

KEYWORDS

Income distribution
Wages
Equal pay
Education
Gender
Multivariate analysis
Statistical methodology
Latin America

Wage inequality in Latin America: a decade of changes

Dante Contreras and Sebastián Gallegos

This work helps to explain the determinants of wage distribution in Latin America in the 1990s. The study employs the basic model of wage variance decomposition developed by Fields (2002), on the basis of an estimated Mincer wage equation adjusted for selection bias, which enables quantification of the impacts of the different explanatory variables of wage inequality. One of the main findings is that education is by far the most important factor in wage inequality in the region. What is more, it has become more significant over time, even though the explanatory power of the model has remained stable.

Dante Contreras
Professor, Department of
Economics,
University of Chile
✉ contreras.dante@gmail.com

Sebastián Gallegos
PhD candidate in economics
Northwestern University
✉ sebastiangallegos@gmail.com

I

Introduction

Income distribution in Latin America has been characterized by persistently high levels of inequality. This has been documented in many reports prepared by international agencies, such as the Economic Commission for Latin America and the Caribbean (ECLAC), the World Bank and the Inter-American Development Bank (IDB). The Gini coefficient for Latin America for the period 1970-1990 is, on average, 10 points higher than for Asia, and around 20 points higher than for the countries of Eastern Europe and the Organisation for Economic Co-operation and Development (OECD) (De Ferranti and others, 2003).

ECLAC (2002a) described the region in the last decade as one of slack economic growth and highly unstable growth rates, largely as a result of the changing international environment. In 2002, Latin America's per capita GDP was about 2% down on the 1997 level.

The region's low income levels and high levels of inequality not only have repercussions in terms of well-being and socio-political stability; in a competitive setting, they also conspire against economic efficiency. This occurs, first, because high levels of inequality may be associated with suboptimal decision-making on the part of economic agents, inasmuch as lower-income households will tend to invest less in human capital, which limits opportunities for a large proportion of the population and thereby reduces potential growth rates and constrains development.

Economic efficiency is also compromised because in scenarios of severe, persistent inequality, governments may be induced to devote their efforts entirely to reducing social gaps. Although that is certainly a priority, neglecting economic policies for driving growth and investment will reduce growth possibilities and welfare in the longer term.

Despite the great importance of inequality in Latin America, most studies on the subject take a mainly descriptive approach, although some articles do attempt to account for the causes of changes in income distribution in the region.¹ Few studies, however, examine the determinants of inequality using databases that are comparable between countries.

This work contributes to explaining the determinants of wage distribution in Latin America, using databases for a broad sample of countries. The information employed comes from ECLAC and the study includes 13 countries of the region, for each of which urban data for a starting and a final year were available. Particular care was devoted to the preparation of the data used here, which are compiled from official sources in each country using technically proven sampling and selection criteria. ECLAC standardizes the definitions and groupings of variables to ensure that the analysis will be comparable.²

The first stage of the analysis is to estimate a wage equation adjusted for selection bias, which yields findings on the returns on education and also on the behaviour of other variables included in the estimate, such as gender and experience.

The gender findings make it possible to examine the wage gap and how it has evolved in Latin America in the past decade. The returns on schooling are also estimated for each cycle of education (primary, secondary and tertiary), which allows examination of how those returns on the different cycles change over time and vary between countries.

Next, following the methodology developed by Fields (2002), the basic model of decomposition of the variance of the labour income logarithm is used to assess the impact on wage dispersion produced by each of the model's explanatory variables. This procedure was applied for each country for a starting year close to 1990 and a final year close to 2000.

□ The authors wish to thank Osvaldo Larrañaga, Claudia Sanhueza, Juan Carlos Feres, Marco Galván, Fernando Medina and the participants at the annual meeting of the Economics Society of Chile (SECHI) for their valuable comments. They are also grateful to the Economic Commission for Latin America and the Caribbean (ECLAC) for providing access to its official databases, which were used as sources of information for this research. Thanks are owed, too, to the Millennium Science Initiative for the funding provided to the Microdata Center through project P07S-023-F. Sole responsibility for the content of this work rests with the authors.

¹ An example is the study by Ganuza and others (2001), which presents an analysis based on microsimulations for Latin America. Contreras (1996 and 2002a) uses the wage variance decomposition methodology proposed by Fields (2002) for Chile, as do Contreras and Galván (2003) for the Plurinational State of Bolivia; Gindling and Trejos (2003) for Costa Rica; and De Hoyos (2006) for Mexico.

² The surveys provided by ECLAC respect the original samples, however, so it is not possible to control for possible changes that may have occurred in their particular characteristics (such as coverage or simple design) during the period analysed.

Following this introduction, this article is organized as follows: section II briefly reviews the literature on the decomposition of income inequality; section III describes the data used; section IV presents the methodology

employed to break down wage variance; section V sets forth the results of the procedure and discusses their interpretation. Lastly, section VI summarizes the key conclusions.

II

Decomposition of income inequality

Several methods of income inequality decomposition have been developed in the literature. Following Morduch and Sicular (2002), these methodologies may be grouped by the structure they impose upon the procedure.

Each of the methods has its advantages and disadvantages. Since income generation by households (individuals) is what ultimately lies behind all decomposition techniques, it would seem reasonable to adopt non-parametric or semi-parametric methods (DiNardo, Fortin and Lemieux, 1996; Deaton, 1997), since these avoid imposing any particular functional form and permit the full distribution of the income function to be examined. They can be extremely complex to calculate, however. Morduch and Sicular (2002) suggest the need to impose more structure, i.e. by parameterizing inequality estimates (rather than conducting parametric estimates) to obtain clearer conclusions. Fields (2002) finds the results of DiNardo, Fortin and Lemieux (1996) highly sensitive to the order in which the adjustments are made.

A very common practice found in the literature is to impose structure and calculate, compare and decompose by subgroups of inequality indexes such as the Gini index, the Theil index or income variance. This procedure allows inequality overall to be calculated as a function of population subgroup inequality. If the inequality index also satisfies an additive decomposition property, then the inequality of the whole population may be expressed as the sum of inequality within subgroups plus the inequality between subgroups. It must be recalled that the more categories of analysis there are, the smaller the number of observations in each subgroup. Accordingly, the inclusion of too many categories may blur the statistical inference.

The main disadvantage of using parametric methods is that they impose a functional form on the income-generation process. However, some of these techniques

are useful in determining whether wage differences or changes in income distribution are attributable to endowment, returns or non-observable effects. Some examples are the decomposition performed by Oaxaca (1973) and the microsimulations of income distribution done at the level of the individual (Juhn, Murphy and Pierce, 1993) and the household (Bourguignon and Ferreira, 2005).

The choice of method depends on the objectives of each investigation and on the data available for it. It is important to ensure that the results are interpreted with the limitations and advantages of the chosen methodology in mind.

This article uses the basic model of wage variance decomposition proposed by Fields (2002), based on an estimation of a Mincer wage equation adjusted for selection bias. This methodology maintains the disadvantages associated with the parametric methods noted earlier. Yet it offers two advantages over other methods. First, the impact of each of the explanatory variables in wage inequality can be isolated and quantified. The decomposition supports dichotomous variables and polynomials in the wage equation; however, the inclusion of interactions precludes ascertainment of the net value of each variable's contribution to inequality.

Second, the use of a log-linear model and decomposition rules renders irrelevant the measure of inequality to be decomposed, because the same effect is obtained for each explanatory factor across a broad range of inequality measures.³ Consistently with the model developed by Fields (2002), this study uses the wage variance log as a measure of inequality.

³ For example, the Gini coefficient, the Atkinson index, the family of generalized entropy indicators and various centile measures. For a demonstration, see Fields (2002).

