic Conditions since 1950

Table 1 provides a brief and oversimplified summary of Mexico's economic performance since 1950. In the first stage, between 1950 and 1970, Mexico's GDP grew at a relatively rapid pace (3% per year in per capita terms) with price stability, low fiscal deficits and with a fixed exchange rate since 1956. The second stage, between 1970 and 1982, was again a period of rapid growth (3% per year in per capita terms) but this time with macroeconomic instability. During this period, Mexico suffered double digit annual inflation and large devaluations in both 1976 and 1981. Mexico's government incurred in large fiscal deficits and Mexico's public sector external debt soared. These two initial stages were characterized by having a semi-closed economy with high tariff and non-tariff barriers. During the first stage inequality remained relatively stable, whereas during the second stage there was a rapid reduction in income inequality in Mexico.

The third stage, between 1982 and 1994, was one of structural adjustment and important economic reforms. During this period Mexico went through a process of macroeconomic adjustment that led to a radical change in Mexico's economic model: the government drastically reduced public expenditures, there was an important renegotiation of public sector's foreign debt, a large-scale privatization process and, in 1985, in the midst of an unexpected collapse in the price of its main exporting product (oil), Mexico unilaterally opened up its economy by significantly reducing its tariffs and by eliminating most of its non-tariff barriers. In the early 1990s, Mexico announced its intention of going well beyond these reforms (as well as locking them in) by proposing a Free Trade Agreement with the United States and Canada.⁵ This agreement came into effect in 1994 in what was denominated as the North American Free Trade Agreement (NAFTA). It established the largest free trade area in the world and the most asymmetrical too. During this period the Mexican economy stagnated in per capita terms and income inequality increased substantively in the country throughout the period.

⁵ See Tornell and Esquivel (1998) for more details on these issues.

The first year of the post-NAFTA period was characterized by a severe macroeconomic crisis that began in December of 1994. In that month, Mexico experienced a large devaluation and it was closed to incur in a financial default. The fiscal and macroeconomic adjustment of 1995, led to a sharp and steep decline in economic activity during 1995 (a contraction of 8% in per capita GDP). Later on, from 1995 to 2000, the domestic economy recovered relatively fast mainly based on an important increase in Mexican exports to the U.S. market. Between 1995 and 2000 Mexico's per capita GDP grew at a rate of 4% per year.

The first post-NAFTA stage was also characterized by the implementation of two important social and economic programs: *Progresa* (later known as *Oportunidades*) and *Procampo*. The first one is a focalized conditional-cash transfer program that started in 1997 and it is currently considered as the most important anti-poverty program in Mexico. This program was first applied in rural areas, although it has now been expanded to include urban areas since 2001. The second program, *Procampo*, is the income support program for agricultural producers designed to help them face the transition from a closed economy towards a more open economy. This program began in 1994 when NAFTA came into effect and it is considered a badly-designed program in redistributive terms (Scott, 2008). In average, the period from 1994-2000 was one of a mediocre economic performance (2% per year) and it was also the period during which income inequality reached its peak.

The most recent stage, from 2000 to 2006, was one of low growth with macroeconomic stability. During these years, Mexico's per capita GDP grew at only 1% per year, since it was negatively affected by the U.S. recession of 2000/2001. Despite that, this period is precisely the one when income inequality started to decline more rapidly as we will see later.

Table 1. Mexico's Economic Overview

	Stage I 1950-1970	Stage II 1970-1982	Stage III 1982-1994	Stage IV 1994-2000	Stage V 2000-2006
Macro	High growth with macroeconomic stability	High growth with macroeconomic instability	Low growth with macroeconomic adjustment	1994 crisis and recovery. Low growth with some inflation	Low growth with macroeconomic stability
Openness	Semi-closed economy with tariff and non-tariff barriers	Semi-closed economy with tariff and non-tariff barriers	Unilateral openness in 1985. NAFTA negotiations began in 1992	NAFTA comes into effect. Free Trade Agreement with the EU.	Open economy
Inequality	Relatively stable	Rapid reduction	Increase	Slight reduction	Fall
Social Protection	Low	Low	Non-targeted Social Programs (Solidaridad)	Targeted Programs in Rural Areas: Progresa and Procampo	Progresa expands to Urban Areas

3. Income Inequality in Mexico since NAFTA

Before discussing inequality in Mexico it is important to clarify what measure of inequality and what definition of income we will use in this paper, since different definitions could not only lead to different estimates of inequality but also to slightly different conclusions.⁶ Most of our results, however, are robust to alternative definitions of income.

In this paper we use the Gini coefficient as our preferred measure of inequality.⁷ This measure not only satisfies all the desirable properties of an inequality measure,⁸ but it is also decomposable by income source, which is something we are interested in. On the other hand, inequality is usually measured using either Current Total Income or Current Monetary Income.⁹ We use both definitions in our initial estimates of inequality, but we later focus only on monetary income estimates. Chart 1 provides a simple description of the components of both income definitions. The description of the sources of monetary income will be later used in a Gini decomposition exercise. All of our estimates use information from the National Survey of Household Income and Expenditure (or ENIGHs by their initials in Spanish). There are surveys available for the years 1984, 1989, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006.

Figure 2 shows the evolution of the Gini coefficient in Mexico for the period that goes from 1984 to 2006, using alternative definitions of income. The figure clearly shows the existence of an inverted U-shape that peaks in 1994 in all cases and that steadily declines thereafter. This figure also shows the rapid increase in inequality that took place between 1984 and 1994, and that has been studied by, among others, Bouillón et al. (2003) and Legovini et al. (2005).

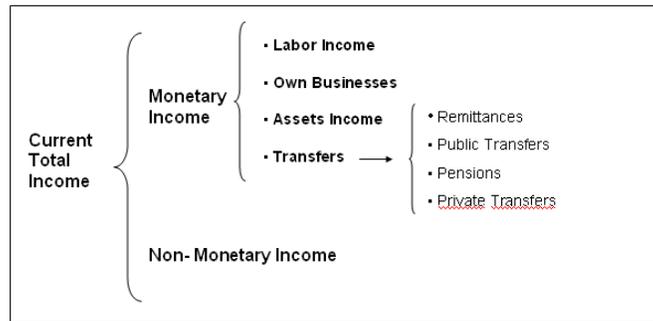
⁶ Corbacho and Schwartz (2002) have a survey of Gini coefficient estimates in Mexico for different periods and different income definitions. CONAPO (2007) and Cortés (2008) show recent estimates of inequality using monetary income.

⁷ Other measures of inequality such as the Theil index show similar trends as those described in the text. They are available from the author upon request.

⁸ These principles are: 1) Adherence to the Pigou-Dalton transfer principle, 2) Symmetry, 3) Independence of scale, 4) Homogeneity, and 5) Decomposability.

⁹ There is yet a third definition of income that is widely used in Mexico: net total income. This definition is similar to current total income but deducts gifts and in-kind transfers given. This measure is the one used in the official estimation of poverty rates in Mexico.

Chart 1. Mexico: Sources of Current Total Income



Source: ENIGHs

The Gini coefficient for current monetary income went from 0.564 in 1994 to 0.505 in 2006, a 10% reduction; whereas the corresponding measure for total income went from 0.537 to 0.494, an 8% reduction. These reductions are similar in magnitude to those recently observed in Brazil as documented by Barros (2008). In annual terms, inequality in Mexico has fallen at a rate of 0.9% and 0.7% in the case of current monetary income and total income, respectively. Although these rates are still below the 1% rate at which income inequality diminished in Mexico between 1954 and 1984 using figures from Szekely (2005), they undoubtedly show a significant improvement with respect to 1994 figures.

Figure 2. Mexico: Gini Coefficients for Alternative Income Definitions, 1984-2006

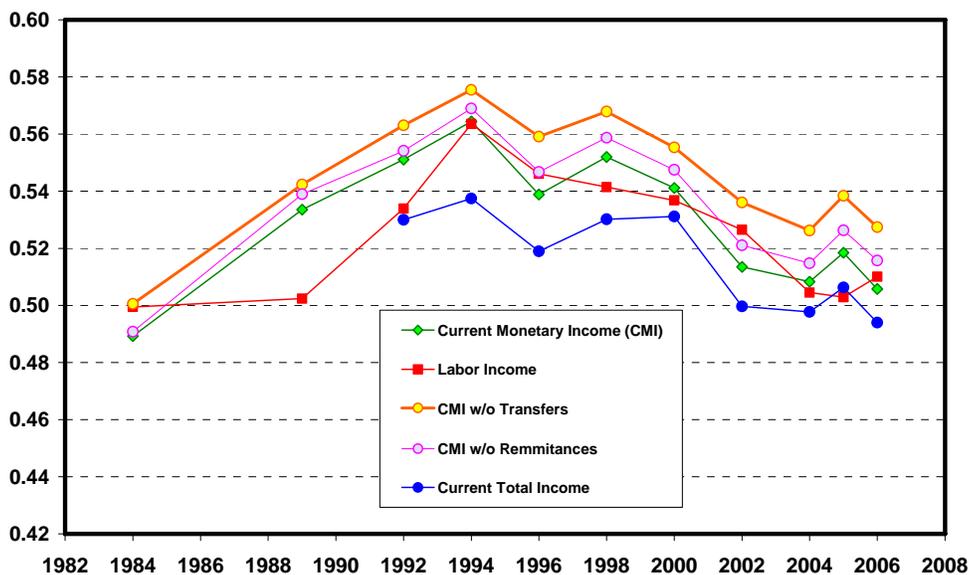


Figure 2 also shows a few other interesting results. For example, the figure shows that the distribution of monetary income is more unequal (i.e. has a higher Gini coefficient) than the distribution of total current income (which is explained by the fact that non-monetary income is less unequally distributed). On the other hand, the graph also shows that the Gini coefficient of monetary income before including either transfers or remittances tends to be slightly higher than the Gini Coefficient of monetary income, thus suggesting the equalizing contribution of these two factors, an issue to which we will return later.

