Distribution effects of the minimum wage in four Latin American countries: Argentina, Brazil, Chile and Uruguay

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Abstract. *This article provides a comparative analysis of the distribution effects of the increase in the real value of the minimum wage in Latin America during the 2000s in four Latin American countries: Argentina, Brazil, Chile and Uruguay. Using semiparametric techniques to estimate counterfactual density functions, the authors find that the increase in the minimum wage had an equalizing effect in Argentina, Brazil and Uruguay, but not in Chile. This increase accounted for a considerable part of the decline in wage inequality, which was the result of compression at the lower tail of the wage distribution.*

During the 2000s, the purchasing power of the minimum wage increased in both developed and developing countries – a process that helped strengthen the role of the minimum wage as a wage policy instrument (ILO, 2009). In Latin America, this positive trend was observed in several countries with varying degrees of intensity, representing a considerable improvement on the situation in the 1990s. At the same time, many Latin American countries saw a decline in wage inequality.

The aim of this article is to identify whether – and to what extent – the minimum wage policy implemented during the approximate period 2000–12[1] contributed to the decline in wage inequality in Argentina, Brazil and Uruguay, where there was a substantial increase in the real value of the minimum wage, and in Chile, where the increase was less marked. These differences, together

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[1] The period analysed is, broadly speaking, the first decade of the 2000s, since this period saw the strongest rise in the minimum wage, as well as a marked decline in wage inequality in these countries. However, the exact years considered for each country depend on the availability of information and the time at which they started to see these positive trends. Specifically, the years studied, for each country, were: 2003–12 (Argentina); 2003–11 (Brazil); 2000–11 (Chile); and 2004–12 (Uruguay).

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with the fact that these countries have dissimilar occupational structures, make for a particularly rich analysis.

This article is also of interest for three further reasons. First, there are diverging theoretical arguments regarding the impact of the minimum wage on the labour market, which calls for empirical studies to be carried out to determine which of the different theories is valid in specific contexts. Second, empirical studies carried out on Latin American economies, using a variety of estimation methodologies and indicators, have yielded very mixed results. Therefore, a comparative study of different cases, based on the same methodology, should provide more useful guidance on the effects of minimum wage policies. Third, most of the studies on the region focus on the role of returns to education in the dynamics of wage distribution, both in the 1990s and subsequently, placing little emphasis on labour institutions. However, given the strong rise in the minimum wage during the 2000s, one might imagine that this would also have an effect on wage inequality. Moreover, it is possible that not only the minimum wage but also other labour institutions and regulations affected the returns to different individual attributes, including human capital. For this reason, in-depth analysis of the minimum wage is a valuable complement to existing wage distribution studies for Latin America.

To estimate the effect of an increase in the real value of the minimum wage on wage inequality in 2000–12 for the four countries studied, we use the methodology proposed by DiNardo, Fortin and Lemieux (1996). These authors use a semiparametric method for estimating counterfactual density functions to assess how the wage distribution would have been in 1988 if, keeping individual attributes constant, the real minimum wage had been that prevailing in 1979, which was 27 per cent higher.

The results obtained in this article suggest that the increase in the value of the real minimum wage had an equalizing effect in Argentina, Brazil and Uruguay, while in Chile the effects were not significant. As expected, in the first three countries, the decline in wage inequality was associated exclusively with greater wage compression at the lower tail of the distribution.

We should point out some limitations relating to the methodology used and hence the results obtained. First, our study ignores the potential negative effects that an increase in the minimum wage can have on employment levels. As Bosch and Manacorda (2010) state, it is not possible to distinguish between a *truncation* effect on the wage distribution, i.e. the loss of jobs paying wages below the minimum as a result of a higher minimum wage, and a *censoring* effect, whereby the minimum wage causes the wages of those initially making less than the minimum to rise to exactly the level of the wage floor.

However, although a priori we should not ignore these potential employment effects, it is important to note that the period under review was characterized by high job growth in the countries studied (Maurizio, 2015; Perazzo, 2012; Beccaria and Maurizio, 2012; Amarante, Colafranceschi and Vigorito, 2014). This was particularly true in Argentina, Brazil and Uruguay, and was accompanied by a strong process of labour formalization (Amarante and Arim,

2015; Berg, 2010; Bertranou, Casanova and Sarabia, 2013; Maurizio, 2015; Tornarolli et al., 2014; Weller and Roethlisberger, 2011). The combination of a sustained increase in aggregate employment, particularly formal employment, and a dynamic rise in the minimum wage would suggest that the minimum wage increase did not have any significant negative effects on these variables.

The second limitation is that our methodology entails partial equilibrium exercises, which could be considered a short-term approach; therefore, certain additional effects are excluded. For example, we do not consider here the effect that changes in the value of the minimum wage could have on consumption (and, in turn, on aggregate demand and employment), especially in those cases where the population directly affected by the minimum wage has a high propensity to consume. Nor do we take into account the possible effects of the minimum wage on labour participation decisions or on the labour supply qualifications structure, nor the effects on the behaviour of wage gaps.

This article focuses exclusively on the direct distribution effects of the minimum wage, without measuring the net effects, or the short- or long-term effects, that this labour institution might have had on other relevant aspects in these four Latin American countries. This, however, is an area on which future analysis could usefully focus.

The remainder of the article is organized into seven sections. The first presents a review of the main theoretical approaches and empirical literature concerning the effect of the minimum wage on the labour market. The second section provides details of our data sources, and the third describes the estimation methodology used to assess the distribution effects of the minimum wage. The fourth section describes the evolution of the minimum wage and of wage inequality, and explores the relationship between the two. The fifth section presents the econometric results, the sixth describes the sensitivity analysis carried out to verify the robustness of our results, and the last section presents our conclusions.

Theoretical approaches and empirical literature

Theoretical approaches: The effects of the minimum wage

One of the most controversial aspects of the minimum wage concerns the effect it can have on employment demand. According to the standard model of perfect labour market competition, fixing the minimum wage above the equilibrium wage will result in reduced employment, adversely affecting those workers to whom the minimum wage applies. The extent of the reduction in employment will depend positively on the price elasticity of demand.

However, alternative conceptual frameworks exist, such as monopsonistic market models or the efficiency wage theory, which present the relationship between labour institutions and their effects on the labour market in a different way. Specifically, under the monopsonistic market model, wages arising from the balance between employment supply and demand are below marginal labour productivity; an increase in the value of the minimum wage does not,

therefore, necessarily lead to reduced employment – the effect can be neutral, or even positive (Manning, 2003).

Dickens, Machin and Manning (1999) argue that labour market search models provide some support for the view that it is not difficult to construct reasonable theoretical models of the labour market where employers have some monopsony power in both the short and the long run.

Interestingly, the authors think of the source of the monopsony power of employers as being labour market frictions (whether the frictions are search-related or related to transitioning from one job to another). Under the efficiency wage theory, increases in the minimum wage could increase labour productivity and thereby also employment.

For Eyraud and Saget (2008), various factors could reduce any potential negative effects of the minimum wage on employment, or even reverse them: "On the supply side, the possibility that most employers have to compensate for higher labour costs by slight changes in work organization leading to productivity gains is crucial. On the demand side, raising the income of those workers with a low propensity to save has a positive effect on consumption levels" (Eyraud and Saget, 2008, p. 116); this has a positive effect on overall employment creation.

The distribution effects of the minimum wage will depend, among other things, on whether the minimum wage affects only the lower tail of the distribution or the entire distribution, whether the minimum wage covers only formal workers or also informal workers, and whether negative effects on employment are observed or not.

For example, one might think that those workers initially making less than the minimum wage will, with the minimum wage, see their wages raised to exactly the level of the wage floor, thereby resulting in wage compression ("censoring" effect hypothesis). On the other hand, the effects on wage inequality could be weaker if the minimum wage acts as an *index*, i.e. if wages are determined as multiples of the minimum wage, which would mean that increases in the minimum wage would have proportional effects throughout the wage distribution. However, as long as these "spillover" effects gradually diminish, the positive effects could get stronger.

If we consider the possibility that the minimum wage has negative effects on employment, those earning less than the minimum wage may be less likely to remain employed if the minimum wage increases. The loss of low-paying jobs would make the distribution more equal ("truncation" effect hypothesis), although this is not what one usually means by positively influencing the wage distribution.