III

Data used

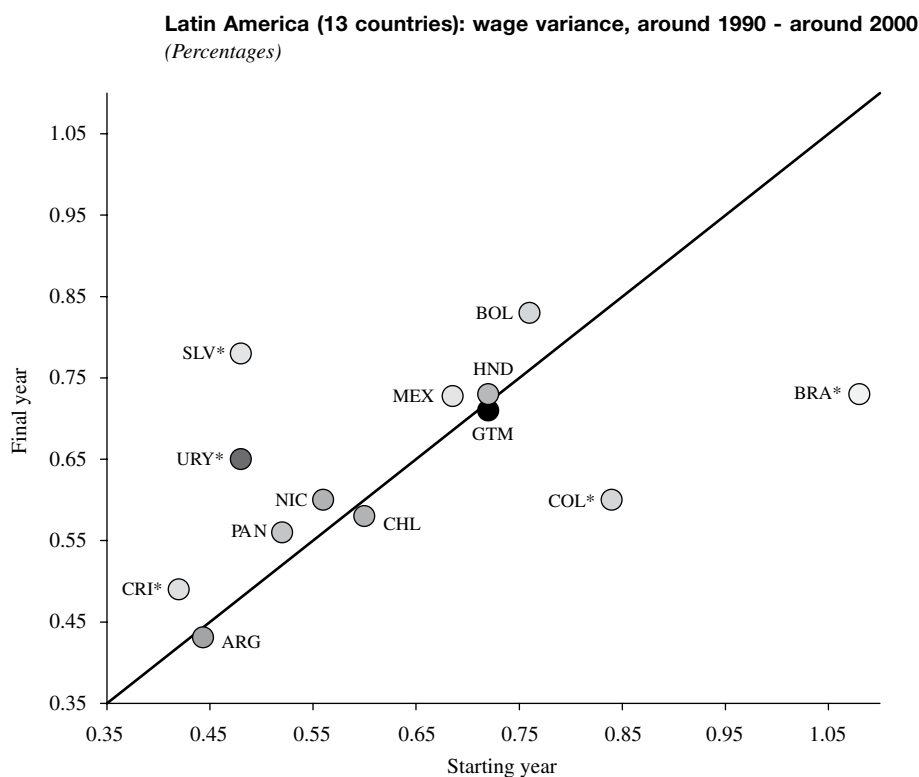
The information used in this report was provided by ECLAC and corresponds to official statistics from each of the countries included in the study. The study examined 13 countries of the region, for each of which the data provided referred to urban areas and covered approximately a decade. Since the source data were drawn from official sources, they did not always share a starting or final year. The databases selected therefore corresponded to the starting year closest to 1990, with a final year around 2000.

The criteria used to examine the determinants of wage inequality supported selection of a sample that was homogenous within countries and comparable between them. Observations were selected in order

to permit analysis of the behaviour of labour-market inequality among wage workers. The informal sector, whose magnitude varies from one country to another, was excluded from the selection. The sample comprises wage workers in urban areas working as employees or labourers. Following the definitions most commonly used in Latin America, the workers included were aged between 14 and 65. In order to avoid bias introduced by life-cycle factors, part-time work and other factors, the selection was limited to “full time” workers, i.e. those working between 20 and 80 hours per week.

Figure 1 shows the behaviour of labour income variance. The horizontal axis shows the indicator for the starting year, and the vertical axis shows the measures

FIGURE 1



Source: prepared by the authors on the basis of official data from the Economic Commission for Latin America and the Caribbean (ECLAC).

BOL: Plurinational State of Bolivia; SLV: El Salvador; HND: Honduras; MEX: Mexico; GTM: Guatemala; BRA: Brazil; URY: Uruguay; NIC: Nicaragua; COL: Colombia; PAN: Panama; CHL: Chile; CRI: Costa Rica; ARG: Argentina.

* Countries whose indicators show statistically significant differences over time.

for the final year. Accordingly, inequality indicators in all the countries above (below) the 45° diagonal worsened (improved) over the 10-year period. The indicators of countries marked with an asterisk (*) show statistically significant differences over time.

Colombia and Brazil stand out as countries in which the inequality index improved considerably. Inequality levels have fallen further in Brazil than in any of the other countries. It is interesting that the two countries with the greatest inequality in 1990 achieved significant improvements in income dispersion, while the opposite occurred in countries which have traditionally been more egalitarian, such as Uruguay

and Costa Rica. These results support the hypothesis that the region's income dispersion levels tended to converge over the decade.

Table 1 provides descriptive statistics for other relevant variables, as well as the number of observations available for the adjusted sample. The levels of schooling rose in all the countries, although only slightly in the overall average.⁴ After a decade, the average number of complete years of schooling in the region rose from 9 to 10. Substantial progress was made on this front in

⁴ Measured as years of schooling completed.

TABLE 1

Latin America (13 countries): descriptive statistics and number of observations per country, around 1990 - around 2000
(Percentages)

Country	Schooling	Experience ^a	Women ^b (Percentages)	Public sector ^c (Percentages)	Size ^d	Observations ^e
Starting year:						
Argentina	10.6	19.4	36	...	4.1	2 726
Bolivia (Plurinational State of)	10.8	16.4	28	...	5.2	3 729
Brazil	6.9	17.7	39	...	4.8	66 515
Chile	11.2	17.4	32	...	4.7	14 120
Colombia	9.3	17.1	37	16	5.1	15 361
Costa Rica	9.6	16.9	34	37	4.9	3 119
El Salvador	9.2	16.2	36	...	5.0	4 137
Guatemala	7.0	17.5	36	22	5.6	4 111
Honduras	7.6	17.0	30	25	5.9	4 117
Mexico	8.5	17.7	31	...	5.6	8 218
Nicaragua	7.8	17.3	35	...	6.0	1 814
Panama	11.0	18.2	40	39	5.0	4 029
Uruguay	8.9	22.1	41	31	4.1	7 956
Average	9.1	17.8	35	28	5.1	
Standard deviation	1.5	1.5	4	9	0.6	
Final year:						
Argentina	11.0	19.6	40	...	4.0	4 554
Bolivia (Plurinational State of)	10.9	16.5	32	...	4.9	1 141
Brazil	8.8	17.7	38	...	4.0	81 851
Chile	12.0	19.1	35	15	4.3	34 672
Colombia	11.2	17.1	43	17	4.6	83 510
Costa Rica	10.3	18.1	37	27	4.5	4 544
El Salvador	9.9	16.7	36	...	4.7	5 437
Guatemala	9.5	13.7	38	14	5.2	1 588
Honduras	8.6	15.7	39	18	5.3	10 420
Mexico	10.1	18.2	38	...	4.7	18 373
Nicaragua	7.8	17.3	35	...	6.0	2 228
Panama	11.9	18.3	39	31	4.5	6 819
Uruguay	10.2	22.3	44	27	3.9	14 109
Average	10.2	17.7	38	21	4.7	
Standard deviation	1.3	2.1	3	7	0.6	

Source: prepared by the authors on the basis of official data from the Economic Commission for Latin America and the Caribbean (ECLAC).

^a Refers to potential experience.

^b Refers to the percentage of women among total employed and among workers in the formal labour market.

^c Refers to percentage of the total employed and public-sector workers.

^d Refers to the number of persons residing in the households.

^e Refers to the number of observations available after adjustment of the sample.

Brazil, Colombia and Guatemala, which each gained approximately two full years of schooling.

On average, potential experience—defined by age, years of schooling and age at admission to the first year of primary education—did not change significantly in the 10 years (at 18 years for both the starting and final year).⁵ Conversely, the number of persons in the household fell in all the countries examined, with the exception of Guatemala. This is consistent with the demographic transition under way in the region.⁶

The available literature also indicates that women's participation in the labour market has risen considerably in Latin America. The participation rate of women classified as poor rose by seven percentage points, while the rate for non-poor women rose four points. The male participation rate held relatively steady, regardless of poverty status (ECLAC, 2003). These figures are consistent with the information shown in table 1. After 10 years, the proportion of women wage-earners rose to almost 40% of all working-age women, with the largest changes in this respect occurring in Honduras and Colombia. Women's rising participation in the labour market may also be attributed to cultural changes benefitting women and encouraging their integration into economic activities.