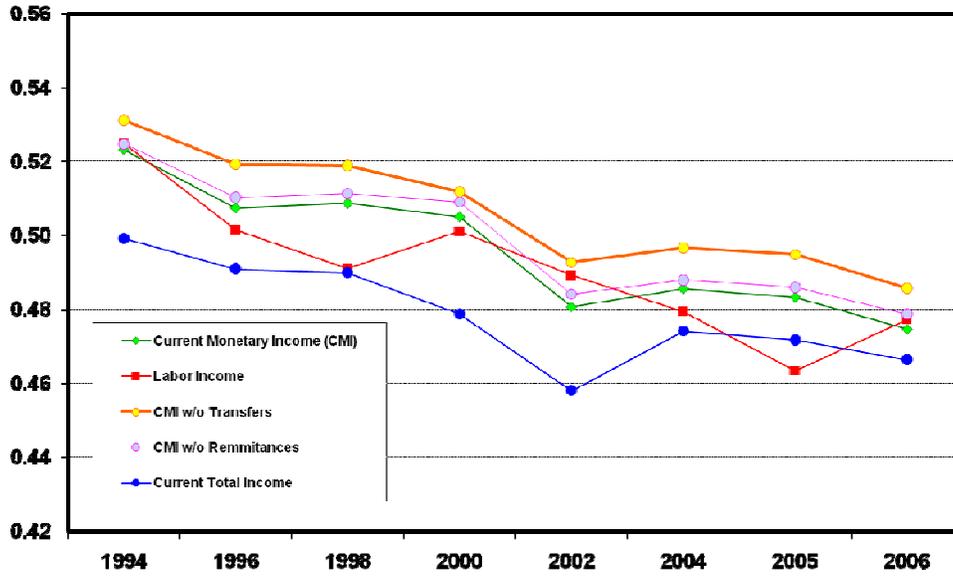
The Urban/ Rural Dimension of Inequality in Mexico

Previous studies have shown the relevance of understanding the dynamics of rural and urban inequality in Mexico by separate. For example, Pánuco-Laguette and Szekely (1996) showed that inequality *within* urban and rural areas accounted for 84% of total inequality in Mexico in 1992, whereas only one sixth of total inequality was explained by the rural/urban gap. For that reason, we now focus on the dynamics of inequality in rural and urban areas in Mexico since 1994. As will be discussed later, this distinction is crucial to understand the different roles that the market and the State have played in the recent downward trend in inequality in the country.

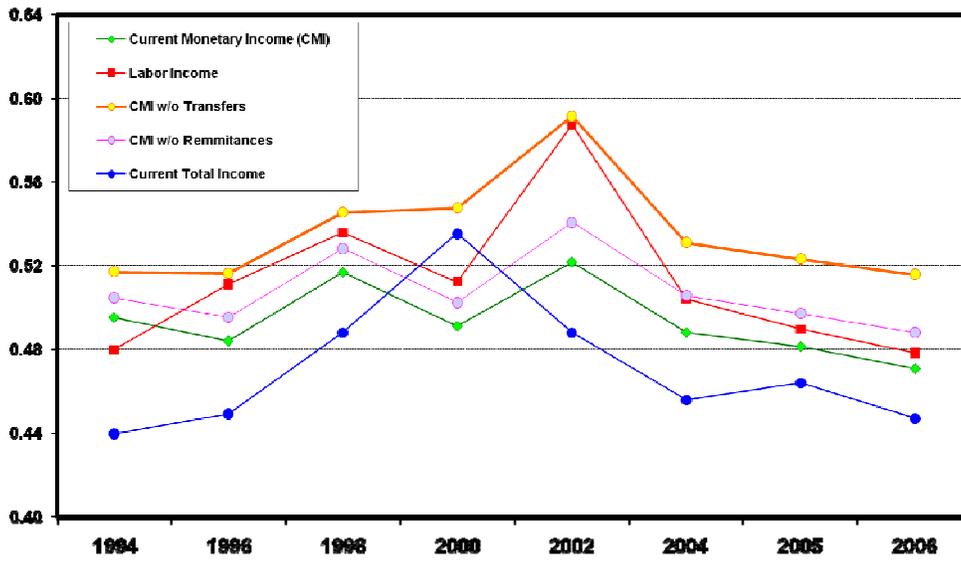
Figures 3 and 4 show the evolution of the Gini coefficients for urban and rural areas in Mexico, respectively, for the 1994-2006 period.¹⁰ The divergence in the patterns of inequality by sector is quite striking. On the one hand, income inequality in urban areas in Mexico, regardless of the income definition that we use, has steadily declined since 1994. On the other, income inequality in rural areas increased until 2000 if we use the total income definition or until 2002 if we use any other income definition. After reaching the peak, income inequality in rural areas has basically returned to their 1994 levels. The existence of such a differentiated pattern of income inequality in rural and urban areas in Mexico somehow suggests that different factors could be affecting the dynamics on those two sectors of the Mexican economy. We explore this idea in more detail later.

¹⁰ Please note that this is not a rural/urban income inequality decomposition exercise. This analysis refers to the income inequality dynamics *within* rural and urban areas and has nothing to say about the contribution of each sector to total inequality in Mexico.

Urban Mexico: Gini Coefficients for Alternative Income Definitions, 1994-2006



Rural Mexico: Gini Coefficients for Alternative Income Definitions, 1994-2006



The Distribution of Monetary Income in Mexico

As mentioned before, we now explore in more detail the distribution of monetary income in Mexico. Table 2 shows the distribution of this type of income in Mexico by deciles between 1984 and 2006. The table also shows some other indicators of inequality such as the ratio of the income received by the top 10% of the households to the income received by the bottom 10%. Other income ratios are also included, as well as the Gini coefficient, which has already been displayed in Figure 2. In general, these ratios follow the same pattern of inequality described by the Gini coefficient. One difference, however, is that all these ratios tend to peak around 1998 rather than in 1994. This fact is explained because between 1994 and 1998 there were some important changes in the tails of the distribution: indeed, both the top deciles and the bottom ones suffered similar absolute losses in their income shares, thus leading to a disproportionate increase in these ratios.

The evolution in the distribution of monetary income in Mexico can also be analyzed using the Growth Incidence Curves (GICs) suggested by Ravallion and Chen (2003). These curves show the percent change in per capita income along the entire income distribution between two points in time. Figure 5 shows the GIC for the entire 1994-2006 period at the national, urban and rural levels. The negative slope in the first graph clearly shows why Mexico's income inequality diminished during this period: throughout the period, the income of the bottom part of the distribution grew faster than the income from the middle and the top segments of the income distribution.

Figure 5 also shows the different patterns followed by the urban and rural income distributions during this period: in the urban areas, income growth was pretty flat across the entire distribution except for the top three deciles which experienced smaller and in some cases even negative income growth rates; in the case of rural areas, two aspects are salient: first, average income growth was greater than in urban areas (an effect that given, the relatively large rural-urban gap, is inequality-reducing) and, second, the rural GIC curve also had a negative slope, so that the bottom half of the rural income distribution had higher income growth rates than the top segment of the distribution. All these facts contributed to the reduction in income inequality in Mexico that has taken place since 1994.

Figure 6 and 7 show the corresponding GIC curves for the 1994-2000 and 2000-2006 sub-periods. We look at these sub-periods with two objectives in mind: first, to find out whether there are common patterns on the income distribution dynamics that have persisted throughout the whole period, and second, to see whether there is something in the GIC curve that can help us to understand the increase and then decline of income inequality in the rural sector that is depicted in Figure 4.

Beyond the fact that the national GIC curves follow slightly different patterns in each of these sub-periods, we observe the following common aspects in both sub-periods: 1) in both cases the first two deciles of the income distribution experienced an above-average increase in their monetary income, and 2) in both sub-periods the income of the top decile of the income distribution grew at below-average rates. The first fact seems to be associated to the income dynamics of the rural sector, whereas the second fact is clearly associated to the dynamics of the urban sector of the economy. In fact, the pattern in the urban areas in the two sub-periods is almost identical: a very flat GIC throughout most of the income distribution, with the income of the top two deciles growing at smaller rates than that of the rest of the distribution.

Regarding the second issue, the rural GIC curves in figures 6 and 7 fully account for the rise and fall of income inequality in Mexico's rural sector. In the first sub-period, both extremes of the rural income distribution grew much faster than the income of the middle part of the distribution. The net effect of this outcome was the rapid increase in rural inequality between 1994 and 2000 that is shown in Figure 4. In the second sub-period, however, the income growth profile was completely different. In this case, the rural GIC curve clearly showed a pro-poor pattern, with the bottom half of the distribution enjoying substantial income growth rates (higher than 5 percent per year), whereas the upper half of the distribution had much smaller income gains.