Finally, in a labour market composed of formal and informal workers, where the minimum wage affects only formal workers, one might think that an increase in the minimum wage would lead to wage compression for this group, but at the same time the increase could widen the wage gap between formal and informal workers, with a priori ambiguous net results. If, on the other hand, the effects of this institution extend to the informal part of the

labour market, as shown in most empirical evidence for the region (Neri, Gonzaga and Camargo, 2000; Fajnzylber, 2001; Lemos, 2009), the results could have a more equalizing effect, since these workers are generally found in the lower tail of the distribution.

International empirical literature

Studies on the distribution effects of the minimum wage in developed countries seem to have started somewhat later than those on its effects on employment demand. One of the first studies was carried out by DiNardo, Fortin and Lemieux (1996), who use a semiparametric approach to simulate what the wage distribution would have been in 1988 in the United States if the real minimum wage had been that of 1979, keeping constant individual attributes, labour demand and unionization. The authors find that the rise in inequality at the lower tail of the wage distribution is explained mainly by the fall in the real value of the minimum wage and by the declining rate of unionization over the period in question. While the first factor is particularly striking for women, the second is for men. In a subsequent study, Fortin and Lemieux (1997) obtained similar results.

Lee (1999) focuses on the same period in the United States and reaches similar conclusions using a different methodological approach. The underlying assumption is that if the value of the minimum wage is "effective", this will have a "censoring" effect on the observed wage distribution, and this effect will be greater in those geographical regions that have lower average wages. Therefore, one way to verify the effect of the minimum wage is to regress, for example, the tenth–fiftieth wage percentile differential on the relative minimum wage. The author finds that over half the growth in inequality between the tenth and fiftieth percentiles is due to the erosion of the real value of the federal minimum wage during the 1980s. In the same vein, Autor, Manning and Smith (2010) also find that the decline in the real value of the minimum wage is responsible for some of the increase in wage inequality in the United States, but less than that suggested by earlier work.

According to the results obtained by Dickens, Machin and Manning (1999) for the United Kingdom, the increase in the minimum wage during the period 1975–92 had the effect of significantly compressing the wage distribution. At the same time, there were no negative effects on employment.

Brown (1999) concluded from his review of existing empirical studies for developed countries that although the effects of the minimum wage on employment remained controversial, the minimum wage did appear to have a positive effect on wage inequality.

In Latin America, however, little research has been carried out on the distribution effects of the minimum wage, especially in recent years.

A study by Gindling, Mossaad and Trejos (2013) for Costa Rica, however, analyses the effects of a national campaign conducted in 2010 with the aim of increasing compliance with the minimum wage. The results suggest that the campaign led to increased compliance with labour regulations, which

resulted in not only increased average wages, but also greater coverage of statutory non-wage benefits. The largest increases were seen by women, the less educated and the young, resulting in improved wage distribution. The study found no negative effects on employment.

The results obtained by Bosch and Manacorda (2010) suggest that a substantial part of the growth in inequality in Mexico in 1989–2001, and essentially all of the growth in inequality at the tail end of the distribution, was due to the steep decline in the real value of the minimum wage. The authors conclude that previous studies overestimated the importance assigned to trade liberalization in accounting for the decline in wage equality in Mexico during the 1990s.

In the case of Brazil, Neri, Gonzaga and Camargo (2000) found minimum wage effects that go beyond the effects on formal workers receiving the statutory minimum wage. First, the minimum wage is a reference for workers with no social security registration, a high percentage of whom are paid the equivalent of the minimum wage ("lighthouse effect"). Second, they find that the minimum wage is also used as an *index* for determining the wages of formal workers, many of whom are paid in multiples of the minimum. These findings are similar to those of Fajnzylber (2001) for the period 1982–97. Lemos (2009) also finds that in Brazil the minimum wage tends to significantly compress the wage distribution, both for formal and informal employment.

In a more recent study, Bosch and González Velosa (2013) evaluate the impact of the rise in the value of the minimum wage in Brazil in 1996–2010. They show that the minimum wage had an equalizing effect on the wage distribution, with spillover effects on the higher distribution percentiles. However, they also find greater inequality at the lower tail of the wage distribution, which effect disappears when the analysis is restricted to formal workers. They argue that this could reflect the fact that some of these formal workers might have lost their jobs, and shifted to lower-paid, informal jobs in response to the minimum wage increase, further widening the gap between the two groups at the lower tail of the distribution. They do not find any negative effects on aggregate employment.

Amarante, Salas and Vigorito (2009) study the effects of the minimum wage on the labour market in Uruguay in 2004–06. This period coincides with the start of the rise in the value of the minimum wage, after a long period of erosion of its real value. The authors show that this process resulted in a decline in inequality, albeit a small one.

Grau and Landerretche (2011) analyse the effects of minimum wage increases over the period 1996–2005 in Chile, finding a significant impact on workers earning wages between *ex ante* and *ex post* minimum wages. They also found a negative effect, albeit small, on the probability of staying employed and on hours worked (although in the latter case the results were not significant). Meanwhile, Groisman (2012) finds that the increase in the value of the minimum wage in Argentina in the 2000s did not result in a fall in employment demand or an increase in informal employment. Finally, in a more general study on the behaviour of the labour market and inequality in Latin America

for the same period, Keifman and Maurizio (2014) also found the minimum wage to have positive effects on the wage distribution in Argentina and Brazil.

As mentioned, there have been no studies to date that provide a comparative analysis, using the same methodology, of the distribution effects of the rise in the real value of the minimum wage in Latin America. This article attempts to make a contribution in this area.

Data

Our study is based on microdata from household surveys conducted in each of the countries studied; for Argentina, the quarterly *Encuesta permanente de hogares* (EPH), conducted by the National Institute of Statistics and Censuses in 31 urban areas; for Brazil, the monthly *Pesquisa mensal de emprego* (PME), conducted by the Brazilian Institute of Geography and Statistics in six metropolitan regions; for Chile, the *Encuesta de caracterización socioeconómica nacional* (CASEN), conducted by the Ministry of Social Development two or three times a year, for both urban and rural areas; and for Uruguay, the annual *Encuesta continua de hogares* (ECH), conducted nationwide by the National Institute of Statistics.

The four household surveys report on a worker's monthly wage,[2] the value of which is compared to the monthly minimum wage in each of these countries. Our analysis is therefore restricted to full-time wage employees (working more than 35 hours per week) with positive income. Since the value of the minimum wage stipulated is the gross value, while the income reported in surveys is net, we deducted workers' contributions from the minimum wage in order to obtain comparable values.

Similarly, since income may sometimes be misreported in the surveys (with respondents rounding wages up or down, for example), in order to determine whether wages are above, equal to or below the minimum wage, the following bands were established. A given wage is considered to be: (1) below the minimum wage if it is less than 90 per cent of the statutory minimum; (2) equal to the minimum wage if it is 90–110 per cent of the statutory minimum; and (3) above the minimum wage if it is at least 110 per cent of the statutory minimum.

Our analysis differentiates between formal and informal workers. Defining informality in terms of non-compliance with labour law, employees are considered to be informal workers if their employment relationship is, in law or practice, not subject to national labour legislation, income taxation, social protection or entitlement to certain employment benefits (ILO, 2002; Hussmanns, 2004). The empirical determination of this status depends on the availability of information in each of the surveys mentioned. Thus, for Argentina, workers are considered to be "formal" employees if their employers deduct social security contributions. For Brazil and Chile, formal employees are those

[2] Questions were also asked about hours worked, making it possible to calculate hourly wages.

who have signed an employment contract, and for Uruguay, formal employees are those who contribute to a pension system.

To achieve comparable results, the analysis focuses exclusively on urban areas in each country; workers in the agricultural sector have their own regulations, and are therefore excluded. Observations were also dismissed if information was missing on individual or job attributes.

Methodology

To analyse the distribution effects of changes in the minimum wage, the semi-parametric estimation method proposed by DiNardo, Fortin and Lemieux (1996) was used. In our study we estimate counterfactual density functions to assess how the wage distribution would have been at the initial point in time (date $t = 0$) if, keeping individual attributes constant, the real minimum wage had been that of the final point in time (date $t = 1$).[3] On the basis of this new counterfactual wage distribution, different measures of distribution – or inequality indicators – are estimated, such as the Gini index, the Theil index and the relationship between percentiles. In this way, since we evaluate only changes in the minimum wage – holding constant other potential causes of change in wage distribution – it is possible to identify the distribution effects of the minimum wage by comparing the inequality indicators prevailing at the initial point in time with those resulting from the counterfactual distribution.