⁵ Age at admission to the first year of primary education varies from 6 to 7, depending on the country.

⁶ According to the classification of the Latin American and Caribbean Demographic Centre (CELADE) – Population Division of ECLAC, Brazil, Argentina, Chile and Costa Rica are the countries furthest ahead in the demographic transition.

Lastly, in the countries with information available, public-sector workers decreased from 28% to 21% of the sample. The largest drops in this variable occurred in Costa Rica, Guatemala and Panama. In part, this decline has to do with structural reforms privatizing activities which were previously the domain of the public sector.

Lastly, the annex provides information on the sectors of economic activity, corresponding to manufacturing, construction, commerce, transport, financial establishments, services and public administration and defence.⁷ Agriculture, mining and electricity, gas and water supply are grouped into a single category. "Other activities" includes teaching, domestic service in private households, and offshore organizations and entities.⁸ Annex tables A-1 and A-2 show that the share of each branch of activity has remained relatively stable over the 10-year period. There was almost no change in the sectors of agriculture, construction, transport and financial establishments. Among the largest sectors, the share of commerce in total activity rose 5%, while that of manufacturing fell back moderately.

⁷ These sectors of economic activity were selected because they are homogenous in most of the countries in the sample.

⁸ These two categories are grouped this way because their component activities account for very little weight in the total and are uncommon in the databases.

IV Methodology

The methodology for measuring which variables account for wage inequality is based on the Mincer theoretical model (1974). In this human capital model, a semilogarithmic wage equation is estimated in which the dependent variable is defined as the logarithm of an individual's hourly wage. The set of explanatory variables comprises years of schooling, work experience and work experience squared. Since there are no measurements of actual experience, this is replaced in the specification by a proxy variable: potential experience.

Dummy variables are also used to control for differences generated by the fact that work is carried out in different sectors of the economy.⁹ Manufacturing

⁹ Based on the assumption that the labour market is competitive and workers are paid a wage equal to the value of their marginal output, which depends on their own observable and measurable characteristics. However, the model does not consider other (non-observable) variables which affect people's wages, such as intelligence, preferences and so forth.

is taken as a reference sector, because it absorbs a large number of formal-labour-market workers in all the Latin American countries. Where the data allow, a dichotomous variable was also added for employment in the public sector.¹⁰

The equation to be estimated is expressed as follows:

$$\text{Ln}(W) = \sum_{j=1}^{J+2} \beta_j \cdot z_j = b' \cdot Z \quad [1]$$

where β_j are parameters and z_j correspond to the explanatory variables included in equation [1]. The decomposition for measuring what variables account for wage inequality is performed on the basis of [1]. Hourly wage log variance is then used as a measure of inequality.

Then, according to the theorem of Mood, Graybill and Boes (1974), we obtain:¹¹

$$\text{Cov}(\sum_{j=1}^{J+2} \beta_j \cdot z_j, \text{Ln}(W)) = \sum_{j=1}^{J+2} \text{Cov}(\beta_j \cdot z_j, \text{Ln}(W))$$

Given that the left side of the above equation corresponds to the covariance of $\text{Ln}w$ with itself, this is the variance of $\text{Ln}w$; therefore:

$$\sigma^2(\text{Ln}(w)) = \sum_{j=1}^{J+2} \text{Cov}(\beta_j \cdot z_j, \text{Ln}(w)) \quad [2]$$

Division of equation [2] by $\sigma^2(\text{Ln}w)$ gives the expression:

$$100\% = \sum_{j=1}^{J+2} \frac{\text{Cov}(\beta_j \cdot z_j, \text{Ln}(w))}{\sigma^2(\text{Ln}(w))} = \sum_{j=1}^{J+2} S_j$$

where each S_j is given by: $S_j = \text{Cov}(\beta_j \cdot z_j, \text{Ln}w) / \sigma^2(\text{Ln}w)$

Using the property that:

$$\text{Corr}(\beta_j \cdot z_j, \text{Ln}w) = \text{Cov}(\beta_j \cdot z_j, \text{Ln}w) / (\sigma_{\beta_j z_j} \cdot \sigma_{\text{Ln}w})$$

and combining these expressions, we obtain:

$$S_j = \frac{\text{Cov}(\beta_j \cdot z_j, \text{Ln}w) / \sigma^2(\text{Ln}w)}{\beta_j \cdot \sigma(z_j) \cdot \text{Corr}(z_j, \text{Ln}w)} = \frac{\text{Cov}(z_j, \text{Ln}w)}{\sigma(z_j) \cdot \sigma(\text{Ln}w)} \quad [3]$$

Therefore:

$$100\% = \sum S_j(\text{Ln}w) \quad [4]$$

where S_j represents the proportion in which each factor (independent variable in the regression) accounts for the inequality (variance) of the wage logarithm at a given point in time.¹²

Expression [3] is useful because it shows that each factor can, to some extent, be decomposed intuitively. For example, if years of schooling explain a large proportion of wage inequality, this may be the result of: (i) a high coefficient of education in the log wage regression; (ii) a high standard deviation in years of schooling; or (iii) a high correlation between education and wages.¹³

Where inequality has risen between two points in time, i.e. where the variance of the wage logarithm has increased, it is necessary to identify the explanatory factors whose contribution to that variance has risen. By

¹² In this model, when the variable (Z) is included in linear and quadratic terms, the S_j corresponding to the “generic” variable “ Z ” is determined by the joint effect of variables Z and Z^2 , which is obtained from the sum of the S_j of each. In turn, where the wage equation includes a generic variable like “manufacturing”, composed of a sum of dummy variables for the sectors (Ind1, Ind2, etc.), the simple sum of the S_j of each gives a good measure of the relative importance of “manufacturing” in inequality levels.

¹³ In relation to points (i) and (iii), although the correlation between the explanatory variables and the dependent variable (hourly wage logarithm) is known to be closely associated with the coefficient of the estimation for each of the variables, these do not necessarily move in a similar manner. In particular, the definition of the education coefficient in the wage regression depends on the covariance of the variable “years of schooling” with the wage logarithm (which, in turn, has to do with the correlation between these variables) and the variance of “years of schooling”. Accordingly, variation in the education coefficient in the wage regression between two points could result from different combinations of variations in the factors involved. For example, the education coefficient could rise while the correlation between years of schooling and the wage logarithm remains constant and the variance of years of schooling decreases.

¹⁰ This information was available for only 7 of the 13 countries in the sample.

¹¹ This theorem is as follows: let $Z1... Zj$ and $Y1... Ym$ be two sets of random variables and $a1... aj$ and $b1... bm$ two sets of constants. Then, $\text{cov}[\sum aj Zj; \sum bm Ym] = \sum \sum aj bm \text{cov}[Zj, Ym]$. Applying the theorem for a single random variable $Y = \sum aj Zj$, gives: $\text{cov}[\sum aj Zj; Y] = \sum \text{cov}[aj Zj; Y]$ (see demonstration in Mood, Graybill and Boes, 1974).

definition, those factors have made a positive contribution to growth in inequality. Where inequality has decreased, the factors whose contribution to wage logarithm variance has declined must be identified. The factors which

show the largest decrease (in absolute terms) and those which have made the largest percentage contribution to inequality are interpreted as those which have had the greatest hand in the retreat of inequality.

V

Results

1. What factors help to explain inequality?

In this section, income equation estimates are used to account for the determinants of wage dispersion.

The results are analysed from the perspective of a simple theoretical model of labour supply and demand at different levels of human capital (Katz and Murphy, 1992), which helps to explain the changes in wage inequality associated with education and other factors. In this model, an increase in schooling can raise inequality levels if it occurs asymmetrically in the population, between target groups or across the income distribution. For example, if the average rise in a country's schooling levels is concentrated in tertiary education, which offers high economic returns to which only a small fraction of high-income households have access, then average education levels and inequality would both increase. Thus, the asymmetric increase in education would be widening inequality. From the point of view of demand, if demand for the most skilled labour rises and the supply of that category of labour is smaller than other educational groups, the returns associated with this level of education tend to be higher, making this an explanatory factor in the increase in inequality. This conceptual model is used to explain the results for S_j , using data on the returns, levels and dispersion of education to support the explanation in each country.