The patterns just described suggest that there are some common (medium-run) aspects on the income distribution dynamics that help to explain the recent reduction in income inequality in Mexico: one that is working at the bottom part of the rural income distribution and one that works at the upper part of the urban income distributions.

Sources of Monetary Income

The main component of monetary income in Mexico is labor income, which accounts for around 60% of all monetary income in 2006; whereas the second largest source of monetary income in Mexico is the one obtained from own businesses, which accounts for another 20 percent of monetary income. The rest of monetary income proceeds from a variety of sources including transfers and remittances. Table 3 shows the percentage of households that receive income from sources other than labor income.

Table 3 shows the dramatic increase that has taken place since 1992 in the percentage of Mexican households that receives some type of transfer. That year, less than 24% of households received a public or a private monetary transfer; whereas, by 2006, more than 45% of all households reported receiving part of their monetary income through a private or public transfer. The single most important contributor to this trend is undoubtedly the social program *Progresa/Oportunidades* which, according to the 2006 ENIGH data, is received by 15% of Mexican households.¹¹ There are two other factors that account for part of this increase in transfers to Mexican households: the rural program *Procampo*,¹² which was aimed to support rural producers during the transition to trade liberalization in agricultural products; and, second, remittances, which are now received in 7 percent of Mexican households, which is twice as large as it used to be back in 1994.

Based on what we know about the distributive effects of the *Procampo* (regressive) and *Progresa/Oportunidades* (very progressive) programs (Scott, 2008), it is quite likely that they can actually account for a large deal of the dynamics of income inequality in rural areas.

¹¹ For more details about this program see Cobacho and Schwartz (2002) and Levy (2008).

¹² For more details on Procampo see Corbacho and Schwartz (2002).

Table 2. Mexico: Monetary Income Distribution across Households, 1984-2006

Deciles	Year										
	1984	1989	1992	1994	1996	1998	2000	2002	2004	2005	2006
I	1.2	1.0	0.9	0.9	1.1	0.8	1.0	1.2	1.1	1.1	1.2
II	2.4	2.2	2.0	2.0	2.2	1.9	2.1	2.3	2.4	2.3	2.5
III	3.3	3.2	3.0	2.8	3.1	2.9	3.0	3.3	3.4	3.2	3.3
IV	4.3	4.2	3.8	3.7	4.0	3.8	3.9	4.2	4.2	4.1	4.2
V	5.6	5.2	4.9	4.8	5.1	4.9	5.0	5.3	5.3	5.2	5.3
VI	7.1	6.5	6.1	6.1	6.4	6.2	6.3	6.5	6.6	6.5	6.7
VII	9.0	8.3	7.9	7.8	8.2	7.9	7.9	8.3	8.3	8.2	8.0
VIII	11.8	10.9	10.8	10.5	10.8	10.7	10.5	11.1	10.9	10.6	10.8
IX	17.0	15.9	16.1	16.2	16.1	15.9	16.0	16.3	16.0	15.4	16.0
X	38.3	42.6	44.6	45.3	43.1	45.0	44.4	41.7	41.8	43.7	42.2
Top 10%/Bottom 10%	31.9	41.7	51.3	48.7	40.2	54.8	44.9	36.3	36.7	40.8	34.3
Top 20%/Bottom 20%	15.4	18.0	21.3	21.3	18.2	22.4	19.9	16.9	16.2	17.8	15.7
Top 10%/Bottom 40%	3.4	4.0	4.6	4.8	4.2	4.8	4.5	3.8	3.8	4.1	3.8
Gini Coefficient	0.49	0.53	0.55	0.56	0.54	0.55	0.54	0.51	0.51	0.52	0.51