We view each individual observation as a vector made up of the real monthly wage y, individual attributes x, and a point in time or date t that will take one of two values: 0 (the initial point in time, when the real value of the minimum wage is lower) and 1 (the final point in time). Each individual observation belongs to a joint distribution $F(y, x, t)$ of monthly wages, individual attributes and dates. The joint distribution of wages and attributes at one point in time is the conditional distribution $F(y, x|t_{y,x} = t)$. For the purposes of this article, this distribution may also be expressed as a function of the real minimum wage, m_t, i.e. $F(y, x|t_{y,x} = t; m_t)$.

The density of real wages at one point in time can be written as the integral of the product of the density of real wages conditional on a set of individual attributes and on a date t_y (hereafter "conditional wage density"), $f(y|x, t_y = t; m_t)$ and the density of these attributes conditional on the same date, $h(x|t_x = t)$:

$$f_t(y) = \int_{x \in \Omega_x} f(y|x, t_y = t; m_t).\, h(x|t_x = t)\, dx \equiv f(y; t_y = t, t_x = t, m_t)$$

where Ω_x is the domain of definition of the individual attributes.

The exercise to perform is to obtain the density that would have prevailed at $t = 0$ if the real minimum wage had been that prevailing at $t = 1$, with the workers involved being paid in accordance with the structure of wages observed at $t = 0$. This exercise rests on three assumptions, namely:

[3] In this study, nominal wages and the value of the minimum wage at $t = 1$ are deflated to the values prevailing at $t = 0$.

- The minimum wage has an effect only on those workers earning less than or equal to the minimum wage – i.e. the minimum wage has no spillover effects on the distribution of wages above the minimum wage;
- The shape of the conditional wage density, for wages below the minimum wage, depends only on the value of the minimum wage. Therefore, for two values of the minimum wage, m_0 and m_1, where $m_0 \leq m_1$, the shape of the conditional wage density $f(y|x, t_y = 0; m_1)$ for wages below m_1 is proportional to the shape of the conditional wage density $f(y|x, t_y = 1; m_1)$;
- The real minimum wage has no effect on employment probabilities.

Under these assumptions, we simulate the distribution effects of the minimum wage. As mentioned, the degree of inequality is evaluated using five different inequality indicators: the Gini index, the Theil index and the relationship between the 90/50, 50/10 and 90/10 hourly wage percentiles.

Our estimator consists in replacing the section of the $t = 0$ conditional wage density below the $t = 1$ minimum wage by the corresponding section of the $t = 1$ conditional wage density. The section imputed from the $t = 1$ density is scaled appropriately to make sure that the overall density still integrates to one. Each "transplanted" observation is assigned a weight proportional to the odds ratio that the wage is below the new minimum, conditional on certain observable attributes[4] and on the date considered in the analysis.

In order to obtain the marginal distribution, it is necessary to integrate this counterfactual conditional density and the distribution of attributes. To this end, the attributes of the "transplanted" observations are reweighted in order to replicate those observed in $t = 0$ and to ensure that the estimated effect will not be influenced by changes in the structure of employment. In formal terms, the procedure is expressed as follows:

$$f(y; t_y = 0, t_x = 0, m_1) = \int \mathrm{I}(y \leq m_1)\, \varphi(x, m_1)\, f(y|x, t_y = 1; m_1)\, h(x|t_x = 1)dx + \int [1 - \mathrm{I}(y \leq m_1)]\, f(y|x, t_y = 0; m_0)\, h(x|t_x = 0)dx$$

where $\varphi(x, m_1) = \Pr(t_y = 0 \,|\, x, y \leq m_1)\ \Pr(t_x = 1) \,/\, \Pr(t_y = 1 \,|\, x, y \leq m_1)\ \Pr(t_x = 0)$ is the product of these reweighting procedures.

To estimate the conditional probabilities involved in the reweighting function $\varphi(x, m_1)$ – i.e., the probability that each observation corresponds to time t, given its individual attributes and a wage below the $t = 1$ minimum wage – we consider exclusively observations that at $t = 0$ and $t = 1$ reported real wages less than or equal to the $t = 1$ real minimum wage, m_1. We then estimate a probit model to obtain the conditional odds ratio for each observation to be "transplanted" (i.e. observations where wages are below the minimum wage at $t = 1$.) Then, the probabilities are adjusted according to the sample proportion ratio of observations corresponding to $t = 0$ and $t = 1$, to ensure that the resulting counterfactual density integrates to one. In addition, to verify the effectiveness of the reweighting procedure, hypothesis tests are carried out on

[4] In line with usual practice, the observable attributes here are sex, age, educational level, formality of employment, industry, firm size and region.

the mean differences between the attributes prevailing at $t = 0$ and those associated with the estimated counterfactual density.

Lastly, to quantify the effect of the minimum wage on wage inequality, we calculate the inequality indicators associated with the counterfactual wage distribution constructed at $t = 0$, consisting of: (1) the section of the real wages that at $t = 0$ was above the minimum wage prevailing at $t = 1$, and (2) the section of the real wages that at $t = 1$ was below the minimum wage, the latter being reweighted as described in the preceding paragraph. This reweighting ensures that the average structure of attributes at $t = 0$ is not modified, and therefore does not influence the effects estimated here, making it possible to deduce the direct effect of changes in the minimum wage on the distribution of hourly wages.

An important aspect here is the rate of non-compliance with the minimum wage in the counterfactual exercises. Since the exercises involve replacing the section of the $t = 0$ density below the $t = 1$ real minimum wage by the corresponding section of the $t = 1$ density, the counterfactual rate of non-compliance will be different to that existing at $t = 0$. However, the rate of non-compliance at $t = 1$ is not reproduced, since the "transplanted" section is reweighted to reproduce the wage structure and attribute structure prevailing at $t = 0$. The greater the changes in structure between $t = 0$ and $t = 1$, the greater the effect of the reweighting, and therefore, the greater the difference between the rate of non-compliance for the counterfactual distribution and the rate of non-compliance at $t = 1$.

On the other hand, it is also necessary to specify the assumption regarding the behaviour of wages that at $t = 0$ were *already below* the minimum wage. This is particularly important in the case of informal workers, a significant percentage of whom are in this situation. In the first simulations, it is assumed that changes in the real value of the minimum wage also affect these wages. However, it could be argued that these exercises may be overestimating the effects of the minimum wage, since it is assumed that changes in the minimum wage also reach those wage earners to whom the minimum wage did not originally apply. In order to avoid this effect, further exercises are described in the "sensitivity analysis" section; in these exercises, the distribution effects are estimated on the assumption that changes in the minimum wage affect only the wage distribution section that is above the $t = 0$ and below the $t = 1$ value of the minimum wage. This assumption is more conservative in terms of the expected effects of the minimum wage on the wage structure and, therefore, on wage inequality.

Minimum wage and wage inequality: An overview

Evolution of hourly wage inequality

There continues to be considerable wage inequality in Latin America. However, during the 2000s, several countries in the region showed positive trends (Beccaria, Maurizio and Vázquez, 2014; ECLAC, 2014; Keifman and Maurizio,

2014; López Calva and Lustig, 2010) that contrast sharply with those seen in the 1990s and also with those currently seen in other regions of the world, such as in Asia (ADB, 2012).

In order to provide a more comprehensive overview of the changes in the wage distribution in the four countries studied, figure 1 shows the Gini index values and the relationship between the median log wage and the tenth and ninetieth distribution percentiles in the period in question.

As can be seen, there was a decline in the degree of wage dispersion in all four countries, albeit with varying degrees of intensity. The Gini index fell by 22 per cent in Argentina, 16 per cent in Uruguay, 6 per cent in Brazil and 5 per cent in Chile. Also, while in Argentina this improvement was mainly the result of less concentration in the upper part of the distribution, the opposite is true for Brazil and Chile. In Uruguay, the decline in inequality was similar at both ends of the wage scale.