The evidence shows that, of the variables included in the estimation discussed in the previous section, education plays the greatest role in determining inequality. The following section therefore examines education's contribution to wage inequality, first by means of a static analysis on the basis of estimations around the year 2000 and, second, by using a dynamic analysis to look at variations in the explanatory capacity of schooling in wage dispersion over the decade. Lastly, the role of other factors in inequality—such as gender, experience and the economic sector in which individuals work—is discussed, looking at how these changed over a decade.

2. Education I: static analysis

Table 2 shows (in decreasing order) the contribution of schooling to wage dispersion for all the countries around 2000. It also includes columns for returns on schooling, the dispersion of years of schooling and the correlation between labour income and years of schooling. As will be recalled, these are the variables which determine the magnitude of education's contribution to wage inequality (see equation [3]).

The evidence indicates that around the year 2000 education accounted for approximately 38% of wage dispersion in Latin America. Table 2 also shows that, on average, the years of schooling variable has a standard deviation of over four years. This suggests that, despite the increase in years of schooling in the region,¹⁴ the distribution of education remains asymmetric.

The contribution of education to inequality (S_j) is closely associated with the return on education. In fact, the correlation between education's contribution to inequality and the returns on schooling is around 0.68. Table 2 shows that the countries with the highest S_j for schooling are also those that show high returns on education. Schooling makes a particularly significant contribution to inequality in Guatemala, Chile, Brazil and Honduras.

In Guatemala and Honduras, this may be attributed to the still low levels of education in the workforce (around 9 years of schooling on average), which implies that those countries still have high relative demand for workers of average skills levels. In addition, schooling in these countries is more dispersed than the regional average, which suggests an asymmetric distribution of education in the workforce. Schooling is therefore associated with

¹⁴ It will be recalled that the average number of completed years of schooling in the region around 2000 was approximately 10 (see table 1).

TABLE 2

Latin America (13 countries): wage inequality and contribution of schooling, around 1990 - around 2000
(Percentages)

Country	Variance (LnW^a)	S_j final year ^b	Return on schooling	Deviation schooling	Correlation (LnW^a , schooling)
Guatemala	0.71	0.53	0.15	4.76	0.62
Chile	0.58	0.48	0.18	3.77	0.55
Brazil	0.73	0.46	0.17	4.14	0.55
Honduras	0.73	0.45	0.14	4.31	0.62
Colombia	0.60	0.42	0.11	4.69	0.62
Costa Rica	0.49	0.42	0.13	3.95	0.59
Nicaragua	0.60	0.37	0.14	4.23	0.50
Bolivia (Plurinational State of)	0.83	0.36	0.14	4.33	0.54
Mexico	0.56	0.31	0.14	4.15	0.41
Panama	0.73	0.31	0.13	4.22	0.50
El Salvador	0.78	0.28	0.10	4.72	0.51
Uruguay	0.65	0.27	0.12	3.76	0.48
Argentina	0.43	0.24	0.11	3.67	0.40
Average	0.64	0.38	0.14	4.20	0.53
Standard deviation	0.11	0.09	0.02	0.36	0.07

Source: prepared by the authors on the basis of official data from the Economic Commission for Latin America and the Caribbean (ECLAC).

^a LnW corresponds to the natural logarithm of hourly wages.

^b S_j refers to the contribution of schooling to inequality.

high average returns (above the regional average), which increases its explanatory power in inequality.

In Chile and Brazil, the data suggest that the reasons for schooling's high contribution to inequality have to do instead with high returns on tertiary education.¹⁵ This fact is also widely documented in the literature (for Chile, see Contreras 1996, 2002a, 2002b; for Brazil, see World Bank, 2004) and speaks of a high demand for skilled workers in relation to the rest of the population, which explains the importance of education in wage dispersion.

Countries such as Argentina and Uruguay show the lowest returns and the smallest S_j in the region. These countries' workforces have levels of education similar to or higher than the regional average, and low levels of schooling dispersion. Overall, this points to a relatively homogenous workforce, moderate premiums on education and a lower explanatory power for education in wage inequality.

3. Education II: dynamic analysis

A dynamic analysis serves to ascertain which variables (returns, dispersion and correlation) are linked with changes in the contribution of education to inequality.

Table 3 shows the contribution of schooling to wage dispersion. The hourly wage logarithm variance is given along with the findings for the contribution of education (S_j) to labour income inequality. In both cases, the table shows the information for the starting and final years, and the variance after a decade.

After a decade, the average contribution of schooling to labour income dispersion in Latin America rose from 35% to 38%. Table 4 shows which factors appear to account for this average increase in education S_j and its unevenness between the countries of the region.

It is worth recalling that the variation in S_j is interpreted differently depending on whether wage income distribution narrowed or broadened over the period. Accordingly, two groups of countries are identified in the analysis, by the direction of the change in the logarithm of wage income.

In countries where inequality increased between two points in time, a proportionally larger contribution of schooling to variance of the wage logarithm means that education has contributed positively to the greater inequality. This first group of countries (in descending order by magnitude of education S_j for the final year) comprises Honduras, Costa Rica,¹⁶ Nicaragua, the

¹⁵ Returns per cycle of education are given in annex table A-4.

¹⁶ According to the available literature, wage inequality in Costa Rica rose between 1992 and 1999 (Gindling and Trejos, 2003).

TABLE 3

Latin America (13 countries): wage inequality and contribution of education, around 1990 - around 2000
(Percentages)

Country	Variance of Lnw^a			Contribution to dispersion		
	Starting year	Final year	Variation ^b	S_j^c Starting year	S_j^c Final year	Dif ^d
Honduras	0.72	0.73	Rises	0.46	0.45	-0.01
Costa Rica	0.42	0.49	Rises ^e	0.38	0.42	0.03
Nicaragua	0.56	0.60	Rises	0.30	0.37	0.07
Bolivia (Plurinational State of)	0.76	0.83	Rises	0.27	0.36	0.09
Panama	0.52	0.56	Rises	0.39	0.31	-0.08
Mexico	0.69	0.73	Rises	0.25	0.31	0.06
El Salvador	0.48	0.78	Rises ^e	0.36	0.28	-0.06
Uruguay	0.48	0.65	Rises ^d	0.23	0.27	0.04
Guatemala	0.72	0.71	Falls	0.45	0.53	0.08
Chile	0.60	0.58	Falls	0.37	0.48	0.11
Brazil	1.08	0.73	Falls ^e	0.48	0.46	-0.02
Colombia	0.84	0.6	Falls ^e	0.33	0.42	0.09
Argentina	0.44	0.43	Falls	0.36	0.24	-0.12
Average	0.64	0.64	Constant	0.35	0.38	0.04
Standard deviation	0.19	0.11	Falls	0.09	0.09	0

Source: prepared by the authors on the basis of official data from the Economic Commission for Latin America and the Caribbean (ECLAC).

^a LnW corresponds to the natural logarithm of hourly wages.

^b Refers to the sign of the subtraction of the final year from the starting year, to give the variance LnW .

^c S_j refers to the contribution of schooling to inequality.

^d Dif refers to the difference between returns in the final and starting years.

^e The variation between the two years is significant upon application of the bootstrap parameter estimation technique, with 95% confidence intervals and 100 iterations.

