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Luis Beccaria<sup>a</sup>, Roxana Maurizio<sup>b</sup> & Gustavo Vázquez<sup>a</sup>

<sup>a</sup> Universidad Nacional de General Sarmiento, Institute of Sciences, Los Polvorines, Buenos Aires Province, Argentina

<sup>b</sup> Universidad Nacional de General Sarmiento and CONICET, Institute of Sciences, Los Polvorines, Buenos Aires Province, Argentina

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## Recent decline in wage inequality and formalization of the labour market in Argentina

Luis Beccaria<sup>a</sup>, Roxana Maurizio<sup>b\*</sup> and Gustavo Vázquez<sup>a</sup>

<sup>a</sup>*Universidad Nacional de General Sarmiento, Institute of Sciences, Los Polvorines, Buenos Aires Province, Argentina;* <sup>b</sup>*Universidad Nacional de General Sarmiento and CONICET, Institute of Sciences, Los Polvorines, Buenos Aires Province, Argentina*

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Labour market conditions improved during the 2000s in Latin America, a process that included a reduction in the magnitude of informal employment. A decline of wage inequality was another feature of this period. Both dynamics were particularly intense in Argentina. The purpose of this study is to evaluate the role played by the process of formalization of the labour market that occurred in Argentina during that period on the reduction of income inequality, while additionally taking into account other factors that might have also contributed to such dynamics of income inequality. The method employed is a decomposition proposed by Firpo, Fortin and Lemieux, which allows extending the Oaxaca-Blinder approach to decompose some distributive statistics of income between a 'composition effect' and a 'returns effect'. The study concludes that the process of increasing labour market formalization had an equalizing effect over the period, a finding that had not been emphasized in previous studies.

**Keywords:** income distribution; labour market; Latin America; informality

### 1. Introduction

In 2003 a process of wage inequality reduction began in Argentina, which eventually more than offset the tendency of rising inequality in the 1990s. The reduction of labour income gaps took place together with an overall improvement of labour market variables, which also meant a reversal of the trends that had prevailed in the previous decade (Beccaria and Maurizio 2012). In fact, during the 1990s the distribution of income continued to deteriorate in a context of poor labour market performance (Altimir and Beccaria 2000; Gasparini and Cruces 2010). The slow growth of employment was a result of the inability of the convertibility regime (established in 1991) to attain macroeconomic stability (Damill, Frenkel, and Maurizio 2011).

To a greater or lesser extent, the positive trends in terms of income distribution and labour market performance exhibited by Argentina since the early 2000s have been present in several other Latin American countries as well. In all the cases, the reduction in wage inequality seems to have been the main source of improvement in household income concentration (ECLAC 2010).

As is further explained below, all previous studies on distributional changes in Argentina and other countries of the region stress the decline in returns to education

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\*Corresponding author. Email: [roxanadmaurizio@gmail.com](mailto:roxanadmaurizio@gmail.com)

as a main factor explaining the improvement observed in labour income inequality. However, they do not address the potential effects of other labour market events that took place in those economies. In particular, there are no studies accounting for the effects of the decline in informality observed in the 2000s in many Latin American countries. The intensity of this process has been significant in some cases, particularly in Argentina, and it is therefore worth consideration as a possible cause of inequality reduction in any analysis of distributional dynamics.

This document analyses the factors associated with the reduction of inequality among wage earners in Argentina, a group that represented 75% of the employed population in the 2003–2012 period. It evaluates the set of variables usually considered in this type of exercise but it pays particular attention to the effects of changes in informality. In this study, the legal approach to informality is employed, which considers informal wage earners as those not registered in the social security system.<sup>1</sup>

In order to assess the impacts of different variables on inequality we employ a decomposition method recently developed by Firpo, Fortin and Lemieux (FFL 2007, 2011) that extends the Oaxaca-Blinder approach to decompose changes in other distributional functionals besides the mean into a ‘composition effect’ and a ‘returns effect’. The composition effect measures the contribution of changes in the structure of characteristics to the reduction of inequality (measured, for example, by the Gini index or by the ratio between percentiles of the distribution), while maintaining returns constant. The returns effect measures the distributional effects of changes in returns while holding the structure of characteristics unchanged. The method also allows quantifying the contribution of each characteristic to the reduction of inequality through each of these effects.

The rest of the document is structured as follows. The next section presents some background information, with the first subsection including a brief summary of the results of previous studies analysing distributional changes in Argentina and other countries of the region during the last decade, and the second subsection discussing the possible transmission channels between the formalization of the labour market and income distribution changes. Section 3 presents the source of information, while Section 4 describes the methodology employed in the econometric estimates. Section 5 provides a descriptive analysis of the evolution of inequality and the main changes observed in the occupational structure and is divided into three subsections: the first one briefly describes the economic context; the second one analyses the changes in the composition of employment, particularly focusing on the educational level and informality; and the third one presents the ‘anatomy’ of the distributional change observed in the period under analysis. Section 6 presents and discusses the results obtained in the decomposition exercise and Section 7 includes the conclusions of the study.

## 2. Background

### 2.1. *Empirical studies for Latin America*

As mentioned above, the studies available on the evolution of Argentina’s income distribution over the past 20 years show a clear contrast between the 1990s and the period that started after the convertibility regime crisis in 2001–2002. Most of these studies focus on the analysis of the changes observed in household income concentration and look into the possible causes of such dynamics (Gasparini and Cruces 2010; Trujillo and Villafañe 2011; Salvia and Vera 2011). One of the main results of

these studies is that concentration of labour incomes explain most of the increase observed in household income concentration throughout the 1990s as well as its subsequent decline in the following decade. Moreover, there are also other studies that analyse the evolution of income distribution in several countries of the region including Argentina, which arrive at the same conclusions (Cornia 2012; Keifman and Maurizio 2012).

These results are also in line with the evidence found for other Latin American countries. Amarante, Colafranceschi, and Vigorito (2011) show that Uruguay initiated a late process of inequality reduction in 2008, after a long period of growing income concentration. The authors find that this evolution was caused by a decline in wage dispersion and also by the introduction of non-contributory cash transfer programmes and changes in the tax scheme.

For Brazil, Soares (2006) estimates that around 75% of the reduction in family income inequality between 1995 and 2004 is explained by a lower concentration of labour incomes, whereas the other 25% responds to the positive impact of the cash transfer program *Bolsa Familia*. On the other hand, Barros, de Carvalho, and Mendonça (2010) point out that public transfers, both contributory and non-contributory, explain a higher proportion of the changes in inequality observed in the 2001–2007 period (almost 50%).

Esquivel, Lustig, and Scott (2010) find that the reduction of inequality in Mexico in the 1996–2006 period was caused by incomes in the lower tail of the distribution growing at a faster pace than those in the richer deciles. The factors explaining these dynamics are related to the labour market (a relative increase of the wages of low-skilled workers) but also to remittance inflows and to public spending becoming more progressive after the implementation of the cash transfer program *Progresá* (currently called *Oportunidades*).

Most of the studies that analyse the changes in labour incomes find that the main factor explaining the reduction in earnings inequality during the 2000s were the returns to education, which had caused an increase in inequality in the previous decade. Alejo, Gabrielli, and Sosa-Escudero (2014), Gasparini and Cruces (2010) and Cornia (2012) are examples of studies for Argentina, while Lustig, Lopez-Calva, and Ortiz-Juarez (2013) and Gasparini et al. (2011) obtain similar results in comparative studies for Latin American countries.

In regard to the causes of the changes observed in returns to education, the studies available for Argentina and other Latin American countries put an emphasis on the interaction between the relative supply and demand for qualifications. Gasparini and Cruces (2010) highlight the slowdown in the rate of technology incorporation during the 2000s in a context of a growing relative supply of skilled workers. In turn, the evolution of the relative demand for skills responded to lower investment growth rates and to the composition of labour demand by branch of activity changing as a result of a shift in relative prices. They also mention that after the overshooting in inequality growth of the previous decade due to the rapid incorporation of technology, it is reasonable to expect an adjustment phase that might also have contributed to the equalizing trends of the 2000s. As put by Gasparini and Lustig (2011): ‘the fading out of the effect of the skill-biased technical change that occurred in the 1990s’.