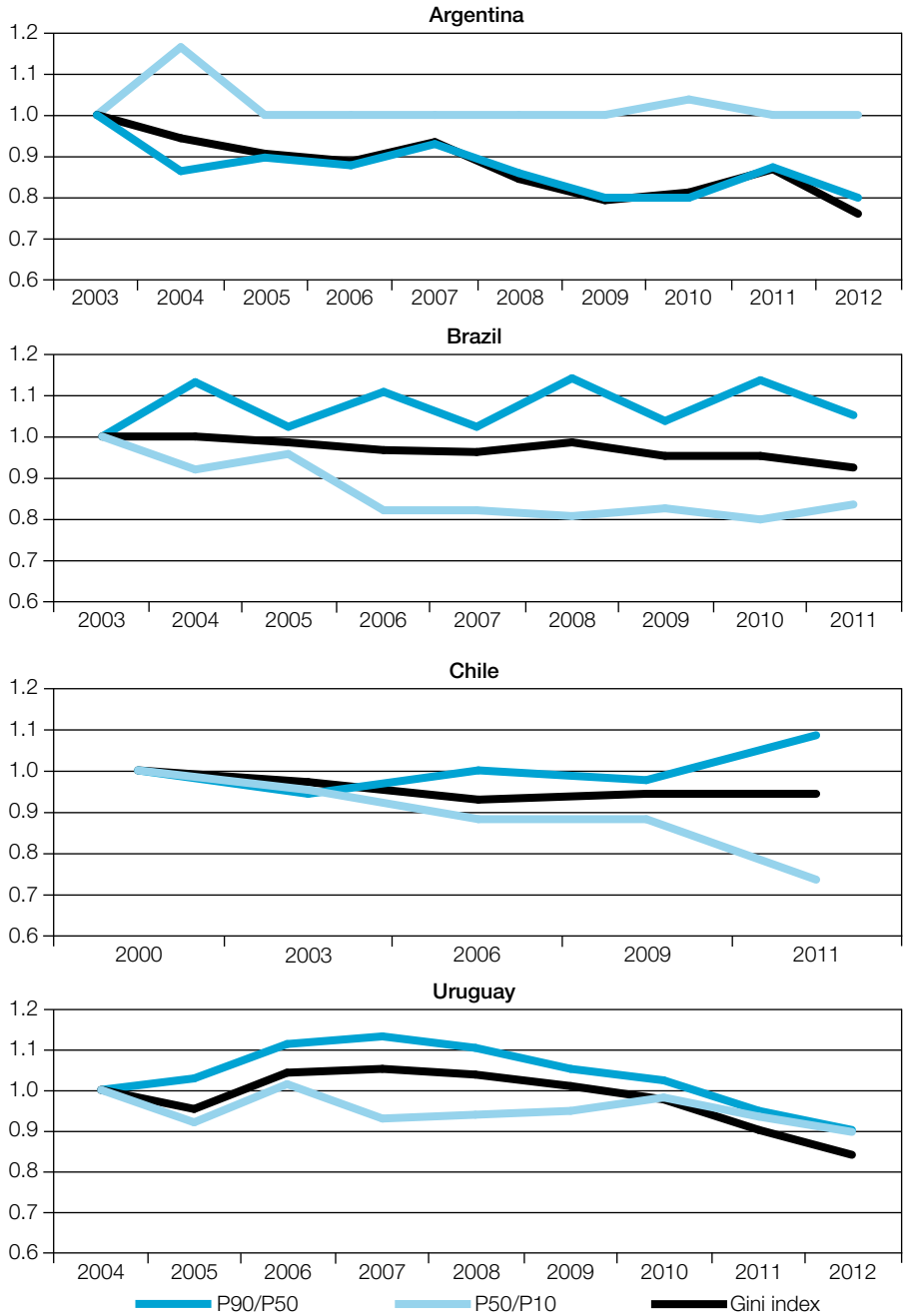
Of the four countries, Uruguay was the last to see the start (in 2007) of the process of a decline in wage inequality (Amarante, Colafranceschi and Vigorito, 2014). In Argentina, however, the reversal of the increasing wage concentration that had been seen in the 1990s began in 2003, associated with the change in the macroeconomic framework established following the collapse of the convertibility regime (Beccaria and Maurizio, 2012). In Brazil, positive trends have been observed since the mid-1990s (Soares, 2006); however, in the 2000s they intensified. Chile has also experienced a decline in wage inequality since the 1990s, albeit with some fluctuations (Contreras and Ffrench-Davis, 2014).

Evolution of the minimum wage

As we have seen, the decline in wage inequality in Latin America in the 2000s was accompanied by the rise in the real value of the minimum wage in a large number of countries in the region, albeit with varying degrees of intensity (ILO, 2008; Keifman and Maurizio, 2014; Marinakis and Velasco, 2006).

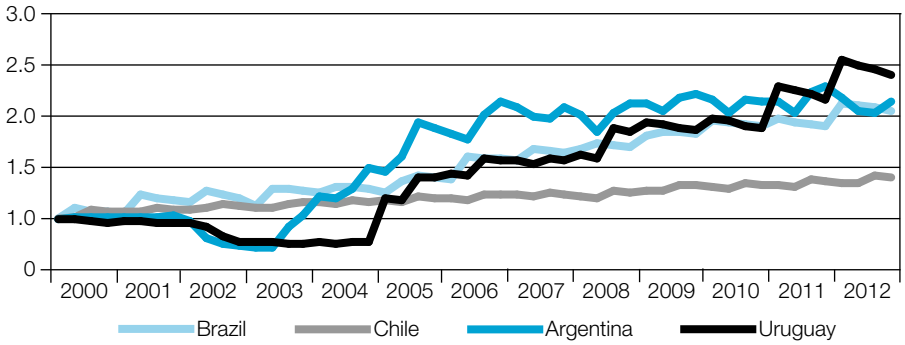
Detailed analysis of the evolution of the minimum wage in the four countries shows a number of differences (see figure 2). In Argentina, the minimum wage remained at a low nominal and real value from 1993 (200 Argentine pesos, equivalent to US$200). However, from 2003 onwards intense policies were implemented to adjust the nominal value of the minimum wage, resulting in a 200 per cent increase in its real value by 2012. However, this positive trend began to tail off from 2007, when rising inflation reduced the purchasing power of the minimum wage. In the case of Brazil, the rise in the value of the minimum wage began earlier than in Argentina, in the mid-1990s. However, in the 2000s this process intensified, with the value of the minimum wage doubling in real terms. After the decline in purchasing power of the minimum wage in Chile over much of the 1980s, this then grew steadily in the late 1980s and early 1990s, albeit with less intensity than in Argentina and Brazil. In the 2000s there was an increase of about 40 per cent in real

Figure 1. Evolution of wage inequality in Argentina, Brazil, Chile and Uruguay



Note: Index of initial year = 1.
Source: Authors' own calculations, based on household survey data.

Figure 2. Evolution of real minimum wage in Argentina, Brazil, Chile and Uruguay



Nota: In local currency, based on prices at the time of the last observation. Index for 2000 = 1.
Source: Authors' own calculations, based on national statistics offices.

terms. Uruguay was the last country to start the process of strengthening the minimum wage. The minimum wage experienced considerable loss in purchasing power over a long period: in 2004 the minimum wage stood at only 25 per cent of its 1969 value, i.e. when it was launched. Only from 2005 did this trend start to reverse, allowing the minimum wage to increase its purchasing power by about 210 per cent, between 2005 and 2012.

In short, in Argentina, Brazil and Uruguay the decline in wage inequality and the increase in the minimum wage in the 2000s was greater than in Chile. Also, the process of labour formalization in this period was more intense in the first three countries. This latter aspect is particularly important because the growth of the percentage of wage employees with social security registration implies, ceteris paribus, greater reach of labour institutions and therefore potentially greater distribution effects.

Relationship between the minimum wage and the wage distribution

Different measures of distribution, or inequality indicators, can be used to assess whether the minimum wage has grown more, or less, intensively than average or median wages, for example, since this gives us a preliminary idea of possible distribution effects. Table 1 shows the minimum wage/average wage ratio, the minimum wage/median wage ratio (or Kaitz index), and the ratio of the minimum wage to the tenth and twentieth wage distribution percentiles for the four countries studied.