TABLE 4

Latin America (13 countries): contribution of schooling to wage dispersion and its components over time, around 1990 - around 2000
(Percentages)

Country	Contribution to dispersion			Return on education			Dispersion of years of education			Correlation between education and income		
	Starting	Final	Dif ^a	Starting	Final	Dif ^a	Starting	Final	Dif ^a	Starting	Final	Dif ^a
Honduras	0.46	0.45	-0.01	0.15	0.14	-	4.31	4.31	0	0.61	0.62	+
Costa Rica	0.38	0.42	0.03	0.11	0.13	+	4.01	3.95	-	0.57	0.59	+
Nicaragua	0.30	0.37	0.07	0.14	0.14	0	4.04	4.23	+	0.41	0.50	+
Bolivia (Plurinational State of)	0.27	0.36	0.09	0.12	0.14	+	4.71	4.33	-	0.42	0.54	+
Panama	0.39	0.31	-0.08	0.14	0.14	0	4.23	4.15	-	0.49	0.41	-
Mexico	0.25	0.31	0.06	0.13	0.13	0	3.96	4.22	+	0.41	0.50	+
El Salvador	0.36	0.28	-0.06	0.10	0.10	0	4.78	4.72	-	0.54	0.51	-
Uruguay	0.23	0.27	0.04	0.12	0.12	0	3.59	3.76	+	0.39	0.48	+
Guatemala	0.45	0.53	0.08	0.13	0.15	+	4.71	4.76	+	0.63	0.62	-
Chile	0.37	0.48	0.11	0.16	0.18	+	3.88	3.77	-	0.47	0.55	+
Brazil	0.48	0.46	-0.02	0.19	0.17	-	4.19	4.14	-	0.61	0.55	-
Colombia	0.33	0.42	0.09	0.15	0.11	-	3.87	4.69	+	0.51	0.62	+
Argentina	0.36	0.24	-0.12	0.12	0.11	-	3.71	3.67	-	0.51	0.40	-
Average	0.35	0.38	0.03	0.14	0.14	+	4.16	4.22	+	0.52	0.54	+
Standard deviation	0.09	0.09	0.08	0.03	0.02	-	0.38	0.35	-	0.08	0.08	0

Source: prepared by the authors on the basis of official data from the Economic Commission for Latin America and the Caribbean (ECLAC).

^a Dif refers to the difference between returns in the final and starting years.

Plurinational State of Bolivia, Panama, Mexico, El Salvador and Uruguay.

Of these countries, the contribution of education to inequality increased the most in the Plurinational State of Bolivia. The return on schooling also rose in this country, where it breaks down into a sharp climb in the premium on the last cycle of education and slight drops in the returns on the primary and secondary cycles. As well as these variations in the premium on education, there has been a major shift in the correlation between income and years of schooling completed in the Plurinational State of Bolivia. The higher relative demand for skilled workers (given the increased returns on tertiary education) leads, in this case, to greater wage inequality.

The explanatory power of education increased not only in the Plurinational State of Bolivia, but also in Nicaragua, Mexico¹⁷ and Uruguay. Two effects were combined in these three countries: rising returns on higher education and heavily falling premiums in primary and secondary schooling. For example, the return on the secondary cycle fell from 15% to 10% in Nicaragua and from 15% to 11% in Mexico. In Uruguay the primary cycle lost three percentage points of return. In addition, associated with their high DS_j is the fact that these three countries are the only ones in this first group to have seen an increase in dispersion in years of education. Here, the higher inequality seems to be driven by changes in the labour force, particularly by expansion in the supply of workers with intermediate skills levels, combined with an asymmetric rise in educational level.

In Costa Rica the variation in education's contribution to inequality is almost equivalent to that of Uruguay. Here, however, the return on the first two cycles of education remained relatively stable.¹⁸ In this case, the greater explanatory power of the schooling factor in inequality lies in the increase in returns on tertiary education, similarly to the Bolivian example.

In Honduras the contribution of education to inequality varied only slightly. This reflected minor changes in the premium on education, a modest variation in the correlation between income and years of schooling completed and no change in the dispersion of years of schooling. These marginal variations suggest minor shifts in the balance between relative supply and demand for different skills levels and, hence, in inequality levels.

This group is completed by El Salvador and Panama, whose S_j fell considerably. The average returns on education remained constant over time in these countries, however, and schooling's decline in importance as an explanatory factor in inequality seems to have to do instead with improvements over time in its distribution. Lastly, in both cases education does not account for as much of the variance in income as it did 10 years earlier. Other factors appear to play an important role here, as will be discussed later.

In those countries where inequality decreased, the factors to observe are those whose contribution to wage logarithm variance has declined (i.e. negative ΔS_j). The factors showing the greatest reduction (in absolute terms) and those making the largest percentage contribution to inequality are those with the greatest role in reducing inequality. The group of countries in which inequality declined consists of Guatemala, Chile, Brazil, Colombia and Argentina.

In Argentina the explanatory power of education in inequality fell sharply, by 12 percentage points. This mainly reflects a weakening of the correlation between income and years of schooling completed. Underlying this may be an effect inherent to a change in returns per cycle of education. In fact, the premium on education fell at every level of education in Argentina. This may be correlated with the severe crisis which broke out in the country in 2000, which could have affected the price of the labour factor at different levels of schooling.

Colombia shows an interesting pattern. The average return on schooling in the country fell by four percentage points, which is associated with a major expansion in educational levels (from 9 to 11 years). The augmented explanatory power of education in this case is driven by increased correlation between income and years of schooling, and particularly by a sharp rise in dispersion in years of education. The fact that education has gained explanatory power in wage inequality seems to be due to the steep fall in returns on primary education (from 12% to 5%), unlike the situation in other countries, where the detonator is rising returns on higher education.

Brazil registers a slight drop in the contribution of education to inequality over time. Here almost all the indicators which make up the education S_j have declined. Interestingly enough, Brazil was one of the few countries in which the returns on the first two cycles of education fell, but the premium on the tertiary cycle did not rise (since it was already quite high). Brazil was also the country to see the greatest increase in average years of schooling in the region. Although it remains a highly unequal country, these seem to be the main

¹⁷ This is in line with the findings of De Hoyos (2006).

¹⁸ This is consistent with the findings of Gindling and Trejos (2003), to the effect that the downtrend observed in returns on education in Costa Rica in the 1980s came to a halt in 1990s.

factors making completed years of schooling work in favour of better distribution of wage income.

Lastly, in Guatemala and Chile education's contribution to inequality rose substantially (by 8 and 11 percentage points, respectively). The results suggest that this is due to the jump in the returns on education in both countries. Again, when these returns are broken down, it appears that the premium on the tertiary cycle plays an important role. In Guatemala the return on this cycle climbed from 11% to 16%. In Chile, although the increase is smaller (from 22% to 24%), the return remains high. In this case, one percentage point is likely to have a stronger impact on inequality.

Although the S_j are constructed on average respective returns (as well as other relevant variables), these results point to the existence of a close relationship between schooling's contribution to inequality and the premium per cycle of education. Consistently with the increase in coverage, the returns associated with the first two cycles lose power to account for inequality. Conversely, the returns on tertiary education appear to gain importance over time. According to the theoretical model, this reflects an increase in relative demand for skilled workers which—added to asymmetry in schooling distribution—is associated with higher levels of inequality. In the long term, however, greater coverage of the tertiary education cycle should also reduce its returns, as seems to have occurred with the primary and secondary cycles.

Accordingly, in order to mitigate labour income inequality, education policy should be directed towards

broadening access to tertiary education, with an emphasis on the poorest population segments. This for at least two reasons. First, the fact that this cycle yields high returns indicates that there is great scope for investment in areas in which those returns can be absorbed. This could help to meet the increased demand for workers with tertiary education. And, second, the greater supply of education in the region means that there should be an ever increasing number of individuals with complete secondary education who are potentially apt for tertiary education.

(a) *Other causes of wage inequality*

Tables 5 and 6 summarize the contribution of all the model's explanatory factors to inequality for the starting and final years. A final column shows the total percentage of inequality which the model is capable of explaining. The role played by other variables in the model and their explanatory power help to interpret the different results for S_j .

For example, the proportion of inequality explained by education rose in both Chile and the Plurinational State of Bolivia. But inequality fell in the first country and rose in the second. Consequently, in Chile other variables are influencing the drop in inequality, such as the role of women's labour force participation and the value attributed to work experience, which are more significant than in the Plurinational State of Bolivia.