In addition, the studies point out that both the implementation of income policies immediately after the crisis and the strengthening of labour unions might have also played a part in the reduction of income gaps between workers with different skills and educational levels. More precisely, Maurizio (2014a) highlights the strengthening

of the minimum wage as a factor that contributed to improving wage inequality, both in Argentina and other countries of the region. Amarante, Salas, and Vigorito (2009) arrived at the same conclusion in the case of Uruguay, and Bosch and González Velosa (2013) also found an equalizing effect of the minimum wage in Brazil. On the other hand, Marshall (2009) also highlights the evolution of the minimum wage and the recovery of collective bargaining as main factors explaining the reduction of wage inequality between sectors in the manufacturing industry.

## **2.2. Formalization of the labour market and wage distribution**

As reviewed in the previous section, the available studies do not consider the possible effects that the reduction of labour informality observed in many Latin American countries during the 2000s might have had on labour income inequality. This study aims to fill such a gap in the literature by including labour informality among the dimensions usually considered in this type of analysis.

The sign of the impact of labour market formalization on wage distribution is a controversial issue as it will depend on the specific characteristics of the process. On the one hand, it is determined by the composition of workers that benefit from formalization: the probability that inequality falls as a consequence of this process increases as the share of low-wage informal workers moving to formality grows, given the increase of wages implied in such a transition.

On the other hand, the behaviour of returns to formality along the wage distribution also matters: if returns are higher for low wages than for high wages, a proportional growth in the share of formal workers along the distribution would reduce inequality.

Finally, if wage dispersion is lower within the group of formal workers than among informal workers, an increase in the share of registered employment will also tend to reduce global inequality.

The previous analysis is based on the direct links between formality and inequality. However, the improvement of working conditions associated with the process of formalization may also affect other variables that have an impact on the distribution of wages. It could lead to an increase in the supply of labour through an inverse ‘discourage effect’, which would moderate overall wage growth with unclear distributional effects.

An increase in the proportion of formal workers could also alter the wage gap between formal and informal workers, although the channels through which this would happen are not clear. For example, some of the newly formalized employees could end up receiving lower wages than those of similar, already formal, salaried workers as employers might transfer onto them part of the increased total labour costs. In this case, returns will fall. The higher probability of obtaining a formal job could also raise the reservation wage, which makes workers less willing to accept low-wage informal occupations. As a consequence, returns may fall, especially at the bottom part of the distribution. On the contrary, labour market formalization could widen the average formal–informal wage gap if the process is biased towards non-registered employees with high wages, resulting in a higher proportion of low wages within informality.<sup>2</sup>

Changes in premia, in turn, have uncertain effects on the wage distribution. An increase in premia would probably tend to raise inequality through the ‘between’

effect. Nevertheless, if the increase is higher at the bottom tail of the distribution, wage inequality could grow with less intensity, or even fall.

Labour regulations might also influence the levels and changes of returns along the distribution. The presence of a minimum wage will – *ceteris paribus* – raise returns to formality. However, if it also has an effect on informal workers' wages (the so-called *lighthouse* effect), it would not necessarily lead to a widening of the wage gap between these two groups of workers.<sup>3</sup> The same possibilities apply to collective bargaining.

As will be discussed in Section 5, in the case of Argentina during the 2000s, the process of labour market formalization took place in a period of high and sustained economic growth and decreasing unemployment, particularly during the 2003–2008 period when GDP grew at an average annual rate of 8.5%. This is in stark contrast with the trends observed in the 1990s, when the unemployment rate and informality grew significantly.<sup>4</sup> However, against expectations, the supply of labour stagnated during the 2000s, breaking the trend of the previous 40 years.<sup>5</sup>

The growing proportion of registered wage earners seems to have been the result of an increase in the demand for labour in a context of a stable macroeconomic environment<sup>6</sup>. Perhaps to a lesser extent, some policies that promoted the creation of formal employment and a more efficient implementation of labour inspection, could also played a role.<sup>7</sup> Consequently, the process of formalization has not been associated with a reduction of labour costs but rather with the combination of labour policies and a better economic environment. As a matter of fact, average returns to informality rose to some extent between 2003 and 2012 – as will be seen below – probably due to the recovery of minimum wages and the extension of collective bargaining. This result casts doubt on the well-established view that emphasizes the requirement of lowering registered labour costs to generate formal employment.

### 3. Source of information

This study employs microdata coming from the Permanent Household Survey (PHS), a sample survey conducted by the National Institute of Statistics and Censuses of Argentina (INDEC). The survey is carried out on a quarterly basis and covers 31 urban centres across the country.

The econometric estimations presented in the following section have been performed for the group of wage earners between 16 and 64 years old in the case of men, and between 16 and 59 years old in the case of women. The lower age limit has been chosen considering the minimum legal age to work, whereas the upper limit indicates the retirement age for men and women, respectively. Individuals enrolled in employment plans,<sup>8</sup> as well as those with no incomes declared have been excluded from the analysis. Also, to preserve the comparability of the results, we have only included in the estimations the 28 urban centres that remain in the PHS sample throughout the whole period under analysis.

Finally, to distinguish between formal and informal wage earners we have employed the criterion that is usually adopted when working with data from the PHS, i.e. the worker's registration condition in the social security system. More precisely, wage earners are considered as informal if they answer negatively to the question of whether her/his employer makes payroll deductions to pay the contributions to the social security system.



#### 4. Methodology

In order to evaluate the contribution of personal and job attributes to the reduction of inequality we employ the Firpo, Fortin, and Lemieux (2007, 2011) approach. This method is an extension of the decomposition approach developed by Oaxaca (1973) and Blinder (1973),<sup>9</sup> allowing a broader application. On the one hand, it allows more flexible specifications of the underlying wage model; on the other hand, it allows quantifying the partial effects of changes in the distribution of covariables and in their returns on other functionals ( $v$ ) besides the mean value, such as quantiles, variance or the Gini coefficient.

The decomposition method consists of two different stages: (1) the estimation of the aggregate composition and return effects, by employing a reweighting methodology; and (2) the disaggregation of those effects into the individual contribution of each attribute using re-centred influence function regressions of each functional of interest.

In order to conduct the first stage, the total variation of  $v$  between  $T = 0$  and  $T = 1$  can be formalized as:

$$\Delta^v = v(F_{(Y_1|T=1)}) - v(F_{(Y_0|T=0)})$$

where  $F_{(Y_1|T=1)}$  is the wage distribution function in time 1, and  $F_{(Y_0|T=0)}$  in time 0.

To control for inequality in the distribution of attributes between groups, it is necessary to consider the counterfactual distribution  $F_{(Y_0|T=1)}$ , i.e. what would have been the wage distribution observed in  $T = 0$ , had the distribution of characteristics observed in  $T = 1$  been present in  $T = 0$ . Then, the observed total change can be rewritten as:

$$\Delta^v = [v(F_{(Y_0|T=1)}) - v(F_{(Y_0|T=0)})] + [v(F_{(Y_1|T=1)}) - v(F_{(Y_0|T=1)})]$$

The total variation of  $v$  can be decomposed into two effects:<sup>10</sup> the ‘composition effect’ ( $\Delta_C^v$ ) and the ‘returns effect’ ( $\Delta_S^v$ ). The first effect measures the total change derived from modifications of the attributes while holding constant the wage structure between two moments in time. The second effect measures the impacts of changes in returns, holding constant the structure of characteristics.