In all cases, the ratios expressed by these indicators increased over the period in question. In Argentina, the Kaitz index was 0.4 in 2003, rising to 0.55 in 2012, while the minimum wage/average wage ratio increased by 18 percentage points, from 30 to 48 per cent. These significant increases are explained, at least in part, by the very low value of the minimum wage at the beginning

Table 1. Minimum wage and wage distribution in Argentina, Brazil, Chile and Uruguay

Year	Minimum wage/ average wage ratio	Minimum wage/ median wage ratio (Kaitz index)	Minimum wage/ tenth percentile ratio	Minimum wage/ twentieth percentile ratio
Argentina				
2003	0.30	0.40	0.80	0.60
2004	0.44	0.53	1.25	0.93
2005	0.51	0.65	1.31	1.05
2006	0.53	0.66	1.32	0.94
2007	0.50	0.67	1.34	1.00
2008	0.52	0.63	1.26	1.01
2009	0.53	0.60	1.20	0.92
2010	0.50	0.58	1.20	0.90
2011	0.49	0.60	1.19	0.95
2012	0.48	0.55	1.11	0.79
Brazil				
2003	0.26	0.44	0.92	0.74
2004	0.27	0.48	0.92	0.80
2005	0.28	0.46	0.92	0.77
2006	0.31	0.52	0.92	0.80
2007	0.31	0.50	0.92	0.83
2008	0.30	0.51	0.92	0.76
2009	0.32	0.53	0.92	0.86
2010	0.32	0.52	0.92	0.78
2011	0.31	0.50	0.92	0.77
Chile				
2000	0.31	0.48	0.92	0.82
2003	0.35	0.53	0.95	0.83
2006	0.37	0.55	0.92	0.82
2009	0.33	0.49	0.82	0.75
2011	0.37	0.60	0.83	0.82
Uruguay				
2004	0.08	0.13	0.28	0.21
2005	0.24	0.33	0.71	0.55
2006	0.27	0.41	0.88	0.69
2007	0.23	0.33	0.76	0.59
2008	0.25	0.38	0.85	0.67
2009	0.22	0.30	0.73	0.54
2010	0.23	0.33	0.71	0.56
2011	0.26	0.33	0.70	0.58
2012	0.30	0.37	0.74	0.59

Source: Authors' calculations, based on data from household surveys.

of the period considered. In Brazil, the minimum wage/average wage ratio increased by 5 per cent while the minimum wage/median wage ratio increased by 6 per cent, between 2003 and 2011. In 2011, these ratios were 0.31 and 0.5, respectively.

In Chile, the minimum wage/average wage ratio and the minimum wage/median wage ratio increased by 6 and 12 per cent, respectively. However, when compared to the tenth and twentieth wage distribution percentiles, the picture changes; the minimum wage/tenth percentile ratio decreased from 92 to 83 per cent, while the minimum wage/twentieth percentile ratio remained unchanged. In Uruguay, owing partly to the very low initial value of the minimum wage, between 2004 and 2012 the minimum wage/average wage ratio increased by 22 per cent (i.e. from 8 to 30 per cent) while the minimum wage/median wage ratio increased by 24 per cent (i.e. from 13 to 37 per cent). Even more significant was the increase in the value of the minimum wage in relation to the lowest wage distribution percentiles; the minimum wage/tenth percentile ratio increased by 46 per cent and the minimum wage/twentieth percentile ratio increased by 38 per cent.

Finally, in the four countries the minimum wage/median wage ratio is similar to that recorded in developed countries, where the Kaitz index is between 40 and 60 per cent (ILO, 2013). Furthermore, the growth trend of the minimum wage during the first decade of the 2000s has made it potentially more "effective" in all countries – i.e. the value of the minimum wage is at an adequate level in relation to the wage distribution. However, for the minimum wage to fulfil its role in practice, actual compliance also needs to be ensured. Accordingly, minimum wage compliance is now analysed for the four countries studied.

Compliance with the minimum wage

Table 2 shows the distribution of full-time wage employment in the 2000s, by wage level compared to the minimum wage, differentiating between formal and informal employees. While there are fluctuations in all four countries, there was an increase in the percentage of employees directly benefiting from the minimum wage, i.e. whose pay is equal to the minimum wage (in Chile this was the case in 2000–06).[5] This greater level of implementation of the minimum wage, together with its growth in real terms, reinforces the effects of this mechanism on the labour market.

Some 6 per cent of employees in Argentina earned less than the legal minimum wage in 2012 and around 7 per cent earned the minimum wage. This means that the remaining 87 per cent earned more than the minimum wage. As expected, the situation varied according to whether employees had social security registration or not. For registered (i.e. formal) employees, 1.4 per cent

[5] Those workers paid in multiples of the minimum wage could also be covered by this mechanism.

Table 2. Real coverage of minimum wage (percentage of employees by wage in relation to the minimum wage)

Year	Total wage employees			Formal wage employees			Informal wage employees		
	Below the minimum wage	Equal to the minimum wage	Above the minimum wage	Below the minimum wage	Equal to the minimum wage	Above the minimum wage	Below the minimum wage	Equal to the minimum wage	Above the minimum wage
Argentina									
2003	5.5	2.5	92.1	0.5	0.8	98.7	16.3	6.1	77.6
2004	12.0	9.0	79.0	1.8	5.3	92.9	32.8	16.5	50.7
2005	14.6	7.4	78.0	3.8	4.6	91.6	39.0	13.6	47.4
2006	13.5	11.1	75.4	3.2	7.1	89.7	36.5	19.8	43.7
2007	15.7	7.5	76.8	4.5	5.1	90.5	42.7	13.2	44.1
2008	15.1	7.8	77.1	5.0	5.8	89.2	41.6	13.2	45.2
2009	12.9	8.0	79.1	3.5	5.4	91.1	40.0	15.7	44.3
2010	11.5	8.3	80.2	3.3	5.0	91.7	34.1	17.4	48.5
2011	12.1	10.2	77.7	3.4	6.3	90.3	37.1	21.2	41.7
2012	6.1	7.4	86.5	1.4	2.7	95.9	19.2	20.4	60.4
Brazil									
2003	2.1	10.1	87.8	0.2	6.3	93.5	7.6	21.2	71.1
2004	3.5	9.7	86.9	0.3	6.6	93.1	12.4	18.4	69.2
2005	2.8	12.8	84.4	0.3	8.2	91.6	10.6	26.5	63.0
2006	2.9	12.0	85.2	0.2	8.3	91.5	11.5	23.7	64.8
2007	3.1	9.7	87.2	0.2	7.5	92.4	13.7	17.6	68.7
2008	2.3	11.5	86.2	0.1	8.8	91.1	10.9	22.3	66.8
2009	2.3	11.8	85.9	0.1	9.4	90.5	11.0	21.5	67.4
2010	2.3	11.7	86.0	0.1	9.7	90.2	12.2	20.9	66.9
2011	1.8	9.6	88.6	0.1	7.9	91.9	10.4	18.0	71.7
Chile									
2000	4.4	7.0	88.7	2.6	5.7	91.7	15.5	15.2	69.3
2003	6.2	6.2	87.7	3.1	5.2	91.7	25.0	11.7	63.3
2006	4.7	9.6	85.7	3.2	8.4	88.4	16.0	18.3	65.7
2009	3.5	3.4	93.1	2.1	3.0	95.0	11.4	5.9	82.8
2011	3.6	4.1	92.3	2.2	3.6	94.2	15.1	8.2	76.6
Uruguay									
2004	0.3	0.3	99.4	0.0	0.0	100.0	3.5	3.1	93.4
2005	2.5	2.4	95.1	1.1	1.5	97.5	11.4	7.9	80.7
2006	5.3	3.9	90.8	2.3	2.7	95.0	21.3	10.2	68.5
2007	3.0	2.0	95.0	1.7	1.3	97.0	13.6	8.1	78.3
2008	4.2	2.9	92.9	2.5	2.5	95.0	21.3	6.3	72.4
2009	2.5	2.5	95.0	1.5	1.8	96.7	16.3	11.4	72.3
2010	2.4	1.9	95.8	1.5	1.4	97.1	15.4	9.0	75.7
2011	2.4	1.9	95.8	1.6	1.6	96.8	16.6	7.4	76.0
2012	2.9	2.0	95.1	1.8	1.5	96.7	19.9	9.9	70.3

Source: Authors' calculations, based on data from household surveys.

of them earned less than the minimum wage;[6] for non-registered (i.e. informal) employees, this figure was 19 per cent. The percentage of formal employees earning around the minimum wage was very low (3 per cent) while this was the case for 20 per cent of informal employees. This means that in 2012, 96 per cent of formal employees earned more than the legal minimum wage. This figure had been almost 100 per cent in 2003 owing to the very low value of the minimum wage, meaning that it was not "effective" in the sense defined earlier.

In Brazil, compliance with minimum wage laws appears to be higher than in the other three countries; in 2011 only 1.8 per cent of wage employees earned less than the minimum wage, while 9.6 per cent earned the minimum wage and approximately 89 per cent earned more than the minimum wage. While, as is expected, compliance is universal among formal employees, the percentage of informal employees earning less than the minimum wage is also very small, only 10 per cent. As in Argentina, the proportion of workers earning the minimum wage is higher among informal employees (18 per cent) than formal employees (8 per cent). As mentioned earlier, this "lighthouse effect" was already been identified by Neri, Gonzaga and Camargo (2000) and Lemos (2009), among others.

In Chile, close to 4 per cent of employees in 2011 earned less than the statutory minimum, while a similar percentage earned the minimum wage. Along with Brazil, Chile recorded the lowest percentage of informal employees earning less than the minimum wage. However, in Chile, unlike in Brazil, the percentage of informal employees earning the minimum wage is very low (about 8 per cent).