Another example has to do with El Salvador and Panama, where education does not account for the increase in income variance to the same degree as it did 10 years

TABLE 5

Latin America (13 countries): contribution of explanatory factors to wage inequality, starting year around 1990
(Percentages)

Country	Schooling	Women	Experience	Experience-2	Public sector	Sectors	Total
Argentina	35.9	-0.3	9.1	-2.8	...	2.3	44.2
Bolivia (Plurinational State of)	26.6	0.2	10.2	-1.5	...	0.8	36.3
Brazil	47.7	2.6	5.6	1.3	...	3.3	60.5
Chile	37.1	0.4	4.5	1.4	...	1.0	44.3
Colombia	32.9	-0.3	-0.7	1.9	2.6	0.8	37.3
Costa Rica	38.4	0.4	6.4	-0.5	4.7	0.6	50.0
El Salvador	35.5	0.4	0.2	1.4	...	8.4	45.9
Guatemala	45.0	0.6	-4.2	4.4	12.7	0.8	59.2
Honduras	46.0	-0.6	10.0	-2.6	4.8	0.1	57.8
Mexico	25.4	1.2	11.8	-1.5	...	0.5	37.5
Nicaragua	30.4	-0.1	4.1	0.5	...	1.2	36.2
Panama	39.0	-0.8	16.7	-4.3	1.6	2.6	54.9
Uruguay	23.3	3.1	23.7	-10.4	1.8	1.3	42.8
Average	35.63	0.52	7.49	-0.98	4.70	1.82	46.69
Standard deviation	7.83	1.17	7.44	3.68	4.16	2.18	8.98

Source: prepared by the authors on the basis of official data from the Economic Commission for Latin America and the Caribbean (ECLAC).

TABLE 6

Latin America (13 countries): contribution of explanatory factors to wage inequality, final year around 2000
(Percentages)

Country	Schooling	Women	Experience	Experience-2	Public sector	Sectors	Total
Argentina	23.8	0.7	7.8	-2.8	...	1.6	31.1
Bolivia (Plurinational State of)	35.9	0.5	10.1	-0.8	...	3.2	48.9
Brazil	45.6	-0.6	11.7	-2.2	...	3.8	58.3
Chile	48.3	-0.3	-1.2	3.6	...	0.9	51.3
Colombia	42.0	-0.3	3.1	0.6	4.4	2.5	52.3
Costa Rica	41.7	-0.2	5.1	-0.8	2.0	2.2	50.0
El Salvador	28.0	-0.2	0.8	1.1	...	7.4	37.2
Guatemala	52.6	0.4	7.1	0.7	3.4	0.4	64.7
Honduras	44.6	-0.5	6.0	-1.0	3.5	1.1	53.6
Mexico	31.0	0.6	6.9	0.8	...	0.7	40.0
Nicaragua	37.5	0.5	2.0	1.5	...	0.8	42.3
Panama	31.2	0.1	13.3	-5.2	2.5	2.0	43.9
Uruguay	26.8	0.2	11.3	-3.7	3.1	1.9	39.6
Average	37.62	0.07	6.46	-0.63	3.15	2.20	47.17
Standard deviation	9.01	0.44	4.45	2.39	0.84	1.87	9.25

Source: prepared by the authors on the basis of official data from the Economic Commission for Latin America and the Caribbean (ECLAC).

ago. In these cases, the model has less explanatory power and, accordingly, education continues to contribute significantly to explaining inequality.

Around 1990, the model explained, on average, 46.7% of total wage variance. Ten years later, it explained close to 47.1%. In other words, the evidence indicates that the model's explanatory power is practically the same after a decade.¹⁹ Interestingly, although the results show the return on education standing still over the decade (a constant 14%), schooling is precisely the factor to have shown the largest gain in explanatory power (2 percentage points).

This means that, after a decade, education remains the most important factor in explaining income inequality in the region's formal labour market. The other variables show changes that may indicate tendencies, but are more moderate.

(b) *A gender perspective*

The results of wage equation estimations showed evidence of a significant gender wage gap in all the countries included in the sample.

The good news, however, is that after 10 years, this wage gap narrowed (in absolute terms) on average for

the region. The contribution of the gender gap to wage inequality is presented here. Tables 5 and 6, which show the contribution to inequality of all the explanatory factors for the starting and final years, offer some findings associated with women's participation in inequality.

Table 5 shows that women's participation in the labour market contributed to inequality, albeit by a small magnitude (0.52%). In table 6, however, it is apparent that the contribution of gender not only remains small but is almost nil (0.07%) by around 2000.

In other words, women's participation through the income they generate widens wage dispersion less than it did a decade earlier. That is, the increase in women's participation in the labour market and the gender shifts in that market have had an equalizing effect on wage distribution. This result may reflect the fact that the greatest increase in women's labour market participation occurred in lower-income sectors.

(c) *Potential experience and economic sectors*

According to the results set forth in tables 5 and 6, after education, the variable that contributes most to explaining wage variance is potential experience. This variable's explanatory power dropped slightly, by around one percentage point.²⁰

¹⁹ The results are consistent with those obtained by De Hoyos (2006) for Mexico, with 50% of wage variance unexplained by the model around 2006; by Gindling and Trejos (2003) for Costa Rica with 50% for 1990 and 48% for 1999; and by Contreras (2002a) for Chile, with 60% for 1992.

²⁰ Since the potential experience variable was included in linear and quadratic terms in the wage estimations, the corresponding S_j is obtained from the sum of the S_j of the two coefficients.

This is consistent with two of the results obtained earlier. First, on average, experience shows almost nil variation in levels for the region. Second, according to the Mincer estimates (1974) shown above, the premium on potential experience did not change either after 10 years.

It may also be ascertained from the results that sector of economic activity accounts for almost two percentage points of labour income variance. Again, this lines up with the fact that the coefficient associated with each of the economic sectors has remained relatively stable for the region. The low incidence of economic sectors as an explanatory variable in inequality suggests that

inequality is fairly stable from one sector to another. In other words, there are factors that cut across sectors which explain inequality to a greater degree than factors within each of the specific sectors.

Lastly, the significance of working in the public sector may also be examined, even though this variable is available for only some of the countries included in the full sample. The relative importance of this variable in explaining wage dispersion seems to have fallen (from 5% to 3%). In reconciling this result with the increased return on work in the public sector as shown in the estimates, it must be recalled that it is heavily influenced by the large drop in Guatemala (from 13% to 3%).

VI

Concluding remarks

Latin America shows a markedly unequal income distribution over time. This work aims to help account for the determinants of wage distribution in the region, using comparable databases for a broad sample of countries. Independently of idiosyncratic differences among countries, the results of this study yield information about levels of inequality, changes during the 1990s and their determinants for the region. The main conclusions arising from this study are set forth below.

First, after a decade, the region experienced a phenomenon of convergence between countries. Inequality indicators, such as the return on factors like experience and gender, show more uniform behaviour.

Second, it is interesting to note the unevenness of gender gaps and their evolution over time. Women in the region receive less income than men with similar levels of schooling and experience. Yet this gap narrowed after a decade. In the 1990s women contributed to greater wage inequality, albeit in small magnitude, whereas that contribution was almost nil by the end of the period examined.

Public policies for equity should consider the potential effects of changes in women's participation in the labour market. It is important to promote female labour-market participation, especially by low-income women, for example through efforts to create more jobs with flexible working hours, child-care services, or both. However, such a policy must also go hand in hand with measures to ensure that jobs satisfy at least threshold levels of social security and protection.

Third, returns on education in Latin America remained relatively stable over a period of 10 years, reflecting two opposing effects. On the one hand, policies implemented in the region to ensure universal access to schooling have lowered the returns on secondary education. On the other, the premium on tertiary education has risen as demand for skilled workers has expanded.

Lastly, on the basis of the methodology used in this study, the explanatory power of the model was found to have remained practically constant over the decade examined. This outcome masks a number of changes, however. Schooling explained around 35% of wage dispersion in Latin America in the 1990s, but this rose to 38% after 10 years. In other words, education has become even more important in accounting for wage inequality in the formal labour market. The other variables show changes which may reflect trends, but are nevertheless small.