For the second stage, in order to obtain the individual contribution of each attribute to the change of  $v$ , either through the composition effect or the returns effect, a re-centred influence function (RIF) is employed. This function is defined as:

$$RIF(y; v) = v(F) + IF(y; v)$$

where  $F$  is the distribution function of the variable of interest (in this case, incomes) and  $IF$  is the influence function.<sup>11</sup>

Given that the mathematical expectation of the re-centred influence function is the parameter of interest, it is possible to rewrite each of the effects as:

$$\Delta_C^v = E_X[E[(RIF(Y_0; v)|X, T = 1)]] - E_X[E[(RIF(Y_0; v)|X, T = 0)]]$$

$$\Delta_S^v = E_X[E[(RIF(Y_1; v)|X, T = 1)]] - E_X[E[(RIF(Y_0; v)|X, T = 1)]]$$

Then, letting  $E[(RIF(Y; v)|X)] = X'\gamma^v$ , and substituting the previous expressions by their respective linear projections,<sup>12</sup> we obtain:



$$\begin{aligned}\Delta_C^v &= E(X|T=1)' \gamma_{0T1}^v - E(X|T=0)' \gamma_0^v \\ &\equiv \sum_{k=1}^K \left( E(X^k|T=1)' - E(X^k|T=0)' \right) \gamma_{0,k}^v + SPE^v \text{ I}\end{aligned}$$

$$\begin{aligned}\Delta_S^v &= E(X|T=1)' \gamma_1^v - E(X|T=1)' \gamma_{0T1}^v \\ &\equiv \left( \gamma_{1,0}^v - \gamma_{0T1,0}^v \right) + \sum_{k=1}^K E(X^k|T=1)' \cdot \left( \gamma_{1,k}^v - \gamma_{0T1,k}^v \right) + RWE^v \text{ II}\end{aligned}$$

where the superscript  $k$  refers to the  $k$ th attribute to be considered in the disaggregated decomposition of the overall effects.

The expression *I*, which as mentioned above describes the ‘composition effect’, can in turn be rewritten by taking into consideration the  $SPE^v$  term – the specification error. This term accounts for the approximation error that originates in the fact that the procedure can only provide a first-order (linear) approximation of such an effect. It can be estimated as the difference between the overall composition effect, obtained using the counterfactual distribution of wages – i.e. the one that would have resulted if the cases observed in  $T=0$  would have shown similar characteristics to those observed in  $T=1$ , and the estimation of the effect obtained using the RIF-regression approach. On the other hand, in order to observe the contribution of each covariate, each term in the expression can be interpreted as the impact of the temporary modification in the distribution of the  $k$ th covariate on the total change of the functional, holding constant the wage structure prevailing in  $T=0$ .

Expression *II* refers to the ‘returns effect’. One difference with the traditional Oaxaca-Blinder approach is that here  $\gamma_{0T1}^v$  is considered rather than  $\gamma_0^v$ , i.e. the coefficients of the counterfactual RIF regression, which consider reweighting the data observed in  $T=0$  to resemble, on average, the structure of attributes observed in  $T=1$ . The objective here is to estimate the ‘pure’ returns effect, i.e. the effect that is not modified by changes in the distribution of attributes.

As with the first expression, this effect can also be rewritten considering the term  $RWE^v$ , which in this case reflects the error of reweighting that results from the fact that the attributes of  $T=1$  might not be exactly replicated when obtaining the counterfactual values.

Moreover, given the interest in assessing the contribution of each variable to the explanation of the ‘returns effect’, we consider the detailed decomposition of the latter, where  $\left( \gamma_{1,0}^v - \gamma_{0T1,0}^v \right)$  represents the ‘returns effect’ attributable to the omitted group, while each term of the following sum refers to the contribution of the  $k$ th covariate. Hence, the overall returns effect is the sum of each of these terms considering the distribution of  $X$  prevailing in  $T=1$ .

Lastly, regarding the estimation procedure, the first step consists of obtaining the overall estimations of both effects by directly estimating the parameters of interest based on the actual distributions and the counterfactual distribution obtained through the reweighting procedure, without specifying any function for the wage structure. The reweighting function will be given by the quotient between the distribution of  $X$  in  $T=1$  and the distribution of  $X$  in  $T=0$ , both multivariate. However, following DiNardo, Fortin, and Lemieux (1996), by applying Bayes’ rule, such a quotient can be summarized as:

$$\psi(X) = \frac{Pr(T = 1/X) Pr(T = 0)}{Pr(T = 0/X) Pr(T = 1)}$$

Then, the weight can be estimated by considering a probability model for conditional probabilities. In this case, we make use of a probit model based on a pool of observations of two different periods. Predicted values for each case are obtained from the estimations of the model, and the marginal probabilities are then replaced by their sample equivalents, thus obtaining the estimated weights for each case.

Once  $\psi(X)$  has been generated, we then apply it to the observations registered in  $T = 0$  with the aim of estimating the functional of interest linked to the counterfactual distribution. On the other hand, in order to estimate the function associated with the other two distributions, we directly consider its application over the empirical distributions. This is,

$$\hat{\Delta}^v = [v(\hat{F}_{(Y_0|T=1)}) - v(\hat{F}_{(Y_0|T=0)})] + [v(\hat{F}_{(Y_1|T=1)}) - v(\hat{F}_{(Y_0|T=1)})]$$

The second stage consists of performing a detailed decomposition by estimating regression functions associated with the estimations of the influence functions of the parameters of interest. In order to do so, we employ the ordinary least squares method.

This is, being  $v(\hat{F}_{(Y_1|T=1)}) = \hat{E}(X, T = 1)\hat{\gamma}_1^v$ ,  $v(\hat{F}_{(Y_0|T=0)}) = \hat{E}(X, T = 0)\hat{\gamma}_0^v$ , and  $v(\hat{F}_{(Y_0|T=1)}) = \hat{E}(X, T = 1)\hat{\gamma}_{0/1}^v$ , we obtain the estimation of the detailed decomposition, given by:

$$\begin{aligned} \hat{\Delta}^v &= \sum_{k=1}^K [\hat{E}(X^k|T = 1) - \hat{E}(X^k|T = 0)]\hat{\gamma}_{0,k}^v + S\hat{P}E^v + (\hat{\gamma}_{1,0}^v - \hat{\gamma}_{0/1,0}^v) \\ &+ \sum_{k=1}^K \hat{E}(X^k|T = 1)' \cdot (\hat{\gamma}_{1,k}^v - \hat{\gamma}_{0/1,k}^v) + R\hat{W}E^v \end{aligned}$$

This methodology was applied to decompose changes in hourly wage inequality in Argentina between 2003 ( $T = 0$ ) and 2012 ( $T = 1$ ). The indicators of inequality employed are the Gini index and the log of the ratios between the median and the 10th and 90th percentiles.

## 5. Main changes in wage distribution and in the occupational structure

### 5.1. The economic context

The changes in inequality briefly described in the first section were accompanied – and in some ways also influenced – by changes in employment levels and in the occupational structure.

The evolution of employment after 2003 is in stark contrast with the trends that had prevailed in the previous decade. During the 1990s, employment grew slowly leading to a significant increase in the open unemployment rate, which reached 13.3% in 1998 and 21% in 2001. The scarce net job creation – particularly of jobs covered by the social security system – was mainly a result of a poor macroeconomic performance characterized by large fluctuations of GDP. The latter was in turn a result of the currency board regime, which implied a direct and full transmission of

international trade and financial markets' fluctuations into the domestic economy. Also, the growing exchange rate appreciation together with the trade liberalization policies implemented at the beginning of the decade had a negative impact on the competitiveness of tradable sectors. The accumulation of external and fiscal imbalances in a context of high external indebtedness and economic stagnation led to the collapse of the regime and to the devaluation of the peso in 2001.<sup>13</sup>

Prices grew significantly as a result of the exchange rate adjustment, giving rise to an inflationary process that was nevertheless less intense than the magnitude of the currency devaluation. It was also quite short-lived compared with previous episodes experienced by the country. The economic depression that prevailed in the years prior to the regime change contributed to weakening the propagation mechanisms of inflationary shocks. The real exchange rate increase was a determinant factor in the rapid and intense economic recovery that begun in late 2002, by raising the competitiveness of the economy, particularly of the manufacturing sector. This period was also characterized by a steady growth of public spending and by the implementation of several income policy measures that favoured private consumption. The accelerated growth of exports – mainly led by the sharp increase in international commodity prices – further boosted aggregate demand and led to a significant improvement of external accounts.<sup>14</sup>

In this context, aggregate employment expanded at a fast pace (3.1% per year between 2002 and 2013), particularly in the first years, when the economy was still benefiting from high idle capacity. Moreover, this process was accompanied by an increase in the proportion of jobs registered in the social security system, contrary to the trend that had prevailed in the 1990s.<sup>15</sup> At the same time, real wages grew 46% between 2003 and 2012, more than compensating the 30% fall that took place in 2002 after the devaluation.