Lastly, of the four countries, Uruguay has, in 2012, the highest percentage of employees earning more than the minimum wage (95 per cent), while only 3 per cent earn less than the minimum wage. This reflects the fact that nearly all formal employees earn more than the minimum wage. However, when it comes to informal employees, 20 per cent earn less than the minimum wage, similar to the proportion in Argentina, but double that of Brazil.

Therefore, differences between the four countries regarding the distribution of full-time employees, in terms of their wages in relation to the minimum wage, is largely explained by the situation of informal employees, as the share of formal employees earning no more than the minimum wage is similar in all four cases.

Results: distribution effects of the minimum wage

Before discussing the results of the econometric exercises that estimate the distribution effects of the minimum wage, table 3 shows the average values of individual and job attributes prevailing at $t = 0$ and those associated with the counterfactual wage density. Also, in the last column, the difference between

[6] This value could be the result of errors in income declaration, since no formal employee should be earning less than the minimum wage.

Table 3. Individual attributes and job attributes used in estimations

Argentina

Attributes	2003	2012	Counter-factual[1]	Differences	
				2012–2003	Counter-factual –2003
Formal	0.64	0.70	0.63	0.1***	–0.00
Educational level					
Below primary education	0.06	0.04	0.06	–0.0***	0.00
Primary education	0.23	0.18	0.23	–0.0***	–0.00
Below secondary education	0.19	0.19	0.18	–0.0	–0.01
Secondary education	0.25	0.31	0.24	0.1***	–0.00
Below higher education	0.12	0.12	0.12	0.0	0.01
Higher education	0.15	0.16	0.16	0.0	0.01
Industry					
Manufacturing	0.18	0.20	0.18	0.0	–0.01
Construction	0.06	0.09	0.06	0.0***	–0.00
Commerce	0.24	0.21	0.23	–0.0**	–0.01
Finance	0.11	0.09	0.11	–0.0*	–0.00
Transport	0.11	0.12	0.11	0.0	0.00
Personal services	0.04	0.04	0.05	–0.0	0.00
Domestic work	0.06	0.04	0.07	–0.0***	0.01
Public administration	0.14	0.14	0.14	–0.0	0.00
Other	0.06	0.07	0.06	0.0	0.00
Man	0.69	0.70	0.67	0.0	–0.02
Age					
< 25 years	0.15	0.13	0.15	–0.0***	–0.00
25–45 years	0.56	0.58	0.57	0.0	0.00
> 45 years	0.28	0.29	0.28	0.0	–0.00
Size of firm					
Up to 5 employees	0.31	0.26	0.32	–0.1***	0.01
6–40 employees	0.32	0.35	0.32	0.0*	–0.00
> 40 employees	0.36	0.39	0.36	0.0**	–0.01
Region					
Greater Buenos Aires	0.61	0.56	0.60	–0.0***	–0.01
North west Argentina	0.08	0.10	0.08	0.0***	0.00
Norh east Argentina	0.04	0.05	0.04	0.0***	0.00
Cuyo	0.06	0.07	0.06	0.0***	0.00
Pampeana	0.20	0.19	0.20	–0.0	0.00
Patagónica	0.03	0.03	0.03	0.0	–0.00

[1] Counterfactual analysis corresponding to the 2003 income distribution, based on the value of the 2012 minimum wage.

*, ** and *** indicate significance at the 10, 5 and 1 per cent levels, respectively.

Source: Authors' own calculations, based on data from household surveys/National Institute of Statistics and Censuses.

Table 3. Individual attributes and job attributes used in estimations *(cont.)*

Brazil

Attributes	2003	2011	Counter-factual[1]	Differences	
				2011–2003	Counter-factual –2003
Formal	0.74	0.83	0.74	0.09***	0.00
Educational level					
Below primary education	0.25	0.16	0.24	–0.08***	–0.00
Primary education	0.19	0.14	0.20	–0.05***	0.00
Below secondary education	0.12	0.08	0.12	–0.03***	0.00
Secondary education	0.31	0.40	0.31	0.09***	0.00
Below higher education	0.06	0.08	0.06	0.02***	0.00
Higher education	0.11	0.16	0.11	0.05***	0.00
Industry					
Manufacturing	0.20	0.17	0.20	–0.02***	–0.00
Construction	0.05	0.06	0.05	0.01***	–0.00
Commerce	0.23	0.23	0.23	–0.00	0.00
Finance	0.15	0.17	0.15	0.03***	–0.00
Transport	0.08	0.09	0.08	0.01***	0.00
Personal services	0.06	0.06	0.06	0.00**	0.00
Domestic work	0.09	0.08	0.09	–0.01***	–0.00
Public administration	0.10	0.09	0.10	–0.01***	0.00
Other	0.05	0.05	0.05	–0.01***	–0.00
Man	0.59	0.57	0.60	–0.03***	0.00
Age					
< 25 years	0.22	0.18	0.22	–0.05***	0.00
25–45 years	0.56	0.56	0.56	–0.00	–0.00
> 45 years	0.22	0.27	0.22	0.05***	0.00
Size of firm					
Up to 5 employees	0.20	0.15	0.20	–0.05***	–0.00
6–40 employees	0.07	0.05	0.07	–0.02***	0.00
> 40 employees	0.73	0.80	0.73	0.07***	0.00
Region					
Recife	0.06	0.06	0.06	0.01***	0.00
Salvador	0.06	0.08	0.06	0.02***	0.00
Belo Horizonte	0.10	0.10	0.10	0.01***	–0.00
Rio de Janeiro	0.25	0.22	0.25	–0.03***	0.00
São Paulo	0.45	0.45	0.45	–0.01**	–0.00
Porto Alegre	0.08	0.08	0.08	–0.00	–0.00

[1] Counterfactual analysis corresponding to the 2003 income distribution, based on the value of the 2011 minimum wage.

*, ** and *** indicate significance at the 10, 5 and 1 per cent levels, respectively.

Source: Authors' own calculations, based on data from household surveys/Brazilian Institute of Geography and Statistics.

(continued overleaf)

Table 3. Individual attributes and job attributes used in estimations *(cont.)*

Chile

Attributes	2000	2011	Counter-factual[1]	Differences	
				2011–2000	Counter-factual –2000
Formal	0.84	0.88	0.84	0.04***	0.00
Educational level					
Below primary education	0.09	0.01	0.08	–0.07***	–0.01
Primary education	0.09	0.01	0.08	–0.08***	–0.01
Below secondary education	0.17	0.19	0.18	0.02***	0.01
Secondary education	0.36	0.47	0.37	0.10***	0.00
Below higher education	0.07	0.08	0.07	0.01**	–0.00
Higher education	0.21	0.24	0.21	0.03***	0.00
Industry					
Manufacturing	0.18	0.12	0.18	–0.06***	–0.00
Construction	0.09	0.12	0.09	0.03***	0.00
Commerce	0.18	0.24	0.18	0.06***	–0.00
Finance	0.10	0.12	0.11	0.01**	0.01
Transport	0.09	0.10	0.09	0.01	–0.00
Personal services	0.12	0.09	0.12	–0.03***	0.00
Domestic work	0.09	0.07	0.09	–0.02***	–0.01
Public administration	0.07	0.13	0.07	0.06***	0.00
Other	0.07	0.01	0.07	–0.05***	0.00
Man	0.61	0.59	0.62	–0.02**	0.01
Age					
< 25 years	0.12	0.13	0.13	0.00	0.01
25–45 years	0.62	0.50	0.60	–0.12***	–0.02*
> 45 years	0.25	0.37	0.26	0.12***	0.01
Size of firm					
Up to 5 employees	0.21	0.21	0.20	0.00	–0.01
6–40 employees	0.31	0.39	0.31	0.08***	–0.00
> 40 employees	0.48	0.40	0.49	–0.08***	0.01
Region					
I	0.03	0.02	0.02	–0.01***	–0.00**
II	0.03	0.03	0.03	0.00	0.01
III	0.01	0.01	0.01	0.00	–0.00
IV	0.03	0.03	0.03	0.00	–0.00
V	0.10	0.09	0.11	–0.00	0.01
VI	0.04	0.04	0.03	0.00	–0.00
VII	0.04	0.04	0.04	–0.00	0.00
VIII	0.10	0.10	0.09	0.01	–0.00
IX	0.04	0.04	0.03	–0.00	–0.00
X	0.05	0.04	0.05	–0.01***	–0.00
XI	0.01	0.01	0.01	0.00	–0.00
XII	0.01	0.01	0.01	–0.00	0.00
Metropolitan Region	0.53	0.51	0.52	–0.02**	–0.01

[1] Counterfactual analysis corresponding to the 2000 income distribution, based on the value of the 2011 minimum wage.