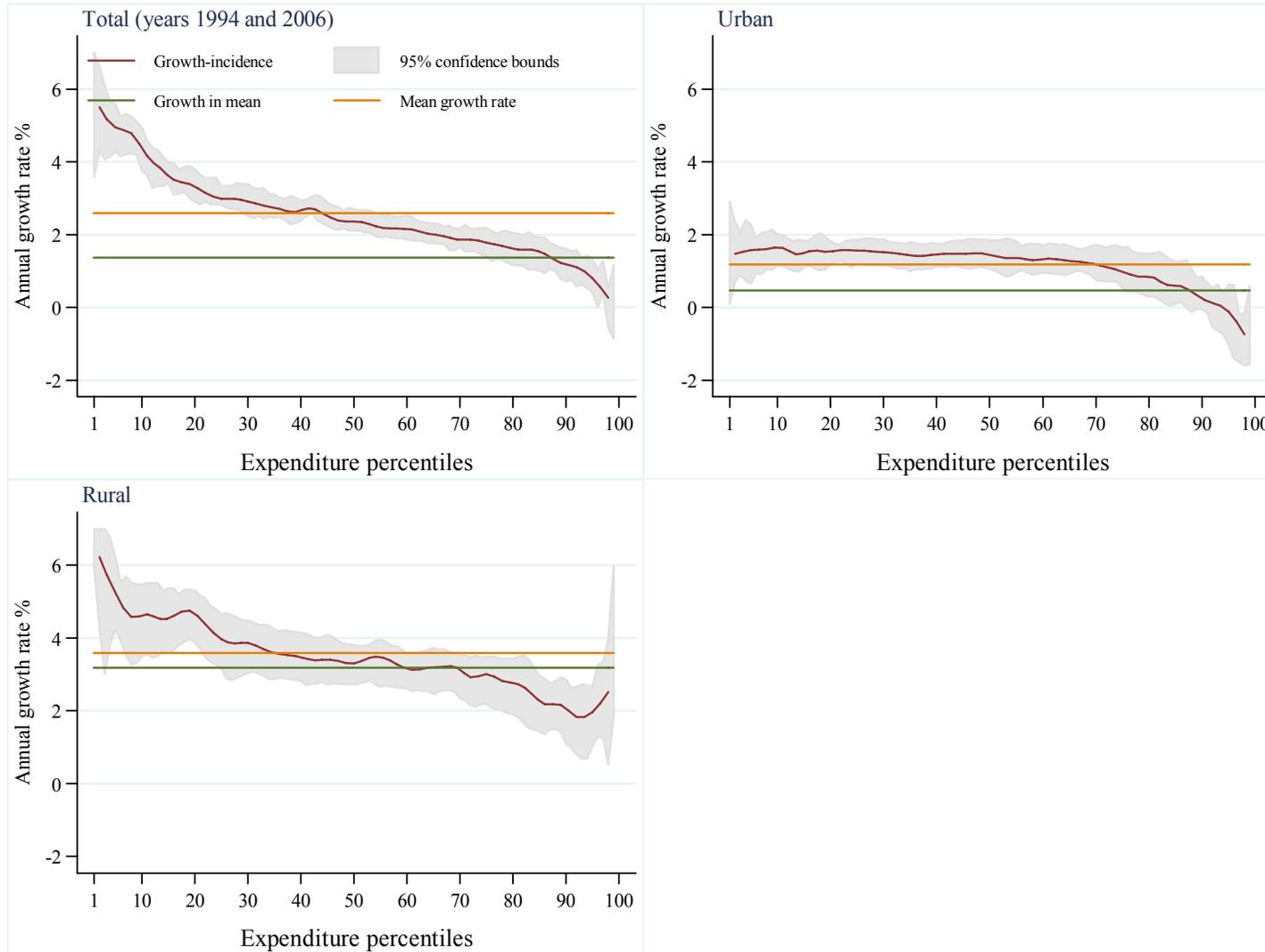
Source: Own estimates based on ENIGHs

**Table 3. Households that receive income from sources other than Labor Income
(as a percent of total households)**

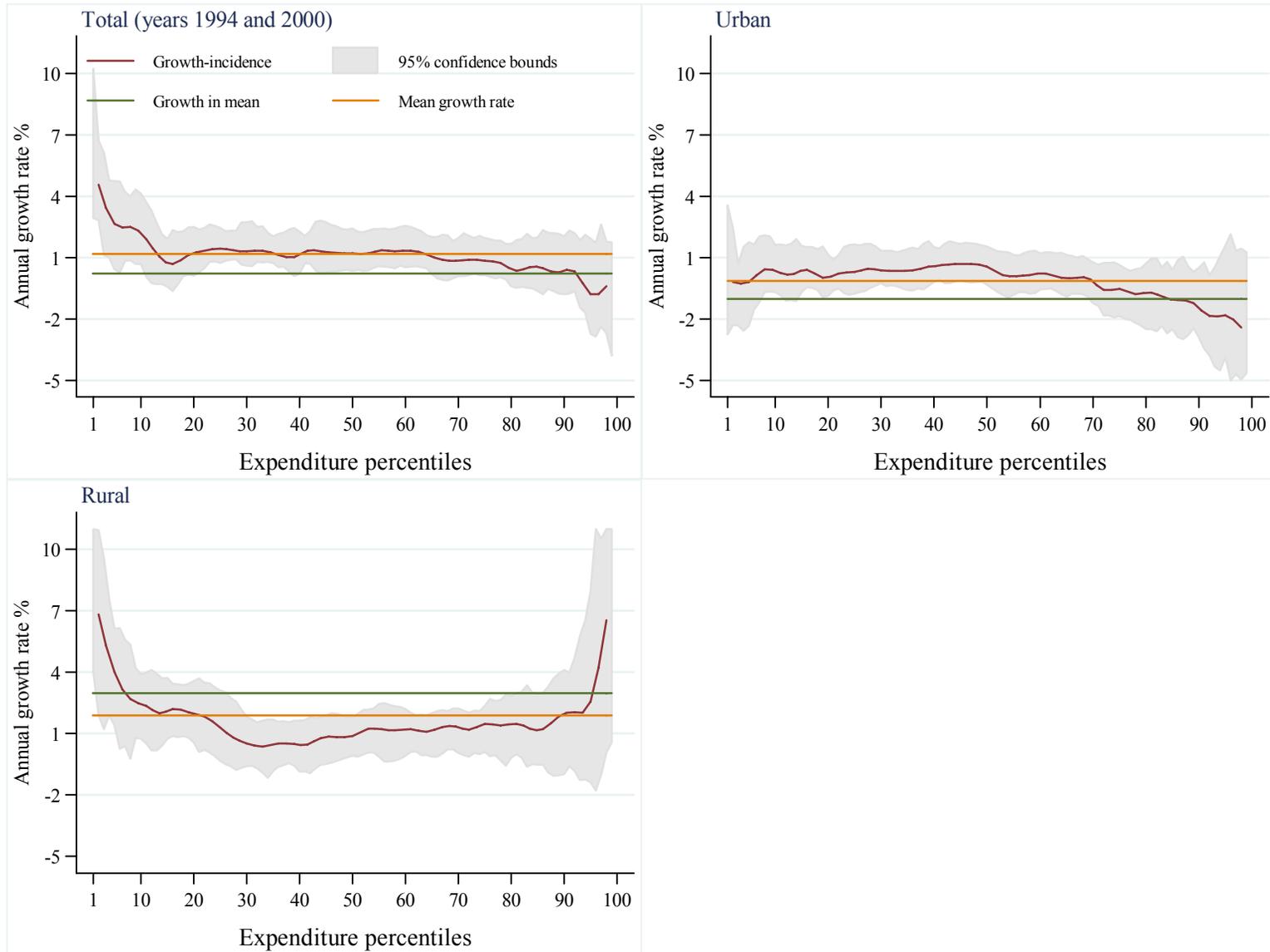
Source of Income	1992	1994	1996	1998	2000	2002	2004	2005	2006
1.- Own Businesses	43.8	42.7	43.3	43.2	41.1	41.9	38.1	39.1	42.0
2.-Property Rents	4.4	3.5	3.7	3.5	3.1	4.0	4.7	4.0	4.6
3.-Financial Income	25.9	15.2	22.9	19.1	19.1	19.3	20.2	18.1	23.5
4.-Transfers	23.5	23.8	29.0	31.2	34.0	38.6	42.0	41.3	45.5
4.1 Remittances	3.7	3.4	5.3	5.3	5.3	5.7	5.6	6.0	7.0
4.2 Pensions	8.8	8.1	8.2	9.5	10.0	10.0	11.8	11.4	11.9
4.3 Public and Private Transfers	13.6	14.5	18.7	19.6	23.1	28.4	31.2	30.5	34.6
4.3.1 Procampo	-	1.2	4.6	2.8	2.6	5.6	4.6	3.5	4.0
4.3.2 Progresa/Oportunidades	n.a.	n.a.	n.a.	n.a.	n.a.	12.3	13.4	13.5	14.8

Source: Author's own estimates based on ENIGHs.

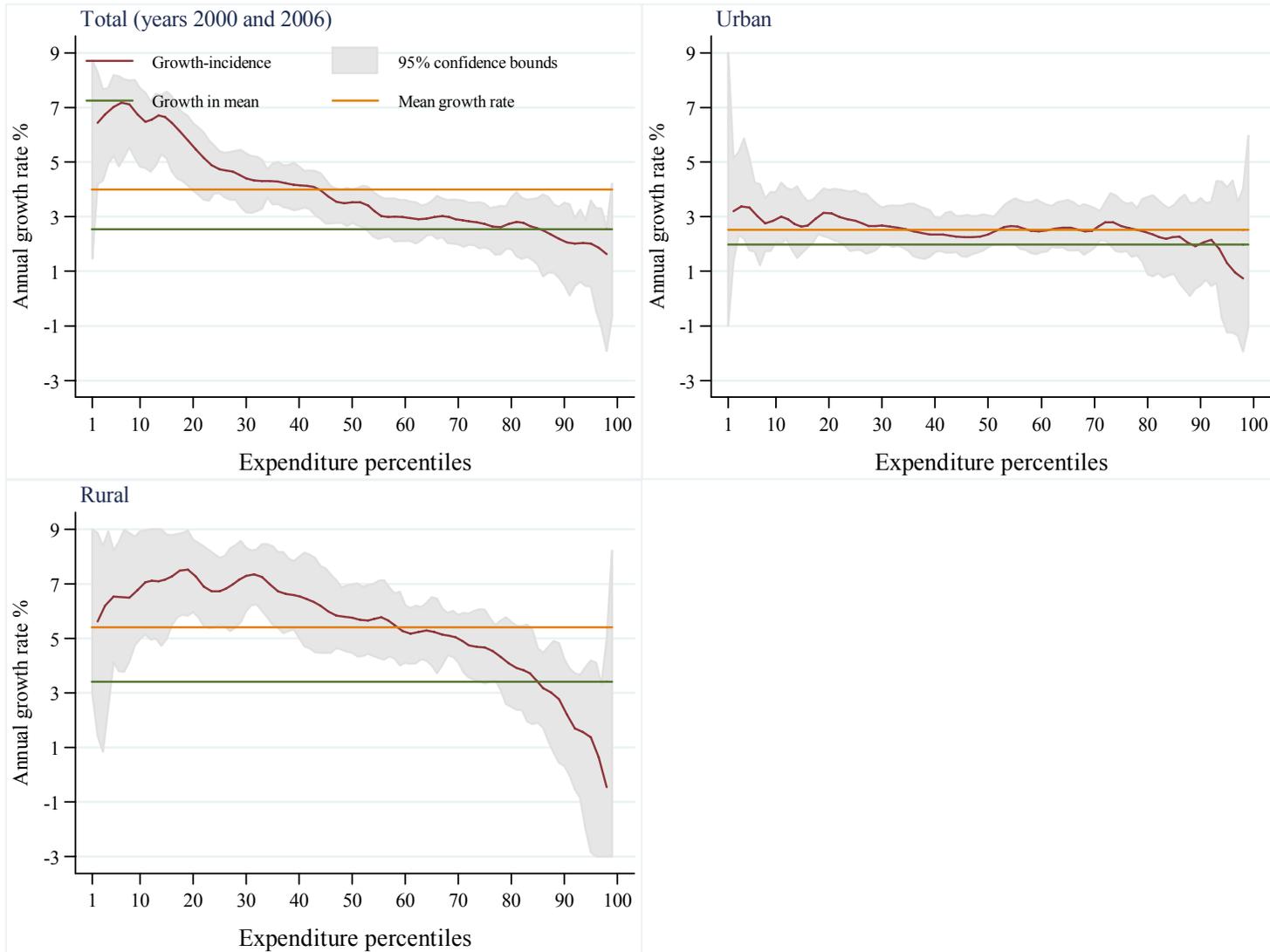
Mexico: Growth Incidence Curves using Monetary Income, 1994-2006



Mexico: Growth Incidence Curves using Monetary Income, 1994-2000



Mexico: Growth Incidence Curves using Monetary Income, 2000-2006



4. What Are the Sources of Income Inequality in Mexico? A Decomposition Analysis

In this section we conduct a decomposition of the Gini coefficient for the years 1994, 2000 and 2006, to investigate the contribution of different income sources on the observed inequality of monetary income in Mexico.

Methodology

Lerman and Yitzhaki (1985) showed that the Gini coefficient for total income inequality (G) with K income sources can be expressed as

$$G = \sum_{k=1}^K S_k G_k R_k$$

where S_k is the share of source k in total income, G_k is the Gini coefficient of the income source k , and R_k is the Gini correlation between the source income k and total income.

This decomposition of the Gini coefficient has a neat and clear-cut interpretation since it shows that the contribution of income source k to inequality depends on the interaction of three elements: a) how important the income source on total income is (S_k), b) how unequally distributed the income source is (G_k), and c) how correlated the income source and the distribution of total income are (R_k).

Therefore, an income source that represents a relative large share of total income could have a large effect on inequality as long as it is unequally distributed (i.e. if it has a relatively high G_k). However, if G_k is low, this factor will dwarf the contribution of that income source. On the other hand, if an income source is very unequally distributed but it is not highly correlated with total income (as in the case of well-targeted transfer programs), then the contribution of such source could in fact become negative.

Later on, Stark, Taylor and Yitzhaki (1986) showed that with this type of decomposition one can estimate the effect of a small percentage change (π) in a given income source on total inequality (holding all other income sources constant) through the following expression:

$$\frac{\partial G}{\partial \pi} = S_k (G_k R_k - G)$$

or, alternatively,

$$\frac{\partial G / \partial \pi}{G} = \frac{S_k G_k R_k}{G} - S_k$$

This expression means that the percent change in inequality resulting from a marginal percentage change in income source k is equal to the initial share of income source k on total income inequality minus the initial share of the income source k .