## 5.2. *The occupational structure*

The period of aggregate employment expansion that started in 2003 was accompanied by significant changes in the occupational structure, in particular those related to education and the formalization of the labour market.

As a matter of fact, most of the net job creation observed since 2003 corresponds to wage-earning positions, and particularly to formal occupations (registered in the social security system). As a result, the proportion of informal salaried workers both in total employment and in total wage earning employment, fell (10 percentage points (pp)), reversing the trend of the previous decade, when the proportion rose by 6 pp. This same result is observed within the subgroup of wage earners considered in the econometric estimates (Table 1). Such improvement in the quality of employment seems to have been favoured, as mentioned above, by a rapid growth of labour demand together with some measures specifically aimed at fighting informality.

The composition of employment by educational level also changed, with a significant increase in the proportion of workers with complete secondary education and a relatively lower increase of workers with complete tertiary education (Table 1). This is in stark contrast with the dynamics observed in the 1990s, when the relative participation of the more educated workers rose sharply while the weight of complete secondary education rose to a much lesser extent. The differences between the two decades seem to be explained by changes occurring in the supply of labour, although the demand might have played a role as well. Between 1991 and 2000, the

Table 1. Composition of wage earners' attributes. 2003 and 2012.

Attribute	Q4-2003 (1)	Q4-2012 (2)	Q4-2003–2012 (3)	(2)–(1)	(2)–(3)
Registered wage earner	0.59	0.67	0.67	0.08***	0.00
Male	0.56	0.57	0.57	0.00	0.00
Age					
<= 25 years old	0.16	0.15	0.15	-0.02***	0.00
25–44 years old	0.55	0.57	0.56	0.02**	0.00
> 44 years old	0.29	0.29	0.29	0.00	0.00
Married	0.60	0.58	0.59	-0.02**	-0.01
Head of household	0.50	0.49	0.49	-0.01	0.00
Education					
Incomplete primary	0.06	0.04	0.04	-0.02***	0.00
Complete primary	0.21	0.17	0.17	-0.04***	0.00
Incomplete secondary	0.19	0.17	0.17	-0.02***	0.00
Complete secondary	0.24	0.31	0.31	0.07***	0.00
Incomplete tertiary	0.13	0.12	0.12	-0.01***	0.00
Complete tertiary	0.18	0.20	0.20	0.02***	0.00
Branches of activity					
Manufacturing	0.11	0.11	0.11	0.00	0.00
Construction	0.06	0.09	0.09	0.03***	-0.01
Commerce	0.18	0.17	0.17	-0.02***	0.00
Financial services	0.07	0.07	0.07	0.00	0.00
Transport services	0.06	0.06	0.06	0.00	0.00
Personal services	0.06	0.05	0.05	-0.01***	0.00
Domestic service	0.11	0.10	0.10	0.00	0.00
Public administration	0.26	0.26	0.26	-0.01	0.00
Other branches	0.07	0.08	0.09	0.01***	0.00
Job duration					
<= 3 months	0.20	0.16	0.16	-0.04***	0.00
3–6 months	0.05	0.04	0.04	-0.01**	0.00
6–12 months	0.07	0.05	0.05	-0.01***	0.00
1–5 years	0.27	0.32	0.32	0.05***	0.00
> 5 years	0.41	0.43	0.43	0.01*	0.00
Region					
<i>Gran Buenos Aires</i>	0.19	0.14	0.14	-0.05***	0.00
<i>Noroeste</i>	0.20	0.23	0.23	0.03***	0.00
<i>Noreste</i>	0.10	0.12	0.12	0.02***	0.00
<i>Cuyo</i>	0.11	0.11	0.10	0.00	0.00
<i>Pampeana</i>	0.31	0.29	0.29	-0.03***	0.00
<i>Patagónica</i>	0.09	0.12	0.12	0.04***	0.00
Full-time worker	0.67	0.67	0.66	0.00	0.01

Source: Author's elaboration based on PHS-INDEC (28 urban areas).

\*\*\* $p < 0.01$ ; \*\* $p < 0.05$ ; \* $p < 0.1$ .

share of individuals above 15 years of age with complete tertiary education grew from 7.7% to 10.3% while the proportion of people with complete secondary school education rose only from 15.7% to 16.8%. Nonetheless, the increase in the number of workers with such educational levels was more pronounced than the expansion of the supply. On the contrary, in the 2000s, the relative participation of individuals with complete secondary education within the population of 15 years of age or older rose more than the proportion of workers with complete tertiary education (4.4 and 3.7 percentage points, respectively). Also, the participation of complete secondary education grew even more intensely among the employed, and this is observed across all the different productive sectors in the occupational structure.

The composition of employment by sectors of activity also changed in the 2000s, although the variation was less significant compared with the other variables. There was an increase in the participation of construction and a reduction in the participation of commerce (Table 1), which again was in contrast to the trends of the 1990s, when employment growth was led by financial services. It is also noteworthy that employment in the manufacturing sector grew at a similar pace than the economy as a whole in the 2000s, after a decade of sharp decline.

### 5.3. Income distribution

Table 2 summarizes the main changes that occurred in the degree of concentration of different income distributions from the beginning of the 1990s. The contrast between the last two decades can be noted: whereas in the 1990s and the beginning

Table 2. Inequality indicators.

	1991 (1)	1995	1998	2001	2003	2012
Per cápita family income						
Gini coefficient	0.504	0.516	0.535	0.546	0.553	0.425
Workers						
Monthly remuneration -main occupation-						
Gini coefficient	0.426	0.439	0.462	0.473	0.459	0.370
Hourly remuneration -main occupation-						
Gini Coefficient	0.437	0.447	0.471	0.479	0.449	0.358
Ratios of percentiles						
90/10	6.27	6.81	7.55	8.56	7.48	5.40
90/50	2.57	2.74	2.97	3.02	2.72	2.25
50/10	2.44	2.49	2.54	2.87	2.79	2.40
Non wage earners						
Monthly remuneration -main occupation-						
Gini coefficient	0.490	0.528	0.559	0.580	0.570	0.420
Hourly remuneration -main occupation-						
Gini coefficient	0.505	0.545	0.572	0.586	0.552	0.428
All wage earners						
Monthly remuneration -main occupation-						
Gini coefficient	0.401	0.402	0.427	0.444	0.423	0.356
Hourly remuneration -main occupation-						
Gini coefficient	0.411	0.407	0.434	0.446	0.414	0.339
Ratios of percentiles						
90/10	5.31	5.68	6.49	7.24	5.88	4.69
90/50	2.37	2.53	2.76	2.89	2.33	2.14
50/10	2.24	2.25	2.35	2.51	2.50	2.19
Wage earners in prime age (2)						
Hourly remuneration -main occupation-						
Gini coefficient	0.375	0.373	0.394	0.410	0.413	0.336
Ratios of percentiles						
90/10	4.70	4.92	5.60	6.30	6.41	4.69
90/50	2.17	2.30	2.52	2.67	2.62	2.14
50/10	2.16	2.14	2.22	2.36	2.45	2.19

Source: Author's elaboration based on PHS-INDEC (28 urban areas).

Note: The estimates for the period 1991–2001 are based on data from the October waves while those for the period 2003–2012 are based on data from the fourth quarters.

(1) Based on extrapolated data from a smaller group of urban areas, according to the observed variation of the variable between 1991 and 1995.