*, ** and *** indicate significance at the 10, 5 and 1 per cent levels, respectively.

Source: Authors' own calculations, based on data from household surveys/Ministry of Social Development.

Table 3. Individual attributes and job attributes used in estimations *(concl.)*

Uruguay

Attributes	2004	2012	Counter-factual[1]	Differences	
				2012–2004	Counter-factual –2004
Formal	0.90	0.94	0.90	0.03***	–0.00
Educational level					
Below primary education	0.01	0.02	0.01	0.01**	–0.00
Primary education	0.08	0.13	0.08	0.05***	–0.00
Below secondary education	0.27	0.43	0.26	0.16***	–0.00
Secondary education	0.19	0.20	0.20	0.00	0.00
Below higher education	0.14	0.19	0.14	0.05***	0.00
Higher education	0.31	0.02	0.31	–0.28***	0.00
Industry					
Manufacturing	0.10	0.12	0.09	0.02	–0.00
Construction	0.03	0.31	0.04	0.28***	0.01
Commerce	0.13	0.08	0.14	–0.06***	0.00
Finance	0.09	0.04	0.09	–0.06***	–0.00
Transport	0.05	0.05	0.05	–0.01	–0.00
Personal services	0.21	0.11	0.21	–0.10***	–0.00
Domestic work	0.00	0.00	0.00	0.00	0.00
Public administration	0.31	0.18	0.31	–0.13***	–0.00
Other	0.07	0.12	0.07	0.05***	–0.00
Man	0.67	0.63	0.68	–0.04**	0.00
Age					
< 25 years	0.06	0.15	0.05	0.09***	–0.00
25–45 years	0.54	0.53	0.53	–0.01	–0.00
> 45 years	0.41	0.32	0.42	–0.09***	0.01
Size of firm					
Up to 5 employees	0.56	0.10	0.56	–0.46***	–0.00
6–40 employees	0.13	0.32	0.13	0.19***	0.00
> 40 employees	0.31	0.58	0.31	0.27***	0.00
Region					
Montevideo	0.65	0.52	0.69	–0.14***	0.03
Rest of the country	0.04	0.48	0.04	0.45***	0.00

[1] Counterfactual analysis corresponding to the 2004 income distribution, based on the value of the 2012 minimum wage.

*, ** and *** indicate significance at the 10, 5 and 1 per cent levels, respectively.

Source: Authors' own calculations, based on data from household surveys/ National Institute of Statistics.

both values for each of the attributes is shown. In virtually all cases, this difference is not statistically significant, which validates the reweighting process, and therefore constitutes sufficient evidence that the effects of interest have been correctly identified.

The first column of table 4 shows the wage distribution indicators, or inequality indicators, used to evaluate the effect of the minimum wage, including the Gini index, the Theil index, and the P90/P10, P50/P10 and P90/P50

Table 4. Estimated distribution effects of the minimum wage

Argentina (2003–12)

Indicator	Initial year	Counterfactual	Final year	Absolute difference	Relative difference (%)	Percentage of total change explained by increase in minimum wage
Average wage	769.057 17.359	790.001 17.417	1 030.657 12.100	20.944*** 3.687	3	8
90/10 wage percentile ratio	5.107 0.304	4.273 0.285	3.750 0.143	–0.834*** 0.354	–16	61
50/10 wage percentile ratio	2.143 0.109	1.756 0.106	2.000 0.000	–0.387*** 0.145	–18	271
90/50 wage percentile ratio	2.383 0.078	2.433 0.078	1.875 0.072	0.050** 0.022	2	–10
Variance	0.464 0.016	0.385 0.020	0.308 0.010	–0.079*** 0.019	–17	51
Gini index	0.378 0.011	0.354 0.012	0.293 0.005	–0.023*** 0.004	–6	27
Theil index	0.278 0.038	0.254 0.037	0.149 0.007	–0.025*** 0.004	–9	19
Observations	5 095	3 858	7 244			

*, ** and *** indicate significance at the 10, 5 and 1 per cent levels, respectively.

Note: Bootstrap standard error shown under each estimate (1,500 sub-samples).

Source: Authors' own calculations, based on data from household surveys/National Institute of Statistics and Censuses.

Brazil (2003–11)

Indicator	Initial year	Counterfactual	Final year	Absolute difference	Relative difference (%)	Percentage of total change explained by increase in minimum wage
Average wage	837.341 5.579	853.446 5.557	1 048.050 6.045	16.105*** 0.366	2	8
90/10 wage percentile ratio	6.667 0.115	4.468 0.075	5.505 0.000	–2.198*** 0.046	–33	189
50/10 wage percentile ratio	2.083 0.000	1.396 0.000	1.835 0.000	–0.687 0.000	–33	276
90/50 wage percentile ratio	3.200 0.055	3.200 0.053	3.000 0.000	0.000 0.013	0	0
Variance	0.604 0.006	0.508 0.005	0.493 0.004	–0.095*** 0.004	–16	86
Gini index	0.477 0.003	0.453 0.003	0.446 0.002	–0.024*** 0.000	–5	79
Theil index	0.467 0.007	0.438 0.007	0.417 0.007	–0.030*** 0.001	–6	60
Observations	69 357	56 741	82 471			

*, ** and *** indicate significance at the 10, 5 and 1 per cent levels, respectively.

Note: Bootstrap standard error shown under each estimate (1,500 sub-samples).

Source: Authors' own calculations, based on data from household surveys/Brazilian Institute of Geography and Statistics.

Table 4. Estimated distribution effects of the minimum wage *(concl.)*

Chile (2000–11)

Indicator	Initial year	Counterfactual	Final year	Absolute difference	Relative difference (%)	Percentage of total change explained by increase in minimum wage
Average wage	249761.552 4644.248	249668.003 6499.497	276914.898 3954.051	–93.549 4370.188	0	0
90/10 wage percentile ratio	6.250 0.150	6.326 0.191	4.551 0.169	0.076 0.216	1	–4
50/10 wage percentile ratio	2.000 0.046	2.024 0.055	1.497 0.030	0.024 0.068	1	–5
90/50 wage percentile ratio	3.125 0.068	3.125 0.082	3.040 0.100	0.000 0.082	0	0
Variance	0.566 0.027	0.586 0.020	0.480 0.012	0.020 0.028	4	–23
Gini index	0.451 0.008	0.453 0.009	0.429 0.006	0.001 0.003	0	–7
Theil index	0.421 0.024	0.423 0.024	0.395 0.018	0.002 0.005	0	–7
Observations	26005	19908	30051			

*, ** and *** indicate significance at the 10, 5 and 1 per cent levels, respectively.

Note: Bootstrap standard error shown under each estimate (1,500 sub-samples).

Source: Authors' own calculations, based on data from household surveys/Ministry of Social Development.

Uruguay (2004–12)

Indicator	Initial year	Counterfactual	Final year	Absolute difference	Relative difference (%)	Percentage of total change explained by increase in minimum wage
Average wage	8012.358 80.307	8025.257 88.375	11094.225 59.058	12.899 38.246	0	0
90/10 wage percentile ratio	6.000 0.055	5.203 0.107	4.795 0.088	–0.797*** 0.107	–13	66
50/10 wage percentile ratio	2.320 0.032	2.012 0.050	2.055 0.036	–0.309*** 0.047	–13	116
90/50 wage percentile ratio	2.586 0.037	2.586 0.045	2.333 0.015	0.000 0.032	0	0
Variance	0.601 0.021	0.533 0.016	0.427 0.006	–0.068*** 0.024	–11	39
Gini index	0.422 0.004	0.414 0.004	0.355 0.002	–0.008*** 0.002	–2	12
Theil index	0.340 0.011	0.331 0.011	0.218 0.003	–0.009*** 0.002	–3	7
Observations	11072	9961	22833			

*, ** and *** indicate significance at the 10, 5 and 1 per cent levels, respectively.

Note: Bootstrap standard error shown under each estimate (1,500 sub-samples).

Source: Authors' own calculations, based on data from household surveys/ National Institute of Statistics.