Gini Decomposition Results

Now we proceed to decompose the monetary income Gini coefficients for Mexico following the approach just described and using the income sources described in Chart 1. Instead of applying the methodology for the whole period under analysis, we have chosen to apply it only to the surveys of 1994, 2000 and 2006, for simplicity of exposition. In the decomposition exercise we have made use of the `descogini` Stata command written by López-Feldman (2006).

The results of our decomposition exercise are shown in Table 4 and the marginal effects are summarized in Figures 8-10. Results are unequivocal: at the national level (Figure 8) there are three inequality-augmenting and three inequality-reducing sources of income. Among the first group we have pensions, income from own businesses and income from property rents. Among the second group we have income labor (at least since 2000), remittances and transfers. In the last two cases, their marginal negative effects on the Gini coefficient have increased along the period as shown in Figure 8.

Figures 9 and 10 show the marginal effect of the different income sources at the urban and rural areas, respectively. The sign of the marginal effects of the different income components is basically the same that we observe at the national level. There are, however, some important differences in terms of the relative importance of the impact of some sources. For example, labor income is a very important inequality-reducing force in urban areas, but not within the rural sector (there, it is even inequality-augmenting in 2006). On

the other hand, transfers are a very important inequality-reducing factor in rural areas, but not as large in urban ones. Finally, note that remittances do not seem to have a large negative marginal effect on inequality in any sector in specific, although they are relevant at the national level. This apparent paradox is explained by the fact that while remittances Gini correlation with rural monetary income is close to 50 percent, they have a much lower Gini correlation with monetary income at the national level (see Table 4). In that sense, remittances have an effect at the national level because they are heavily concentrated on the bottom half of the *national* income distribution.¹³ Therefore, remittances work as an inequality-reducing source of income through the rural/urban income gap and not through the sector specific income distribution.

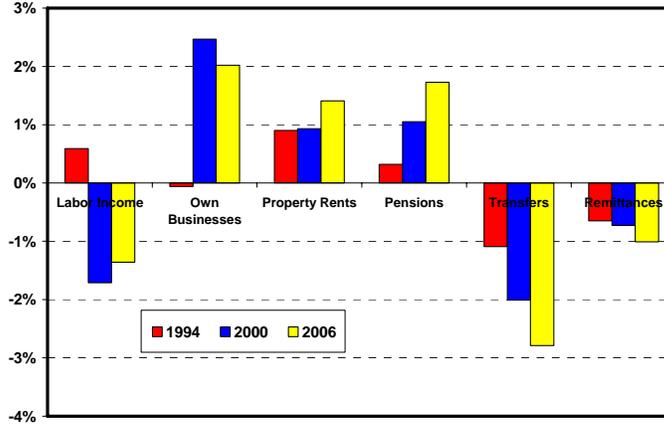
¹³ See, for example, Esquivel and Huerta-Pineda (2007).

Table 4. Mexico: Monetary Income Gini Decomposition and Marginal Effects by Income Source

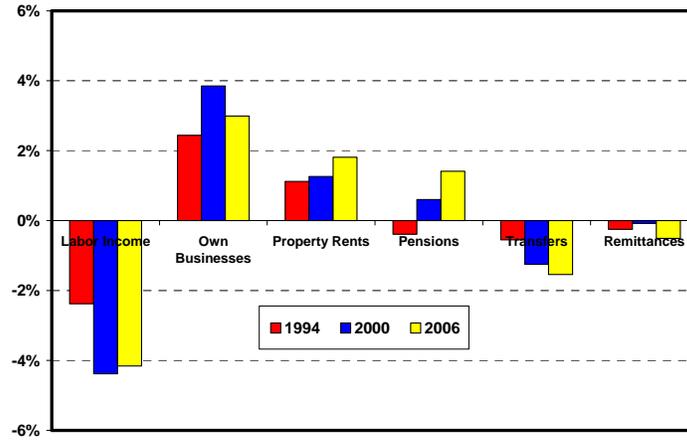
National Level	1994					2000					2006				
Income Source	Sk	Gk	Rk	Share	Marginal Effect	Sk	Gk	Rk	Share	Marginal Effect	Sk	Gk	Rk	Share	Marginal Effect
Labor Income	0.62	0.70	0.83	0.63	0.01	0.58	0.67	0.79	0.57	-0.02	0.60	0.66	0.80	0.58	-0.01
Own Businesses	0.25	0.87	0.66	0.25	0.00	0.25	0.88	0.68	0.28	0.02	0.22	0.88	0.67	0.24	0.02
Property Rents	0.02	0.99	0.80	0.03	0.01	0.02	0.99	0.80	0.03	0.01	0.03	0.99	0.82	0.04	0.01
Pensions	0.05	0.96	0.64	0.05	0.00	0.06	0.96	0.66	0.07	0.01	0.07	0.95	0.70	0.09	0.02
Transfers	0.05	0.95	0.47	0.04	-0.01	0.06	0.93	0.38	0.04	-0.02	0.06	0.89	0.32	0.03	-0.03
Remittances	0.01	0.98	0.25	0.01	-0.01	0.02	0.97	0.39	0.02	-0.01	0.02	0.97	0.31	0.01	-0.01
Urban Level	1994					2000					2006				
Income Source	Sk	Gk	Rk	Share	Marginal Effect	Sk	Gk	Rk	Share	Marginal Effect	Sk	Gk	Rk	Share	Marginal Effect
Labor Income	0.66	0.63	0.81	0.64	-0.02	0.62	0.62	0.77	0.57	-0.04	0.62	0.61	0.77	0.57	-0.04
Own Businesses	0.22	0.89	0.66	0.24	0.02	0.23	0.89	0.67	0.27	0.04	0.21	0.88	0.65	0.24	0.03
Property Rents	0.03	0.99	0.76	0.04	0.01	0.02	0.99	0.80	0.04	0.01	0.03	0.98	0.80	0.05	0.02
Pensions	0.05	0.95	0.52	0.04	0.00	0.07	0.95	0.58	0.08	0.01	0.08	0.94	0.63	0.09	0.01
Transfers	0.04	0.96	0.48	0.03	-0.01	0.04	0.95	0.38	0.03	-0.01	0.05	0.93	0.37	0.03	-0.02
Remittances	0.01	0.99	0.29	0.00	0.00	0.01	0.99	0.49	0.01	0.00	0.01	0.98	0.32	0.01	-0.01
Rural Level	1994					2000					2006				
Income Source	Sk	Gk	Rk	Share	Marginal Effect	Sk	Gk	Rk	Share	Marginal Effect	Sk	Gk	Rk	Share	Marginal Effect
Labor Income	0.51	0.70	0.73	0.50	-0.01	0.50	0.69	0.72	0.48	-0.02	0.53	0.72	0.79	0.55	0.02
Own Businesses	0.34	0.81	0.67	0.35	0.01	0.30	0.84	0.70	0.34	0.04	0.24	0.86	0.69	0.25	0.02
Property Rents	0.02	0.99	0.74	0.02	0.01	0.01	0.99	0.71	0.02	0.00	0.02	0.99	0.78	0.02	0.01
Pensions	0.04	0.98	0.71	0.05	0.01	0.04	0.97	0.69	0.06	0.01	0.06	0.98	0.79	0.08	0.02
Transfers	0.07	0.93	0.42	0.05	-0.02	0.10	0.89	0.42	0.07	-0.03	0.10	0.78	0.31	0.04	-0.06
Remittances	0.03	0.97	0.46	0.03	0.00	0.05	0.96	0.48	0.04	-0.01	0.06	0.95	0.52	0.05	-0.01

Source: Own Estimates based on ENIGHs.

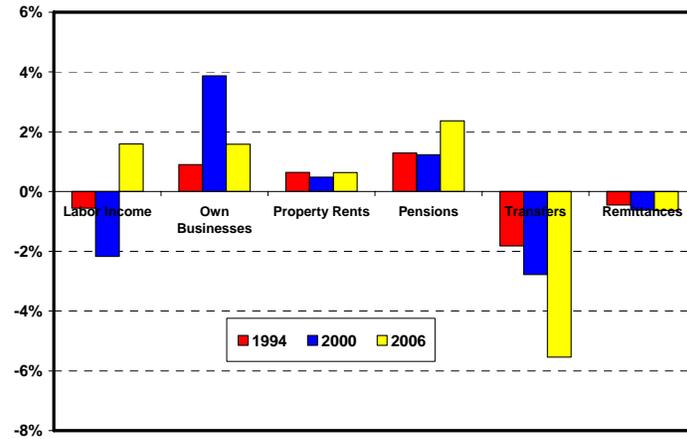
Marginal Effect on Gini Coefficient by Income Source



Urban Mexico: Marginal Effect on Gini Coefficient by Income Source



Rural Mexico: Marginal Effect on Gini Coefficient by Income Source



5. Why has Labor Income Become an Equalizing Income Force?

The results of the decomposition exercise of the previous section suggest that one of the most important equalizing forces in recent years in Mexico has been the evolution of labor income (both, in urban areas and in the country as a whole). In fact, the reduction in the total contribution of labor income to the Gini coefficient accounts for almost all of the observed reduction in this coefficient throughout the 1994-2006 period. Therefore, understanding the nature of the change in the effect of labor income on inequality, that went from being positive in 1994 to becoming negative in 2000 and 2006 (see Figure 8), is crucial to understand the whole dynamics of income inequality in Mexico since 1994.