(2) Women from 16–59 years old and men from 16–64 years old.

of the 2000s income concentration rose for both labour and household incomes, since 2002/03 the Gini coefficient for labour incomes fell by 9 pp, while that of per capita household incomes decreased by 12 pp. By 2010, these indicators reached the values registered twenty years before.

Table 2 shows that the concentration of the distribution of wage and non-wage earnings exhibited a similar evolution. The figures also indicate that inequality in the distribution of monthly and hourly remunerations of both wage earners and the total employed population fell sharply since 2003. A similar behaviour was exhibited by the group of wage earners in prime ages,<sup>16</sup> which is the subgroup considered for the decomposition exercise.

The analysis of ratios between the p10, p50 and p90 percentiles of the distribution shows that both the growing concentration of wage earners' incomes during the 1990s and the subsequent fall in the following decade are a result of changes registered both in the upper and lower tails of the distribution (Table 2).

## 6. Decomposition of changes in the distribution of remunerations

Before carrying out the decomposition exercise, a balance test was performed to check for the absence of statistically significant differences between the actual 2012 and the reweighted 2003 (counterfactual) distributions of characteristics. Table 1 shows that there are no differences in any of the considered attributes (fifth column).

### 6.1. Aggregate decomposition

The first step in the aggregate decomposition shows that two thirds of the decline observed in the log p90/p10 ratio between 2003 and 2012 was explained by a fall in the returns to the observed variables considered (Table 3). The other third was a

Table 3. Decomposition of changes in wage inequality between the IVQ-2003 and IVQ-2012.

	log(90/10)	log(50/10)	log(90/50)	Gini
Q4 2012	1.713*** 0.023	0.871*** 0.018	0.843*** 0.017	0.349*** 0.003
Q4 2003	1.870*** 0.026	0.955*** 0.020	0.915*** 0.019	0.409*** 0.006
Total change	-0.157*** 0.035	-0.085*** 0.027	-0.072*** 0.025	-0.059*** 0.006
First stage				
Composition effect	-0.055** 0.028	-0.063*** 0.023	0.008 0.021	-0.002 0.006
Return effect	-0.102*** 0.028	-0.022 0.023	-0.080*** 0.021	-0.057*** 0.006
Second stage				
Composition effects:				
Formality	-0.042*** 0.003	-0.021*** 0.001	-0.021*** 0.001	-0.009*** 0.001
Education	0.017*** 0.004	0.002 0.002	0.015*** 0.002	0.005*** 0.001

(Continued)

Table 3. (Continued).

	log(90/10)	log(50/10)	log(90/50)	Gini
Branches of activity	0.009*** 0.002	0.004*** 0.001	0.005*** 0.001	0.002*** 0.000
Gender	0.000 0.001	0.000 0.000	0.000 0.001	0.000 0.000
Age	-0.005*** 0.002	-0.004*** 0.001	-0.001* 0.001	-0.001** 0.000
Other characteristics	0.022*** 0.003	0.010*** 0.002	0.012*** 0.002	0.001*** 0.000
Total composition effects	0.001 0.005	-0.008*** 0.003	0.009*** 0.003	-0.001 0.001
Specification error	-0.056** 0.027	-0.055** 0.023	-0.001 0.021	0.000 0.006
Return effects:				
Formality	-0.093** 0.042	-0.054 0.038	-0.038 0.025	-0.014 0.012
Education	-0.110** 0.047	0.018 0.034	-0.128*** 0.037	-0.023*** 0.008
Branches of activity	-0.103* 0.058	-0.013 0.039	-0.090* 0.047	-0.011 0.011
Gender	-0.070** 0.031	-0.041** 0.021	-0.029 0.027	-0.020** 0.008
Age	-0.042** 0.020	-0.006 0.012	-0.036** 0.018	-0.007 0.005
Other characteristics	-0.118 0.114	-0.009 0.085	-0.110 0.083	-0.024 0.024
Constant	0.435*** 0.142	0.084 0.102	0.351*** 0.109	0.042* 0.025
Total return effects	-0.101*** 0.027	-0.021 0.023	-0.079*** 0.021	-0.057*** 0.006
Reweighting error	-0.002 0.005	-0.001 0.003	-0.001 0.003	0.000 0.001

Source: Author's elaboration based on PHS-INDEC (28 urban areas).

Note 1: Bootstrapped standard errors with 1000 replicates.

Note 2: Other characteristics includes head of household, job duration and region.

Note 3: Estimates were obtained based on a probit model with registered wage earner, sex, age, married, head of household, branches of activity, and region dummies, and a full set of education and job duration dummies and its interactions.

\*\*\* $p < 0.01$ ; \*\* $p < 0.05$ ; \* $p < 0.1$ .

result of changes in the composition of wage earning employment according to those factors.

This indicator also allows identifying to what extent these changes affected the whole distribution or only a part of it. As mentioned above, inequality fell with quite the same intensity in both the lower and the upper tails of the distribution, as shown by the behaviour of the p50/p10 and the p90/p50 ratios, respectively. The decomposition exercise indicates that whereas the reduction in the upper segment seems to have been the result of changes in returns exclusively, the decline observed in the lower segment seems to have responded to changes in the composition of employment. Figure 1 shows the decreasing impact of changes in returns to individual



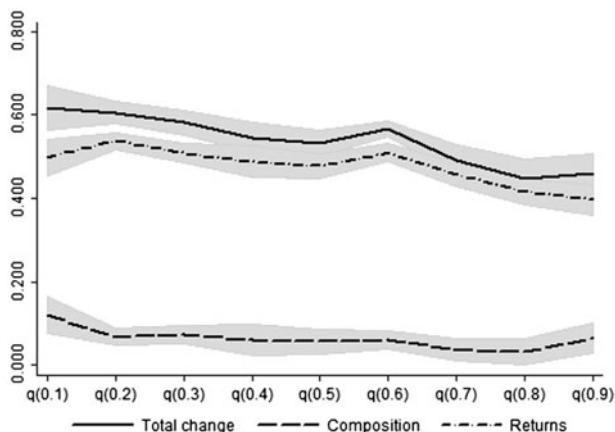


Figure 1. Aggregate decomposition of changes in wages along the distribution. Source: Own elaboration based on PHS-INDEC.

attributes along the distribution. The influence of the composition effect on wages is considerably lower. Both channels imply an increase in all deciles, although to a larger extent at the bottom of the distribution.

On the other hand, in the case of the Gini coefficient, the reduction is entirely explained by the returns effect.<sup>17</sup>

## 6.2. Detailed decomposition: composition effect

As discussed in Section 3, the second stage in the decomposition exercise allows assessing the contribution of different characteristics to each of the two effects considered, i.e. the one derived from the changes observed in the occupational structure – composition effect – and the one derived from changes in returns – returns effect.

With regards to the composition effect, Table 3 shows that except for gender, all the other variables included in the exercise had a significant effect on the variation of the  $p90/p10$  ratio. The changes in structure in terms of educational levels and branches of activity raised inequality, whereas the changes that occurred in the age composition as well as the growing proportion of formal workers had a positive effect in reducing inequality. Similar results are obtained for the Gini index.

Of all the different variables considered, the rise in the proportion of formal jobs in total employment had the most significant impact on inequality. This variable explained more than one quarter of total  $\log p90/p10$  ratio variation and 80% of the composition effect measured by this same indicator. It also explained approximately 15% of the reduction in the overall Gini. The importance of a growing share of formal employment in the reduction of inequality has not been stressed in the literature that studies the evolution of inequality in Argentina during the 2000s. Nor has this been mentioned in the studies conducted for other countries of the region, where formalization has also been taking place. The improvement in the quality of jobs seems to have a positive effect not only in terms of average incomes but also in terms of equality.