In order to achieve a more equitable distribution of labour income in Latin America, it would seem essential to move on from secondary education coverage towards broader access to tertiary education. This should be treated as a long-term strategy. At first, higher levels of tertiary education may be associated with increased inequality, owing to high relative demand for skilled workers and asymmetric distribution of schooling. But as the labour supply becomes more skilled, two effects should materialize. First, the premium on tertiary education should diminish as hitherto rising demand is met. And,

second, that premium should be better distributed among the population. Consistently with this, where access to tertiary education remains exclusive, gains in education will broaden inequality, but where tertiary education becomes more widely accessible, the opposite will occur.

Accordingly, future investments in education should aim to raise levels of education beyond secondary school, which will call for a particular emphasis on efforts to facilitate access to tertiary education for the poorest segments of the population.

ANNEX

TABLE A-1

Latin America (13 countries): economic sectors by country, starting year around 1990
(Percentages)

Country	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	Total
Argentina	1	23	5	18	9	12	13	8	10	100
Bolivia (Plurinational State of)	7	16	9	9	9	4	46	...	...	100
Brazil	7	23	6	12	5	4	30	9	4	100
Chile	4	26	9	17	10	11	24	...	...	100
Colombia	3	29	6	20	7	9	26	...	...	100
Costa Rica	6	24	5	18	5	7	36	...	...	100
El Salvador	6	27	9	19	6	6	9	10	7	100
Guatemala	12	21	7	14	5	4	38	...	...	100
Honduras	11	21	11	16	6	4	32	...	...	100
Mexico	6	24	8	15	4	3	40	...	...	100
Nicaragua	9	17	7	16	7	4	40	...	...	100
Panama	9	14	3	25	6	8	11	15	11	100
Uruguay	3	23	6	14	6	5	43	...	...	100
Average	6.5	22.0	6.9	16.5	6.8	6.5	29.0	10.5	8.0	
Standard deviation	3.4	4.5	2.2	4.1	1.7	2.9	12.6	3.1	3.2	

Source: prepared by the authors on the basis of official data from the Economic Commission for Latin America and the Caribbean (ECLAC).
Notes:

[A] Agriculture, mining, and electricity, gas and water supply.

[B] Manufacturing.

[C] Construction.

[D] Commerce.

[E] Transport and communications.

[F] Financial establishments.

[G] Services.

[H] Public administration and defence.

[I] Other activities.

TABLE A-2

Latin America (13 countries): economic sectors by country, final year around 2000
(Percentages)

Country	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	Total
Argentina	2	19	5	21	10	8	13	9	12	100
Bolivia (Plurinational State of)	5	20	11	15	9	8	10	8	14	100
Brazil	6	20	6	23	6	11	4	10	15	100
Chile	10	16	9	19	9	10	27	...	...	100
Colombia	8	21	5	23	6	9	...	28	...	100
Costa Rica	5	19	6	25	6	11	10	8	11	100
El Salvador	4	25	9	22	7	9	9	9	6	100
Guatemala	3	24	5	27	4	3	21	12	...	100
Honduras	6	26	9	21	5	7	27	...	...	100
Mexico	3	23	9	17	5	...	44	...	...	100
Nicaragua	13	17	8	18	5	1	37	...	...	100
Panama	4	12	7	26	8	10	11	12	10	100
Uruguay	6	13	5	18	7	9	14	13	17	100
Average	6.0	19.3	7.1	21.5	6.8	8.0	16.6	12.1	12.1	
Standard deviation	3.1	4.4	2.1	3.6	1.9	3.1	10.0	6.2	3.6	

Source: prepared by the authors on the basis of official data from the Economic Commission for Latin America and the Caribbean (ECLAC).
Notes:

[A] Agriculture, mining, and electricity, gas and water supply.

[B] Manufacturing.

[C] Construction.

[D] Commerce.

[E] Transport and communications.

[F] Financial establishments.

[G] Services.

[H] Public administration and defence.

[I] Other activities.

TABLE A-3

Latin America (13 countries): Mincer equation coefficient corrected for each sector of the economy, around 1990 - around 2000

Country	[A]		[C]		[D]		[E]		[F]		[G]		[H]		[I]	
	Year		Year		Year		Year		Year		Year		Year		Year	
	Starting	Final	Starting	Final	Starting	Final	Starting	Final	Starting	Final	Starting	Final	Starting	Final	Starting	Final
Argentina	0.19*	0.01	0.09	-0.04	-0.15	-0.12**	0.04	-0.01	0.08*	0.04	0.04	0.04	0.16	0.13	0.06	0.05
Bolivia (Plurinational State of)	0.18*	0.32*	0.00	0.20*	0.03	-0.1	0.17	-0.07	0.29**	0.06	0.06	0.16	...	0.32	0.17	...
Brazil	-0.26**	-0.24**	-0.13	-0.14**	-0.28	-0.22**	-0.03	0.01	0.30**	0.17	-0.32	-0.15	-0.06	0.13	0.03**	-0.15
Chile	0.06**	0.05*	0.08	0.08**	-0.16	-0.13**	0.02	-0.04*	0.21**	0.03	-0.11	0.03	...	...	...	...
Colombia	0.11**	0.32**	-0.19	-0.09**	-0.05	-0.12**	-0.14	-0.03*	0.15**	0.10**	-0.04	...	...	0.04	...	...
Costa Rica	0.11*	0.21**	0.09	-0.05	0.01	-0.12**	0.14	-0.03	0.15**	0.00	0.02	-0.02	...	0.05	0.02	...
El Salvador	-0.37**	-0.38**	0.09	-0.18	0.21	-0.16	0.38	0.09	-0.04**	-0.03	0.49	0.37	0.72	0.17	0.45**	0.67
Guatemala	-0.19**	0.02	0.02	0.07	-0.09	-0.07	-0.05	0.13	0.18**	0.45	-0.09	-0.04	...	-0.01	...	...
Honduras	-0.23**	-0.56**	-0.04	-0.05*	-0.18	-0.23**	-0.08	-0.08*	0.09*	-0.01	-0.13	-0.18	...	...	...	...
Mexico	-0.03	-0.11	-0.14*	-0.05	-0.09*	-0.15**	0.10	-0.13**	...	...	-0.02	0.00	...	...	...	...
Nicaragua	0.15	0.06	0.06	0.21*	-0.06	0	0.34	0.30**	0.33**	0.49**	-0.02	-0.01	...	...	...	...
Panama	0.27**	0.14*	0.19	0.22**	-0.02	-0.12**	0.29	0.25**	0.26**	0.08*	0.08	-0.06	0.12	-0.04	-0.04	0.20
Uruguay	-0.01	-0.08*	-0.09	0.01	-0.10	-0.04	-0.09	0.12**	0.24**	-0.04	-0.13	0.13	...	0.09	...	...
Average	-0.04	-0.01	-0.04	0.03	-0.11	-0.11	0.04	0.04	0.13	0.10	-0.02	0.03	0.24	0.10	0.09	0.19
Standard deviation	0.25	0.25	0.21	0.13	0.18	0.07	0.24	0.13	0.23	0.17	0.18	0.14	0.34	0.10	0.17	0.35

Source: prepared by the authors on the basis of official data from the Economic Commission for Latin America and the Caribbean (ECLAC).

Notes: * Significant at 5%. ** Significant at 1%.

The manufacturing sector was chosen as a reference sector, because it absorbs a large proportion of formal market workers in all the countries in the region.

[A] Agriculture, mining, and electricity, gas and water supply.

[C] Construction.

[D] Commerce.

[E] Transport and communications.

[F] Financial establishments.

[G] Services.

[H] Public administration and defence.

[I] Other activities.