To begin with, note that labor income is basically the output of multiplying hourly wages and hours worked. In that sense, leaving aside changes in the number of hours worked along the income distribution (which could have occurred, but probably not necessarily in the magnitude or direction that could actually explain the observed changes in income inequality), the only other channel through which labor income can affect income inequality is through changes in wage rates. Therefore, most of the changes in this type of inequality must be somehow the outcome of changes in wage inequality. In some sense, this is a very fortunate circumstance since we can then establish a link between our discussion on income inequality with the abundant literature on wage inequality in Mexico that is part of the debate on the relationship between trade and wages.¹⁴

Let us first look at the evolution of wage inequality in Mexico in recent years. For that purpose, we will make use of a standard definition of wage inequality, which is given by the ratio of the wages of non-production workers to those of production workers. This ratio is also (grossly) defined as the skilled/unskilled wage ratio, where non-production workers are considered as a proxy for skilled labor and production workers are a proxy for unskilled labor.¹⁵

¹⁴ See the abundant references to the Mexican case that appear in the recent survey on globalization and inequality by Goldberg and Pavcnik (2007).

¹⁵ This is, of course, a gross simplification, since there are production workers that are highly skilled and non-production workers that are relatively unskilled.

Figure 11 shows the evolution of this measure of wage inequality in the Mexican industry for the periods that goes from 1984 through 2007. The data for this graph came from the Industrial Survey in Mexico, which has monthly and annual data on total wages paid and total hours worked in the industry by both production and non-production workers. This figure is an updated version of similar versions published in, for example, Esquivel and Rodríguez-López (2003) and Chiquiar (2008).



The pattern of wage inequality in Mexico’s industry in Figure 11 is remarkably similar to the evolution of inequality in the various definitions of income that were shown before. This figure shows a continuous upward increase in wage inequality since 1984 that lasted until the mid-1990s, followed by a steady decline since then. A slight difference between this graph and the income inequality indicators, however, is that our measure of wage inequality peaks in 1996, whereas all the other definitions of inequality peaked around 1994.¹⁶ A second difference is that wage inequality in 2006, unlike the income inequality measures, has not returned yet to its mid-1980s level. This suggests that some additional elements, other than those associated to wage inequality, are contributing to the reduction of income inequality in Mexico (such as remittances and transfers, as discussed above).

¹⁶ See also the discussion on this issue in Robertson (2007) and Campos (2008).

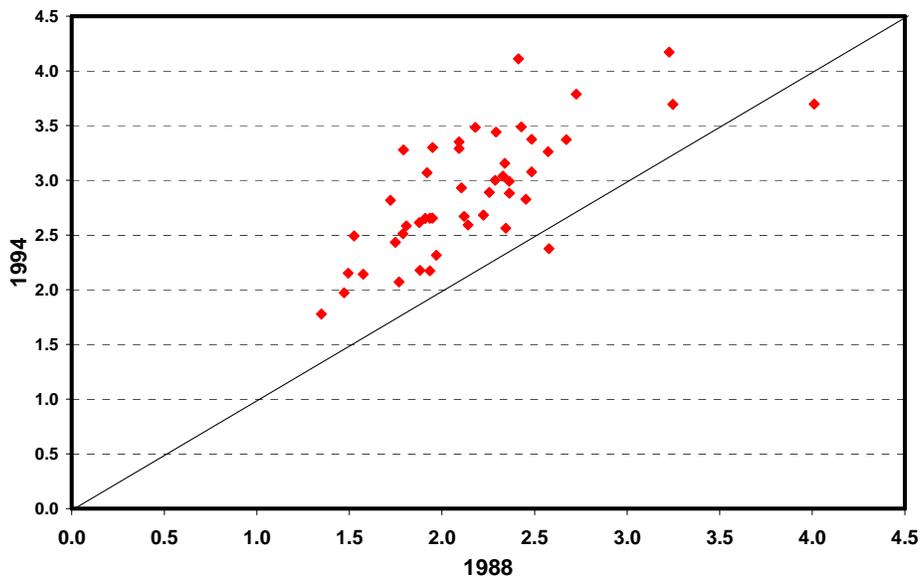
Let us now take a more detailed look at the evolution of wage inequality in Mexico's industry in recent years. Figure 12 and 13 show the skilled/unskilled wage ratio at the branch level of Mexico's manufacturing industry in two different points in time. Figure 12 compares the observed wage ratio in 1988 (*x*-axis) with that of 1994 (*y*-axis), whereas Fig. 13 shows the equivalent ratio for the years 1994 and 2007. Both figures include a 45 degree line as a reference. Fig. 12 shows that the increase in the wage gap between skilled and unskilled workers that occurred before 1994 was completely generalized across the whole manufacturing industry. In fact, the wage ratio increased in 46 of the 48 manufacturing branches, and slightly decreased in the other two branches.

Between 1994 and 2007, however, the pattern of the skilled/unskilled wage ratio in Mexico's manufacturing industry looks somewhat different and more heterogeneous than in the previous period: now, most industries show a slightly declining wage ratio between these two years, but there are also a few branches where the wage ratio is now either the same or it is slightly above its 1994 level.

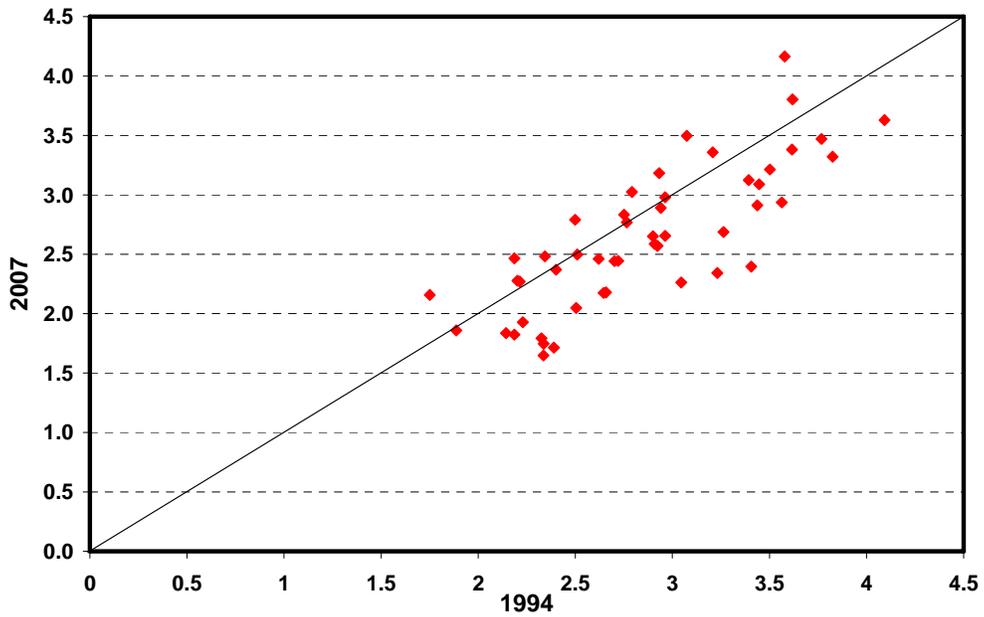
On the other hand, Figure 15 shows the evolution of the skilled/unskilled wage ratio at the state level in Mexico since 1994. We have information for 19 specific Mexican states, whereas the information from the remaining 13 states is grouped under the variable "Resto". The evolution of the wage ratios of these 19 individual states and of the composite variable are all displayed in Figure 14. Note that most wage ratios show a steadily declining trend in wage inequality.

In summary, since 1996 there has been an important reduction in wage inequality in Mexico. This reduction took place not only at the industry-wide level, but it also occurred in most manufacturing branches and across the country in many regions and states. As a consequence, a good explanation of labor income inequality (and of wage inequality) has to be able to explain not only the rapid increase in wage inequality between 1984 and 1996, but it must also be able to explain the reduction in wage inequality that has been observed since 1996.