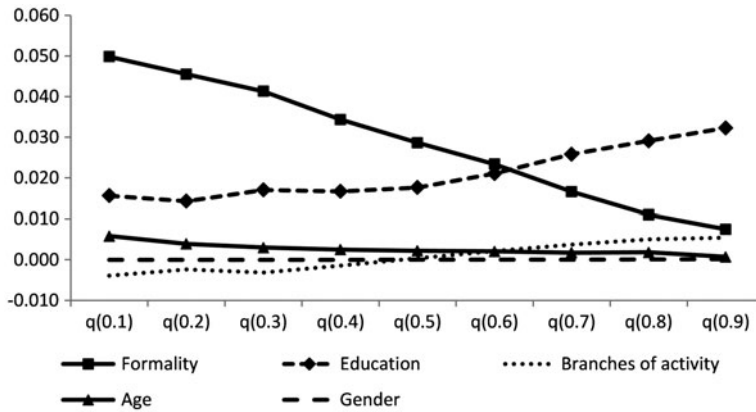


Figure 2. Composition effect along the distribution by variable under analysis.  
Source: Own elaboration based on PHS-INDEC.

The analysis of the effects of formalization of the labour market along the distribution of income shows that its equalizing effect has been a result of a decreasing impact from the lowest to the highest percentiles of income (Figure 2). In particular, it had a greater impact on the 10th percentile than on the 50th, whereas it had no significant effects on percentile 90. This is because both the proportion of informal wage earners (and hence of the population susceptible to becoming formal) and the premium to formality decrease along the distribution (Table A1). This higher return to formality at the bottom of the distribution could in turn be a consequence of the binding minimum wage, as already mentioned.

After formalization of the labour market, the educational level is the second most important factor in terms of its distributional impact, although it had an opposite effect, that of increasing inequality. This unequalizing effect of education is in line with the results of other studies of the region.<sup>18</sup> Its absolute magnitude is around 10% of the size of the reduction in both the log p90/p10 ratio and the Gini index (Table 3). This effect is concentrated in the upper part of the distribution, as can be also appreciated in Figure 2. It is worth remembering that throughout the 2003–2012 period, wage earners' average educational level continued to grow, with a relatively higher increase registered in the proportion of employees with complete secondary school education than in the proportion of those with complete tertiary education (Table 1). Even though the latter would commonly lead to a growth of incomes in the middle or lower-middle part of the distribution (where most of the employees with complete secondary school are located), the relatively lower increase in the number of workers with complete tertiary education had a greater impact on incomes in the upper part of the distribution due to larger premiums associated with higher educational levels (Table A1).

The modifications in the structure of wage earning employment by age led to a decline in inequality, although the effect was smaller than in the cases of formalization and education. The age factor explains 3% of total p90/p10 ratio reduction (10% of the composition effect). As can be seen in Table 1, the effect is more intense in the lower part of the distribution, probably because the young, whose participation in total employment fell, have relatively lower remunerations and are mostly concentrated in that part of the distribution.

The changes in the occupational structure by branch of activity had an unequalizing effect on labour income distribution, although the effect was rather small. The impact of this variable was similar in both tails of the distribution (Table 3). The increase of income concentration in the lower end could have been caused by a reduction of wages at the bottom of the distribution, led by a higher concentration of employment in construction activities, which have relatively lower remunerations.

Lastly, the absence of gender-related effects is not surprising since the composition of wage earning employment has remained unchanged according to this variable (Table 1).

### 6.3. Detailed decomposition: returns effect

When the returns effect is considered, all five variables included in the analysis show significant effects on the reduction of the log p90/p10 ratio in the 2003–2012 period; on the other hand, only education and gender are significant when using the Gini indicator.

Figure 3 shows that the changes in formality premiums seem to raise incomes in the lower tail of the distribution and reduce incomes in the upper tail. However, only the reduction of the p90/p10 ratio is statistically significant (Table 3), while the changes registered in the p50/p10 and p90/p50 ratios are not.

The changes in returns to education made the most significant contribution to the reduction of inequality indicators. It explains two thirds of the p90/p10 ratio reduction and more than one half of the reduction in the Gini. The analysis of the ratios between percentiles indicates that this equalizing effect is concentrated in the upper part of the distribution (Table 3). Figure 3 shows this same result but also that the effect is particularly intense in the highest third of the distribution.

It is worth taking into account that the results related to the returns effect of a variable (in this case, education) on the value of the percentiles are obtained by weighting the changes observed in the premiums along the non-conditional distribution by the relative weight of each category in the occupational structure. Table A1 shows that returns fell for all educational levels (in relation to complete primary

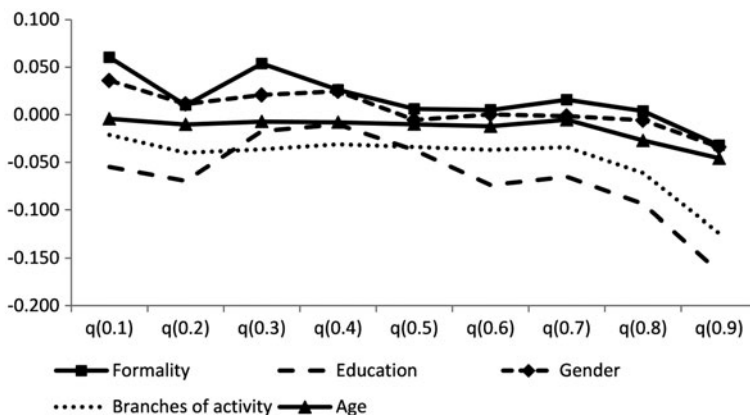


Figure 3. Returns effect along the distribution by variable under analysis. Source: Own elaboration based on PHS-INDEC.

education) except for incomplete primary school education. However, this reduction has been more intense in the upper part of the distribution, a process that affects all educational levels but particularly the higher ones (complete and incomplete tertiary education). Given that this part of the distribution has a relatively higher concentration of workers with higher education, it is more intensely affected by the changes in returns.

As mentioned above, the results regarding the equalizing effect of declining returns to education are in line with previous studies. However, unlike the 1990s, when there was some agreement on how the behaviour of the relative demand of skills was a main factor leading to increasing returns, nowadays there is less consensus regarding the possible causes of the decline observed in this variable. Except for some studies that suggest that the decline in returns could be a sign of a reversion in trend of the demand for skills, there is really no in-depth analysis addressing this issue. Labour institutions were also mentioned in some studies as another factor contributing to the reduction in skill premia in Latin America. In the case of Argentina, the strengthening of collective bargaining that started in 2003 might have had an impact on the upper tail of the distribution, since most of the workers with higher wages are not included in the collective agreement process and hence their remunerations have lagged behind since then.

A rise in female wages relative to male wages is more significant in the case of the Gini coefficient than the percentiles ratios (Table 3). This is associated with an increase in returns to men in the first percentile and with a reduction in the last one. No significant changes are observed in the rest of the distribution (Figure 3).

The changes in wage gaps between workers in different branches of activity also contributed to the reduction of inequality as measured by the  $p90/p10$  ratio, although this result is statistically significant only at a 10% level. The effect is almost in its entirety concentrated in the upper part of the distribution (Table 3). The analysis of returns to different productive sectors suggests that the equalizing effect of changes in the productive structure would be at least in part derived from a sharp reduction in the premium to financial services, which is one of the highest ones (Table A1).

Lastly, the convergence of returns to the three groups of age considered shows an equalizing effect of this dimension, with a similar intensity in the upper and lower ends of the income distribution. However, the effects are not statistically significant in the case of the Gini index (Table 3).

## 7. Conclusions

In the last decade, Argentina experienced a process of wage inequality reduction that is in stark contrast with the trends of the previous decade. The purpose of this study is to analyse the contribution of different factors to that process.

The method employed is a decomposition proposed by Firpo, Fortin, and Lemieux (2007, 2011), which allows extending the Oaxaca-Blinder approach to decompose some distributional statistics of income between a 'composition effect' and a 'returns effect'. However, when analysing the results of this paper the limitations of this method that is appropriated for partial but not for general equilibrium analyses, must be taken into account.

This study, like others, reveals that declining returns to education have been a major factor explaining the improvement observed in the distribution of income, while the changes observed in the composition of employment according to this variable –biased

towards the most educated levels – have been unequalizing. On the other hand, the formalization of the labour market has been a significant factor in the reduction of inequality. This result, which has been barely included in previous studies, is relevant since formalization can also have the opposite effect on wage inequality.