TABLE A-4

Latin America (13 countries): return on schooling by cycle of education, around 1990 - around 2000
(Percentages)

Country	Primary			Secondary			Tertiary		
	Starting year	Final year	Dif ^a	Starting year	Final year	Dif ^a	Starting year	Final year	Dif ^a
Argentina	0.06	0.05	-	0.12	0.10	-	0.15	0.13	-
Bolivia (Plurinational State of)	0.08	0.05	-	0.08	0.05	-	0.13	0.21	+
Brazil	0.16	0.11	-	0.21	0.17	-	0.25	0.25	0
Chile	0.08	0.09	+	0.15	0.13	-	0.22	0.24	+
Colombia	0.12	0.05	-	0.12	0.10	-	0.16	0.13	-
Costa Rica	0.07	0.05	-	0.11	0.11	0	0.11	0.16	+
El Salvador	0.07	0.07	0	0.15	0.11	-	0.15	0.18	+
Guatemala	0.10	0.09	-	0.15	0.16	+	0.11	0.16	+
Honduras	0.12	0.10	-	0.16	0.14	-	0.17	0.16	-
Mexico	0.07	0.05	-	0.15	0.11	-	0.15	0.17	+
Nicaragua	0.09	0.10	+	0.15	0.10	-	0.15	0.18	+
Panama	0.06	0.11	+	0.13	0.11	-	0.17	0.18	+
Uruguay	0.08	0.05	-	0.12	0.10	-	0.12	0.15	+
Average	0.09	0.08	-	0.14	0.12	-	0.15	0.18	+
Standard deviation	0.03	0.03	0	0.03	0.03	0	0.04	0.04	0

Source: prepared by the authors on the basis of official data from the Economic Commission for Latin America and the Caribbean (ECLAC).
Note: All coefficients are significant at 1%.

^a Dif refers to the sign (negative, positive or nil) of the difference between the value for the starting year and that for the final year.

(Original: Spanish)

Bibliography

- Acemoglu, D. (1997), "Matching, heterogeneity and the evolution of income distribution", *Journal of Economic Growth*, vol. 2, No. 1, New York, Springer.
- Alesina, A. and D. Rodrik (1994), "Distributive politics and economic growth", *Quarterly Journal of Economics*, vol. 109, No. 2, Cambridge, Massachusetts, MIT Press.
- Atkinson, A. (1970), "On the measurement of inequality", *Journal of Economic Theory*, vol. 2, No. 3, Amsterdam, Elsevier.
- Bertola, G., F. Blau and L. Kahn (2001), "Comparative analysis of labor market outcomes: lessons for the US from international long-run evidence", *NBER Working Papers*, No. 8526, Cambridge, Massachusetts, National Bureau of Economic Research.
- Bourguignon, F. and F. Ferreira (2005), "Decomposing changes in the distribution of household incomes: methodological aspects", *The Microeconomics of Income Distribution Dynamics in East Asia and Latin America*, F. Bourguignon, F. Ferreira and N. Lustig (eds.), Washington, D.C., World Bank/Oxford University Press.
- Contreras, D. (2002a), "Explaining Wage Inequality in Chile: Does Education really matter?", Santiago, Chile, University of Chile, October.
- (2002b), "Poverty and Inequality in a Rapid Growth Economy: Chile 1990-1996?", Santiago, Chile, University of Chile, January.
- (1996), "Pobreza y desigualdad en Chile: 1987-1992. Discurso, metodología y evidencia empírica", *Estudios públicos*, No. 64, Santiago, Chile, Centro de Estudios Públicos.
- Contreras, D. and M. Galván (2003), "Are the Gender and Ethnic Wage Discrimination Decreasing in Bolivia? Evidence of 1994-1999", April.
- Contreras, D. and A. Ruiz Tagle (1997), "Cómo medir la distribución de ingresos en Chile", *Estudios públicos*, No. 65, Santiago, Chile, Centro de Estudios Públicos.
- De Ferranti, D. and others (2003), *Inequality in Latin America and the Caribbean: Breaking with History?*, Washington, D.C., World Bank.
- De Hoyos, R. (2006), "Accounting for Mexican Income Inequality during the 1990s", June.
- Deaton, Angus (1997), *The Analysis of Household Surveys: A Microeconomic Approach to Development Policy*, Baltimore, Johns Hopkins University Press.
- DiNardo, J., N.M. Fortin and T. Lemieux (1996), "Labor market institutions and the distribution of wages, 1973-1992: a semiparametric approach", *Econometrica*, vol. 64, No. 5, New York, Econometric Society.
- ECLAC (Economic Commission for Latin America and the Caribbean) (2004), *Social Panorama of Latin America 2004 (LC/L.2220-P)*, Santiago, Chile. United Nations publication, Sales No. E.04.II.G.148.

- _____ (2003), *Social Panorama of Latin America 2002-2003* (LC/G.2209-P), Santiago, Chile. United Nations publication, Sales No. E.03.II.G.185.
- _____ (2002a), *Social Panorama of Latin America 2001-2002* (LC/G.2183-P), Santiago, Chile. United Nations publication, Sales No. E.02.II.G.85.
- _____ (2002b), *Preliminary Overview of the Economies of Latin America and the Caribbean 2002* (LC/G.2196-P), Santiago, Chile. United Nations publication, Sales No. E.02.II.G.126.
- Fields, G. (2002), "Accounting income inequality and its change: a new method, with application to the distribution of earnings in the U.S.", *Working Paper*, Cornell, Cornell University.
- _____ (1996), "Accounting for Differences in Income Inequality", Cornell, Cornell University, January, unpublished.
- Galor, O. and J. Zeira (1993), "Income distribution and macroeconomics", *Review of Economic Studies*, vol. 60, No. 1, Blackwell Publishing.
- Ganuzza, E. and others (eds.) (2001), *Liberalización, desigualdad y pobreza: América Latina y el Caribe en los 90*, Buenos Aires, Eudeba, June.
- Gindling, T.H. and J. Trejos (2003), "Accounting for changing earnings inequality in Costa Rica, 1980-1999", *UMBC Economic Department Working Papers*, No. 03-108, Baltimore, UMB Department of Economics, April.
- Jimeno, J.F. and H. Simón (2001), "Instituciones y estructura salarial: lecciones desde la experiencia española", unpublished.
- Juhn, C., K. Murphy and B. Pierce (1993), "Wage inequality and the rise in returns to skill", *Journal of Political Economy*, vol. 101, No. 3, Chicago, University of Chicago Press.
- Katz, L. and K. Murphy (1992), "Changes in relative wages, 1963- 1987: supply and demand factors", *The Quarterly Journal of Economics*, vol. 107, No. 1, Cambridge, Massachusetts, MIT Press.
- Mincer, J. (1996), "Changes in wage inequality, 1970-1990", *NBER Working Papers*, No. 5823, Cambridge, Massachusetts, National Bureau of Economic Research, November.
- _____ (1974), *Schooling, Experience and Earnings*, New York, Columbia University Press.
- Mood, A., F. Graybill and D. Boes (1974), *Introduction to the Theory of Statistics*, New York, McGraw-Hill.
- Morduch, J. and T. Sicular (2002), "Rethinking inequality decomposition, with evidence from rural China", *Economic Journal*, vol. 112, No. 476, London, Royal Economic Society.
- Oaxaca, R. (1973), "Male-female wage differentials in urban labor markets", *International Economic Review*, vol. 14, No. 3, University of Pennsylvania/ Osaka University Institute of Social and Economic Research Association.
- Persson, T. and G. Tabellini (1994), "Is inequality harmful for growth?", *American Economic Review*, vol. 84, No. 3, Nashville, Tennessee, American Economic Association.
- Robbins, D. (1994), "Relative wage structure in Chile, 1957-1992: changes in the structure of demand for schooling", *Estudios de economía*, vol. 21, special number, Santiago, Chile, University of Chile, November.
- Shorrocks, A. and G. Wan (2003), "Spatial Decomposition of Inequality", UNU/WIDER Research Paper, Helsinki, World Institute for Development Economics Research.
- World Bank (2004), "Inequality and economic development in Brazil", *A World Bank Country Study*, No. 30114, Washington, D.C.