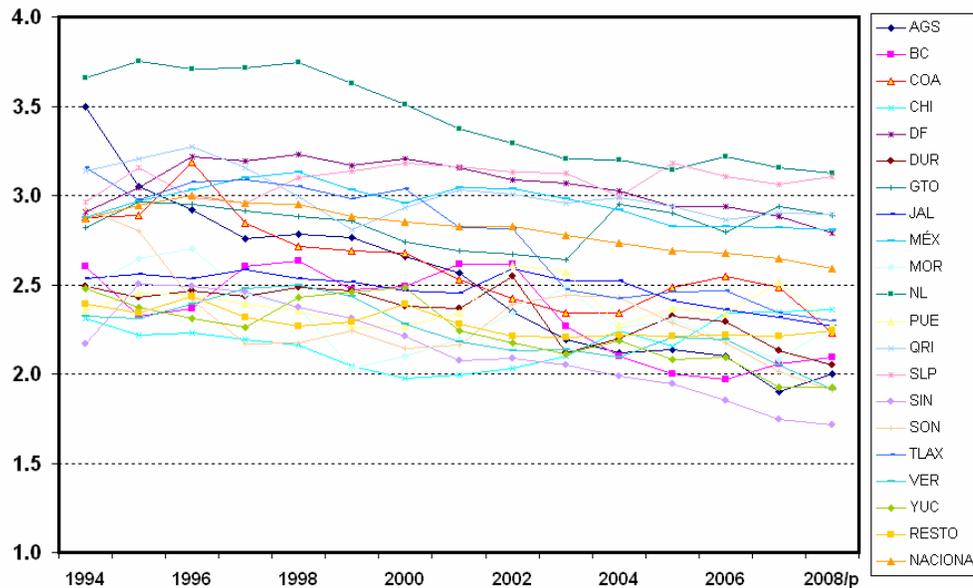
Mexico: Skilled/Unskilled Relative Wage by Industry, 1988 vs 1994



Mexico: Skilled/Unskilled Relative Wage by Industry, 1994 vs 2007



Skilled/Unskilled Wage Ratio by State



Explaining the Evolution of Wage Inequality in Mexico

The rapid increase in wage inequality that occurred in Mexico between 1984 and 1994 or 1996 has been widely documented and studied.¹⁷ An interesting aspect of this trend is that the beginning of this process coincided with the unilateral opening of the Mexican economy that started precisely in the mid-1980s. In that sense, the evolution of Mexico's wage inequality was somehow unexpected considering that Mexico is a relatively unskilled-labor abundant country (at least from the perspective of its main trade partner: USA), and that standard theories of trade would have predicted exactly the opposite pattern (i.e. a reduction in the skilled/unskilled wage ratio, see Cragg and Eppelbaum, 1996). As a consequence, several possible channels (most of them linked to the opening of the economy in the mid-1980s) have been suggested to explain this apparent paradox.

The explanations that have been proposed to explain the post-openness increase in Mexico's income inequality can be grossly divided in two groups: in the first one, the explanations emphasize factors affecting the bottom part of the income distribution (that is,

¹⁷ See, for example, Esquivel and Rodríguez López (2003), Airola and Juhn (2005), Robertson (2007), Acosta and Montes-Rojas (2008), Chiquiar (2008), Verhoogen (2008), and the references cited therein.

the segment mostly comprised by less skilled and less experienced workers); whereas the second group of explanations emphasizes factors affecting the upper part of the distribution. In the first group, for example, we have theories emphasizing the reduction in real minimum wages (Fairris, Popli and Zepeda, 2008), as well as theories suggesting that the mid-1980s reduction in tariffs disproportionately affected industries intensive in low-skilled workers (Hanson and Harrison, 1999). On the second group, some explanations have emphasized the role of an increase in the demand for skilled workers associated either to the presence of foreign investment (Feenstra and Hanson, 1997), to a skill-biased technological change (Cragg and Eppelbaum, 1996 and Esquivel and Rodríguez-López, 2003), and to a process of quality-upgrading due to an increase in exports (Verhoogen, 2008). Other explanations have suggested that education inequality could have also played a role (López-Acevedo, 2006) or that these trends could be indicating only short-run effects (Canonero and Werner, 2002).

On the other hand, the post-1996 reduction in wage inequality in Mexico has been much less studied. So far, only Robertson (2007) and Campos (2008) have analyzed this trend. While the latter favors an explanation based on supply factors, the former suggests that Mexico's manufacturing workers are now complements rather than substitutes of U.S. workers and that there has been an important expansion of assembly activities in Mexico which has increase the demand for less-skilled workers.

Of course, many of the proposed explanations for the pre-NAFTA increase of wage inequality in Mexico are not mutually exclusive and they could in fact be (at least partially) correct. However, it is also true that most of them cannot explain the subsequent reduction in wage inequality that has been observed since 1996. In that sense, these explanations are either incorrect or incomplete since there could be many underlying forces acting in different directions. That is why Robertson (2007) has noticed that the pattern of wage inequality in Mexico is puzzling because no single theory could explain the evolution of wage inequality before and after NAFTA.¹⁸

¹⁸ There are, however, some tentative theoretical explanations for such pattern. For example, Atolia (2007) has suggested that, under certain circumstances, even if the standard prediction from a Heckscher-Ohlin-Samuelson model works as predicted in the long-run, there may be some short-run (or transitory) effects of

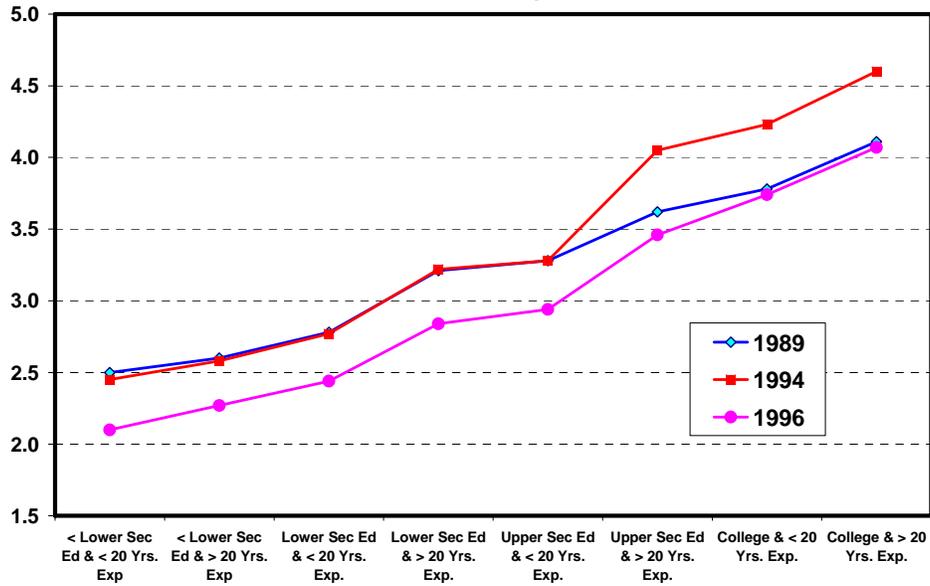
Although it is not the objective of this paper to identify or to establish which explanation (if any) is correct, we could at least rule out some of them by looking at some wage data provided by Campos (2008). The next two figures show the mean log wage of male workers in Mexico for selected years and for different combinations of education and years of experience. Workers are classified according to the level of education achieved (less than lower-secondary, lower-secondary, upper-secondary, and college education) and to the number of years of work experience (less or more than 20 years of experience).

Figure 16A shows data for years 1989, 1994 and 1996, whereas Figure 16B shows information for 1996 and 2006. The first figure shows an interesting result: between 1989 and 1994, most of the changes in the wage distribution in Mexico occurred in the upper tail of the distribution. That is, the increase in wage inequality in those years cannot be explained as a result of a reduction in the wages of the low-skilled or inexperienced workers; instead, such increase in inequality can only be explained as a result of an increase in the wages of the high-skilled or high-experienced workers. This result basically rules out any explanation based on changes in the lower tail of the wage distribution such as those based on a falling real minimum wage or on a biased openness of unskilled-labor intensive industries. Figure 16A also shows the widespread negative effects of the financial crisis of 1994/95 which reduced, almost proportionally, the real wages of all types of workers in Mexico between 1994 and 1996.

Figure 16B shows the wage distribution in Mexico for 1996 and 2006. Unlike the previous figure, this one shows that most of the changes in the wage distribution took place in the lower tail. That is, workers with lower levels of education and/or less years of work experience had the largest increases in their average wages and this explains the reduction in wage inequality that has been observed since 1996. This also suggests that any convincing story of the post-NAFTA reduction in wage inequality has to explain the increase in the wages of the low-skilled/less-experienced workers rather than the reduction of the wages of the high-skilled/more-experienced workers.

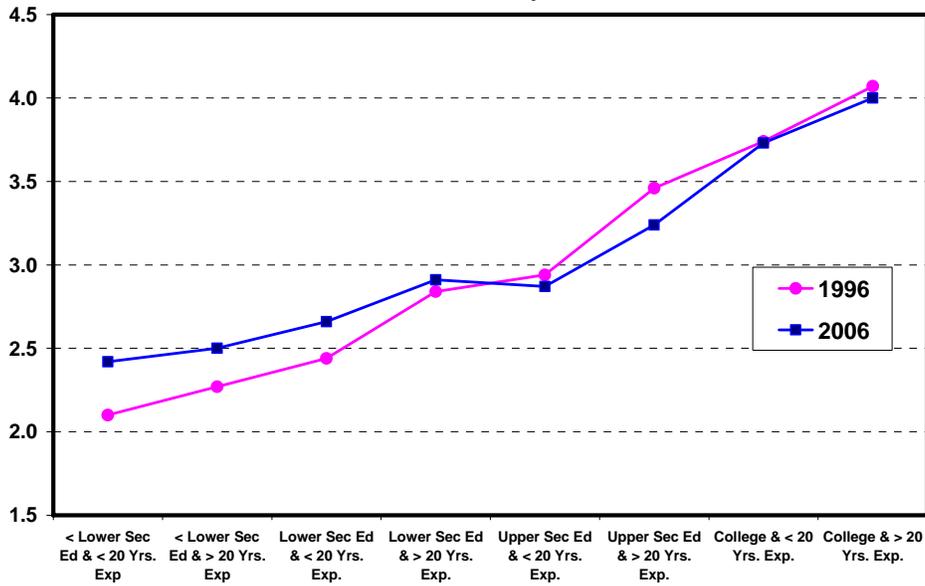
trade liberalization that may lead to a different outcome from those of the long-run as a result of two factors: first, an asymmetry in the contraction and expansion of some sectors, and second, because of the capital-skill complementarity in production.