The equalizing effect of the increase in the proportion of registered workers in total wage employment in Argentina during the 2000s might have been associated with certain characteristics of the labour market formalization process and to the behaviour of returns to formality along the distribution. Since wage gaps were larger at the bottom tail, the growth in the participation of formal workers led to a reduction in inequality. In turn, the inverse relationship found between wages and premia could be at least in part due to the influence of the minimum wage. According to Maurizio (2014a) this institution had an impact on the bottom tail of the formal workers' wage distribution, particularly at the beginning of the decade. In addition, the author found no evidence of lighthouse or spillover effects.

Regarding the characteristics of the labour market formalization process, Maurizio (2014b) showed that those who became formal during the 2000s belonged to the upper deciles of the informal workers' income distribution before the change and transited to the lower deciles of the formal wage earners' distribution. However, when the analysis is made on the global income distribution (including all employees), the author finds that the rise of formal employment was more intensive in the middle part of the distribution.

These characteristics of the labour market formalization process, given the structure of premia along the distribution, led to an equalizing effect, although moderate. It is reasonable to expect that this effect will grow as this process continues and reaches the group of informal workers with lower incomes.

Despite the reduction in wage concentration during the 2000s, Argentina continues to exhibit high levels of inequality and labour precariousness. This calls for the need to implement new measures and reinforce existing ones on both the supply and demand sides of the labour market in order to reduce the incidence of such phenomena. Promoting formal job creation (through greater enforcement of labour regulation, better incentives and more productive policies), increasing the educational level of the population and fighting against wage discrimination should all be part of an integral policy agenda to improve labour conditions in a context of sustained economic growth.

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### **Notes**

1. Therefore, this definition corresponds to ILO's 'informal employment' category. This category differs from the category 'employment in the informal sector', which consists of wage earners working in small-size establishments. For a discussion, see Hussmanns (2004).

2. In this case, the reduction of average informal wages would be greater than the potential reduction of formal average wages resulting from such transitions. However, the final effects on the change in formality returns will depend on the position of informal workers within the global wage distribution.
3. Neri, Gonzaga, and Camargo (2000).
4. Between 1991 and 2001 the unemployment rate grew from 5.3% to 21% while the share of informal wage earners in total wage employment rose from 38.1% to 42.3% (Beccaria and Maurizio 2012).
5. Data from Greater Buenos Aires indicate that female labour force participation rose from 39.8% to 56.7% between 1974 and 2001 and remained at those levels during the following years to reach 57.9% in 2013.
6. There are theoretical arguments on both the demand and supply sides of the labour market that account for the countercyclical nature of informality. On the one hand, the functioning of the labour market becomes more foreseeable as a result of sustained economic growth, thus favouring the growth of long term contracts. In this context, formalization becomes more feasible. On the other hand, a process of sustained labour demand growth might also lower the expected probability of layoffs and consequently the probability of employers having to face the relatively higher costs of firing a formal worker compared with firing an informal one. Hence, the incentives to informality associate with the relatively lower costs of staff reductions in downward phases of the business cycle are reduced. In this context, employers can benefit from the positive effects of long term labour relations: productivity increases as a result of the intensification of training activities and higher levels of job engagement. Bosch and Esteban-Prete (2009) evaluate the role of the economic cycle in informality from a two-sector search and matching model where firms can choose between hiring formal or informal workers. In the former case, firms can fully take advantage of the productivity of the matching by facing the cost of complying with labour regulations. In the latter case, firms avoid these costs but they can be penalized if they are caught. Vacancies grow in the expansion phase of the cycle and therefore the number of matches between firms and workers also increase. In addition, firms engage more intensely in formal contracts during booms, since this type of contract allows them to further benefit from the increase in productivity. Both effects boost entry rates to formal jobs. Under a similar perspective, Boeri and Garibaldi (2007) use a two-sector formal/informal model to predict a positive correlation between unemployment and informality.
7. Beccaria (2013), Bertranou et al. (2013), Maurizio (2014b).
8. An extensive employment plan was launched in 2002. According to the PHS, the number of beneficiaries represented 6.5% of total occupation in 2003. The benefit initially consisted of a cash transfer with a value lower than the minimum wage, which has not been adjusted afterwards. As employment begun to grow, the quantity of beneficiaries gradually decreased to around 0.5% of total occupation in 2007. The incorporation of these individuals into the analysis of the changes observed in wage inequality would bias the results given the variability of the programme's contribution to total employment and the marginal and decreasing value of the benefit compared with average wages.
9. Other studies employing this same methodology for Latin American countries are Serrano and Yupanqui (2012), Campos, Esquivel, and Lustig (2012), and Alejo, Gabrielli, and Sosa-Escudero (2014).
10. It is worth noticing that for the mentioned effects to be identified it is necessary to consider two restrictions on the joint distribution of  $(T, X, \varepsilon)$ , namely: (1) ignorability assumption, i.e. the distribution of non-observable attributes determining wages  $-\varepsilon-$  is the same for the two groups considered; (2) common support assumption, i.e. observed attributes cannot be considered for one of the groups under analysis and not the other, but rather observable characteristics should overlap. These are the two assumptions usually considered in the program evaluation literature.
11. The concept of influence function was introduced by Hampel (1974) with the aim of assessing the robustness of  $\nu$  in the presence of outlier data when replacing  $F$  by the empirical distribution:



$$IF(y; v, F) = \lim_{\epsilon \rightarrow 0} \frac{(v(F_\epsilon) - v(F))}{\epsilon}$$

being  $F_\epsilon(y) = (1 - \epsilon)F + \epsilon\delta_y$ ;  $0 \leq \epsilon \leq 1$  and where  $\delta_y$  is a distribution that only puts mass at the point value  $y$ .

12. Here, we follow the suggestion made by FFL (2007), who highlight the practical advantages of such linear specification. They argue that: (i) the methodology carries an approximation error anyway, given that it is a first-order approximation of the impact of significant changes in the distribution of  $X$ ; (ii) a linear specification does not affect the estimations obtained when employing a reweighting procedure; and (iii) the substitution simplifies the interpretation of results.
13. Simultaneously, a political crisis unfolded with the resignation of the President. The transition period lasted more than 17 months: elections were conducted in March 2003 and the new constitutional president took office in May that year.
14. See, for example, Beccaria and Maurizio (2012), Damill, Frenkel, and Maurizio (2011).
15. Formal wage employment as a share of total wage employment rose from 57.7% to 65.6% from 2001 to 2012.
16. As already mentioned, it consists of men between 16 and 64 years of age and women between 16 and 59 years of age.
17. The values of the Gini coefficients considered in the decomposition exercise are somewhat different from those included in Table 2 since the former were computed for the set of observations that have valid values in all the characteristics considered in the analysis.
18. For example, Gasparini and Cruces (2010).

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Table A1. Unconditional quantile regressions IVQ-2003 reweighted and IVQ-2012.