Mexico: Mean Log Wage of Male Workers by Education and Experience



Source: Own elaboration based on Campos (2008).

Mexico: Mean Log Wage of Male Workers by Education and Experience



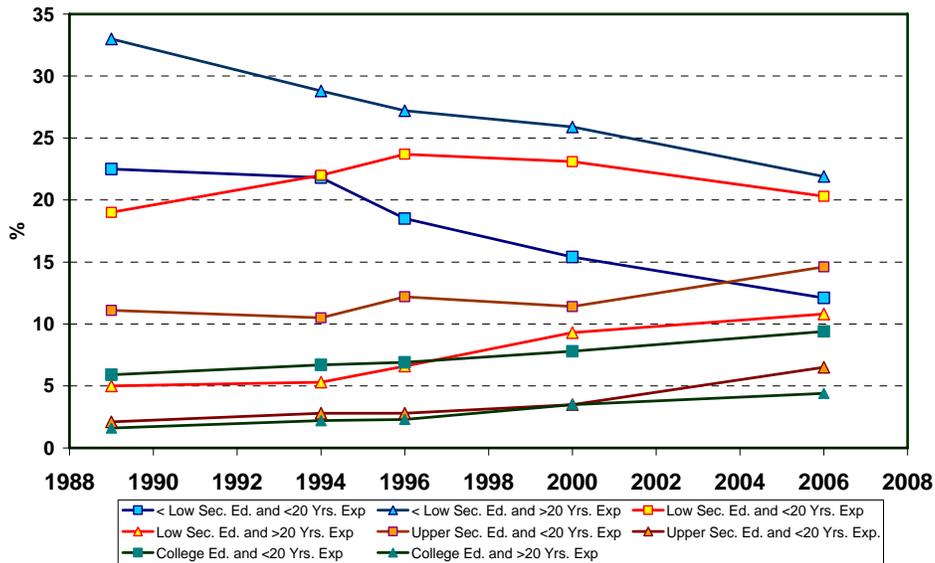
Source: Own elaboration based on Campos (2008).

The previous results confirm the intuition that there is no single explanation for the evolution of wage inequality in Mexico since 1984. Indeed, the fact that the 1984-1994 increase in wage inequality is associated to changes in the upper tail of the distribution, whereas the post-NAFTA reduction in wage inequality is mostly associated to changes in the bottom tail, suggests that there at least two leading forces at play. In the first case, as discussed before, the only explanations that seem to be compatible with the observed trend are those suggesting the presence of a skill-biased technological change, either exogenous (Cragg and Eppelbaum, 1996 and Esquivel and Rodríguez-López, 2003) or endogenously determined by the presence of multinational firms (Feenstra and Hanson, 1997) and/or by the quality-upgrading of exporting firms (Verhoogen, 2008).

For the post-NAFTA period there are at least three possible explanations, two of which have already been mentioned and that are not mutually exclusive: an increase in the supply of relatively skilled workers (Campos, 2008) and an increase in the demand for unskilled labor resulting from an expansion in assembly activities in Mexico's manufacturing sector (Robertson, 2007). Any of these two effects could explain the reduction in the skilled wage premium that is observed in the data. A third explanation that is also compatible with the previous two stories is that of a standard Heckscher-Ohlin-effect in an unskilled-abundant country such as Mexico (Chiquiar, 2008). This effect could be the late outcome of trade liberalization as suggested by Canonero and Werner (2002) and that has been already modeled by Atolia (2007) or, alternatively, as an underlying effect that had not showed up in the data before due to the presence of a stronger force such as a skill-biased technological change as previously hypothesized by Esquivel and Rodríguez-López (2003).

To discriminate amongst these alternative hypotheses a much more detailed and rigorous analysis is needed. However, we might move forward by trying to analyze whether some of these hypotheses are borne out by the data. For that matter, Figure 17 shows the composition of Mexico's workforce between 1989 and 2006 according to the levels of education and experience defined above. This composition obviously reflects the interaction of both supply and demand factors.

Mexico: Workforce Composition by Education and Experience Levels, 1989-2006



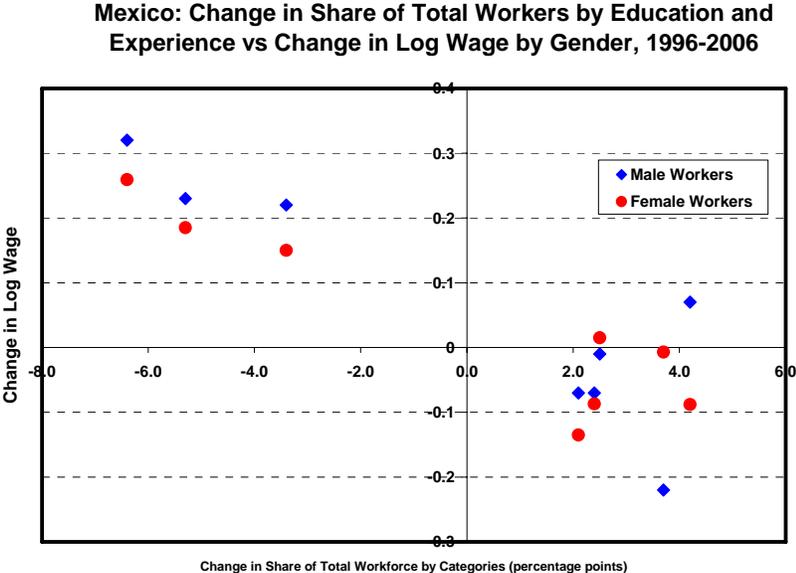
Source: Own elaboration based on Campos (2008).

In general, the figure shows that throughout the period there was both a reduction in the share of the least skilled (those with less than lower secondary education) and less experienced workers, and an increase in the share of the most skilled and more experienced workers. The most dramatic changes, however, took place in the share of those workers with less than lower secondary education. In fact, this group, which accounted for almost 55% of workforce population in 1989, only represented about one third of the workforce population by 2006, that is, a reduction of about 20 percentage points in a 17 year span. Such reduction was compensated by increases in the shares of all the other groups of workers. These trends, which had already been present between 1989 and 1994, accelerated in the post-NAFTA period.

Therefore, these results suggest that most of the relative increase in the wages of the low-skilled/low-experience workers is associated to the change in the composition of the workforce in Mexico and, in particular, by a reduction in the number of unskilled workers rather than by an increase in the supply of skilled workers. Of course, this result is not at all incompatible with the hypothesis of an increase in the demand for unskilled workers as suggested by Robertson (2007) but this story, by itself, cannot explain the simultaneous

increase in the relative wages and the reduction in the participation of these workers in Mexico's total workforce population.

The next figure shows some results that are compatible with this view. The graph shows on the *x-axis* the change between 1996 and 2006 in the share of the eight different groups of workers according to their levels of education and experience as defined above. There are three groups of workers that have had a decline in their participation in Mexico's workforce and they correspond to the least educated and less experienced workers (see Figure 17). The *y-axis* indicates the average change in the log wage of male and female workers that belong to each one of these groups. As expected, the groups whose shares have diminished in the past decade are those that have had the largest increase in their wages. Notice that the increases in the wages of these workers are close to 20%, and in some cases even close to 30%, throughout this ten-year period. On the contrary, those categories of workers that have increased their shares in Mexico's workforce (the more educated/more experienced workers) tend to have either stagnant or even decreasing wages since 1996. This graph then supports the hypothesis that the change in Mexico's workforce composition is the leading force explaining the reduction in wage and labor income inequality in Mexico in the post-NAFTA period.



Source: Own elaboration based on Campos (2008).

6. Summary and Conclusions

In this paper we have reviewed the pattern of income inequality in Mexico since 1994, the year when NAFTA came into effect. Using nationally representative information from household surveys we have shown that there has been an important reduction in Mexico's income inequality since 1994, and that this process has almost reversed income inequality to the levels that were observed before the rapid increase in inequality that took place between 1984 and 1994.

Using a Gini decomposition analysis by income source we conclude that labor income, remittances and public transfers (mainly through the Progresa/Oportunidades program) have all played an important role in this equalizing process. In particular, we have shown that labor income has become a very important equalizing force in urban areas, whereas public transfers have been particularly important for the reduction of inequality in the rural sector. Remittances, on the other hand, have also been a nationally inequality-reducing source of income in Mexico since 1994.

We have also provided some evidence suggesting that the forces that led to a sharp increase in wage inequality across all industries in Mexico during the 1980s and early 1990s are no longer operating. In fact, we now observe a generalized reduction in wage inequality across all regions and industries in Mexico suggesting the growing relevance of other elements in this process.

In general, we believe that Mexico is now beginning to experience the inequality-reducing effects of having a more educated workforce and of trading with more skill-abundant countries. This equalizing effect seems to have been postponed by a skill-biased technological change (either exogenous or endogenous) or by an endogenous technological upgrading which, in any case, now seem to have ended. This fact, together, with an ambitious and widespread social program focused on poor rural households; seem to be the main explanatory factors of the sharp reduction in inequality that has been observed in Mexico. In that sense, we can conclude that this process has been due to the interaction and combination of both, the Market and the State.

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