Covariates	Q4-2012								
	q(0.1)	q(0.2)	q(0.3)	q(0.4)	q(0.5)	q(0.6)	q(0.7)	q(0.8)	q(0.9)
Registered wage earner	0.643***	0.666***	0.578***	0.450***	0.352***	0.277***	0.178***	0.119***	0.0820**
Education									
Incomplete primary	-0.124	-0.0904	-0.0786	-0.0911**	-0.0818**	-0.0480	-0.0447	-0.0485	-0.0410
Incomplete secondary	0.0842	0.129***	0.0832**	0.0792***	0.0786***	0.103***	0.109***	0.172***	0.163***
Complete secondary	0.187***	0.200***	0.214***	0.186***	0.186***	0.232***	0.245***	0.301***	0.314***
Incomplete tertiary	0.315***	0.323***	0.366***	0.350***	0.395***	0.411***	0.458***	0.508***	0.535***
Complete tertiary	0.209***	0.315***	0.397***	0.417***	0.550***	0.661***	0.800***	0.944***	1.100***
Branches of activity									
Construction	-0.0397	-0.0733	-0.0831*	-0.0749	-0.0268	-0.00881	0.00168	0.0138	0.0333
Commerce	-0.0805*	-0.0991**	-0.105***	-0.124***	-0.139***	-0.165***	-0.148***	-0.149***	-0.163***
Financial services	-0.0408	0.00935	-0.00752	0.0120	0.0538	0.0880**	0.145***	0.174***	0.179**
Transport services	-0.116*	-0.0803	-0.0144	-0.0176	0.0415	0.0261	0.00544	-0.0298	-0.0849
Personal services	0.0577	0.113**	0.0657	0.0713*	0.0274	0.0164	-0.00423	-0.0758	-0.102
Domestic service	0.0631	0.0409	0.0670	0.0408	0.0550	0.0578	0.0757*	0.0853*	0.140**
Public administration	0.0742*	0.154***	0.119***	0.159***	0.157***	0.156***	0.164***	0.111**	0.0173
Other branches	0.0326	0.0817*	0.0660	0.0678*	0.0969**	0.179***	0.216***	0.242***	0.269***
Male	-0.0153	-0.0162	-0.0258	-0.0335	0.0247	0.00722	0.0167	0.0625**	0.122***
Age									
≤ 25 years old	-0.228***	-0.167***	-0.144***	-0.120***	-0.0966***	-0.0864***	-0.0881***	-0.0468*	0.00656
> 44 years old	0.0359	0.0581**	0.0717***	0.0911***	0.118***	0.134***	0.172***	0.246***	0.297***
Region									
<i>Noroeste</i>	-0.520***	-0.549***	-0.457***	-0.407***	-0.382***	-0.338***	-0.371***	-0.363***	-0.398***
<i>Noreste</i>	-0.553***	-0.584***	-0.500***	-0.420***	-0.406***	-0.376***	-0.421***	-0.421***	-0.457***
<i>Cavo</i>	-0.295***	-0.384***	-0.339***	-0.314***	-0.325***	-0.323***	-0.314***	-0.345***	-0.377***
<i>Pampaerna</i>	-0.0847***	-0.184***	-0.192***	-0.185***	-0.190***	-0.190***	-0.227***	-0.256***	-0.286***
<i>Piaui</i>	-0.0635**	-0.0771**	0.0107	0.0773*	0.163**	0.219***	0.235***	0.331***	0.490***
<i>Piaui</i>	0.0347	0.0595**	0.0709***	0.0764***	0.0639***	0.0804***	0.0801***	0.0700***	0.143***
Head of household									
Job duration									
≤ 3 months	-0.319***	-0.205***	-0.129**	-0.0482	-0.0658	-0.0368	-0.0128	0.0104	0.00546
6-12 months	-0.0921	-0.0560	-0.0630	-0.0747	-0.0690	-0.116**	-0.0706	-0.00249	0.0306
1-5 years	-0.0276	0.00629	0.00537	0.0179	-0.0279	-0.00649	0.00121	0.0209	0.0425
> 5 years	0.0313	0.133**	0.182***	0.210***	0.176***	0.192***	0.222*	0.267***	0.203***
Constant	-0.117	0.0663	0.272***	0.494***	0.633***	0.747***	0.937***	1.082***	1.362***
Number of observations	8661	8661	8661	8661	8661	8661	8661	8661	8661
R <sup>2</sup>	0.187	0.274	0.316	0.308	0.313	0.299	0.280	0.227	0.151

(Continued)

Table A1. (Continued).

	Q4-2012								
Covariates	q(0.1)	q(0.2)	q(0.3)	q(0.4)	q(0.5)	q(0.6)	q(0.7)	q(0.8)	q(0.9)
Incomplete secondary	0.0193	0.000719	0.0698***	0.0326	0.0400**	0.0354*	0.0520***	0.0554***	0.0547***
Complete secondary	0.122***	0.139***	0.206***	0.178***	0.154***	0.145***	0.179***	0.192***	0.160***
Incomplete tertiary	0.202***	0.229***	0.307***	0.347***	0.321***	0.311***	0.307***	0.332***	0.294***
Complete tertiary	0.191***	0.247***	0.376***	0.426***	0.493***	0.546***	0.725***	0.853***	0.755***
Branches of activity									
Construction	0.0787	-0.00877	-0.07113**	-0.0731**	-0.0664***	-0.0432*	-0.0185	-0.0532**	-0.126***
Commerce	-0.0597	-0.0661**	-0.0981***	-0.143***	-0.134***	-0.147***	-0.154***	-0.211***	-0.282***
Financial services	0.0803*	0.0650*	0.0364	0.0366	0.0496*	0.0223	0.0339	-0.00493	-0.155***
Transport services	-0.199***	-0.125***	-0.101***	-0.0786**	-0.0178	-0.0116	0.0272	-0.0549	-0.189***
Personal services	0.0170	0.0433	0.0150	0.000933	0.00989	-0.0295	-0.0122	-0.0915**	-0.114**
Domestic service	-0.173*	-0.0955	-0.0760	-0.0462	-0.0900***	-0.0711**	-0.0783**	-0.0732**	-0.114***
Public administration	0.0721**	0.0646**	0.0784***	0.118***	0.146***	0.153***	0.189***	0.125***	-0.0255
Other branches	-0.101**	-0.0518	-0.0386	-0.0268	-0.00827	0.0222	0.0404	0.0383	0.00550
Male	0.0484*	0.00384	0.0109	0.0100	0.0151	0.00766	0.0143	0.0522***	0.0623***
Age									
≤ 25 years old	-0.178***	-0.151***	-0.126***	-0.0968***	-0.0610***	-0.0525***	-0.00759	-0.000640	0.00865
> 44 years old	-0.00535	0.0138	0.0370**	0.0515***	0.0650***	0.0738***	0.111***	0.128***	0.136***
Region									
Norwest	-0.400***	-0.372***	-0.349***	-0.298***	-0.233***	-0.213***	-0.235***	-0.234***	-0.198***
Nordest	-0.455***	-0.433***	-0.405***	-0.355***	-0.284***	-0.258***	-0.300***	-0.311***	-0.239***
Cityo	-0.161***	-0.196***	-0.194***	-0.215***	-0.174***	-0.161***	-0.184***	-0.221***	-0.166***
Pampeana	0.00127	-0.0399	-0.0651***	-0.0725***	-0.0576***	-0.0480**	-0.0775***	-0.111***	-0.0894***
Patagonica	-0.00450	0.0381	0.105***	0.211***	0.328***	0.387***	0.569***	0.714***	0.819***
Head of household	0.100***	0.0750***	0.0573***	0.0575***	0.0399***	0.0465***	0.0570***	0.0559***	0.0351*
Job duration									
≤ 3 months	-0.209**	-0.0972	-0.110**	-0.0528	0.0225	0.0132	0.0110	-0.0254	-0.0427
6-12 months	0.00970	0.0810	-0.0251	-0.0345	-0.0440	-0.0584*	-0.0642*	-0.0832**	-0.0772*
1-5 years	0.0392	0.103**	0.0566	0.0472	0.0717**	0.0348	0.0124	-0.0308	-0.0458
> 5 years	0.0818	0.154***	0.147***	0.154***	0.214***	0.198***	0.221***	0.159***	0.129***
Constant	0.499***	0.499***	0.669***	0.912***	1.019***	1.245***	1.347***	1.620***	2.099***
Number of observations	11,559	11,559	11,559	11,559	11,559	11,559	11,559	11,559	11,559
R <sup>2</sup>	0.187	0.290	0.362	0.359	0.371	0.364	0.351	0.302	0.202

Source: Author's elaboration based on PHS-INDEC (28 urban areas).

Note: Base categories are Complete Primary (Education), Manufacturing (Branches of Activity), 25-44 years old (Age), Gran Buenos Aires (Region), and 3-6 months (Job duration).

\*\*\*p<0.01; \*\*p<0.05; \*p<0.1.