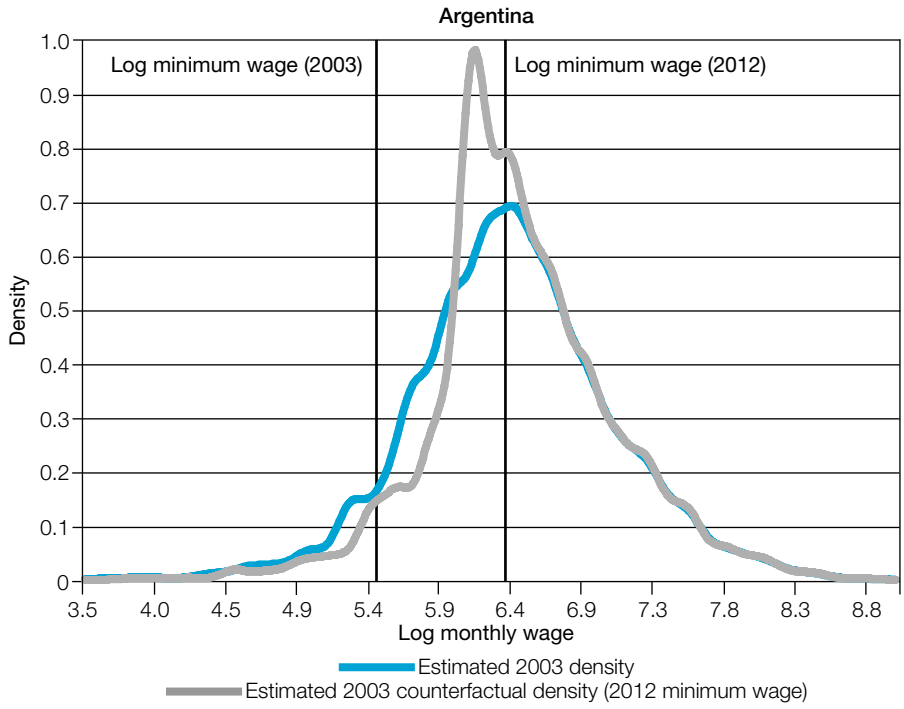
percentile ratios. In the second column, the actual values of these indicators are shown, for the initial year ($t = 0$). The third column shows the counterfactual values arising from stimulating the changes in the minimum wage, using the methodology described earlier. The next column shows the actual values at the final point in time ($t = 1$). The fifth column shows the absolute differences between the counterfactual and the initial values, and the statistical significance of the effect of the minimum wage on inequality. The sixth column shows the relative differences, expressed as a percentage, while the last column shows the percentage of the total change for each of these inequality indicators that is explained by the increase in the minimum wage.

In all cases except Chile, the results suggest that the minimum wage had an equalizing effect, although the intensity of the effect varies between countries. In Argentina, Brazil and Uruguay, the decline in wage inequality is explained by compression at the lower tail of the wage distribution. The assumption that the minimum wage affects only those individuals earning less than or equal to the minimum wage may determine, at least in part, this latter result.

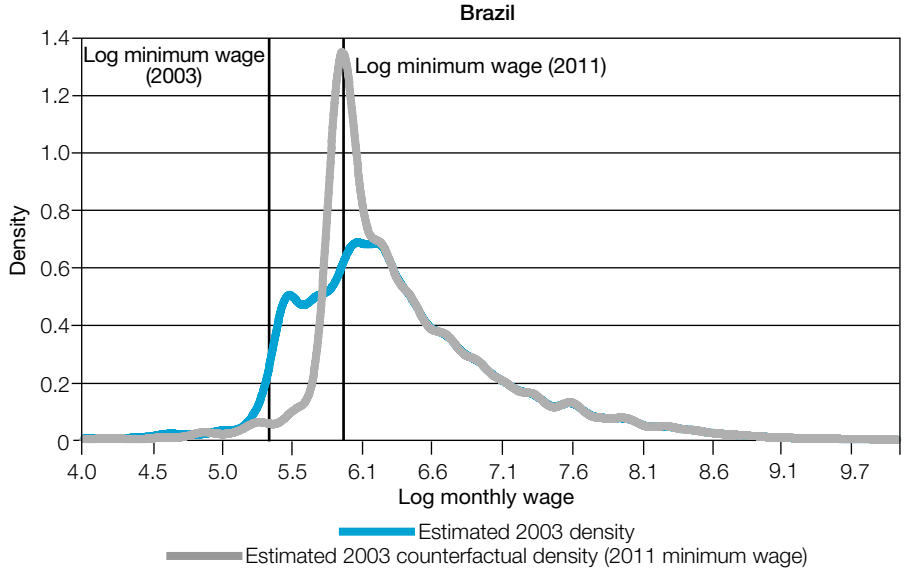
In Argentina the minimum wage increase is associated with a fall of 2.3 per cent in the Gini index, which represents a drop of 6 per cent from its initial value; the minimum wage accounts for about a third of the decrease in this index seen between 2003 and 2012. A similar situation is observed with the Theil index, which contracted by 2.5 per cent (representing a decline of 9 per cent); the minimum wage accounts for about 19 per cent of the decrease in this indicator. Meanwhile, the P50/P10 ratio also declined significantly, from 2.14 to 1.76. In this part of the distribution, the rise in the minimum wage accounts for 271 per cent of the decrease in the gap between the two percentiles. The minimum wage increase also changed the differential between the extreme percentiles – i.e. the P90/P10 ratio – which contracted by 16 per cent. Figure 3 provides a graphical representation of these changes, showing the wage density in 2003 and the counterfactual density obtained by simulating the effect of raising the minimum wage. The real value of the minimum wage is also shown, for 2003 and 2012. There is clearly a strong shift that occurs from the lower to the central part of the distribution as a result of the increase in the minimum wage, thereby illustrating the improvements in wage distribution.

The rise in the value of the minimum wage in Brazil also had important equalizing effects. The Gini index decreased by 2.4 per cent, i.e. a 5 per cent drop from its initial value (table 4). Importantly, the increase in the minimum wage accounts for 80 per cent of the decrease in this indicator between 2003 and 2011, which is very high indeed. As in Argentina, the equalizing effect is seen exclusively in the lower tail of the distribution: the P50/P10 ratio fell by 33 per cent, from 2.1 to 1.4. This contraction is sufficiently intense to also reduce the gap between extreme percentiles – i.e. the ninetieth and tenth percentiles – by about a third. As in Argentina, the results suggest that if the effect of the minimum wage alone had been considered, the P50/P10 ratio of the final year would have been even lower than actually observed. The importance of this

Figure 3. Estimated hourly wage densities



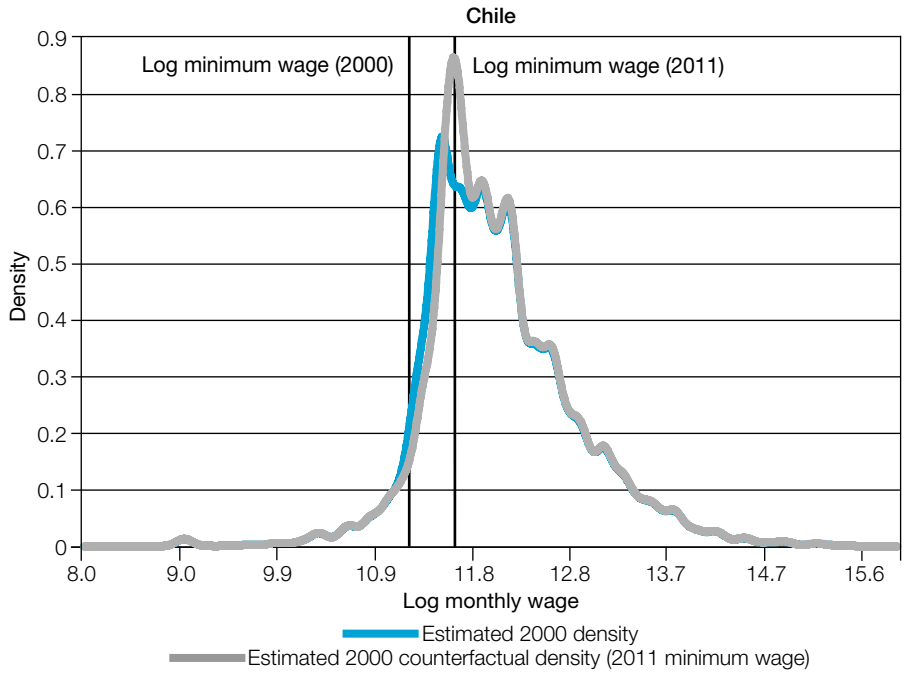
Source: Authors' own calculations, based on data from household surveys/National Institute of Statistics and Censuses.



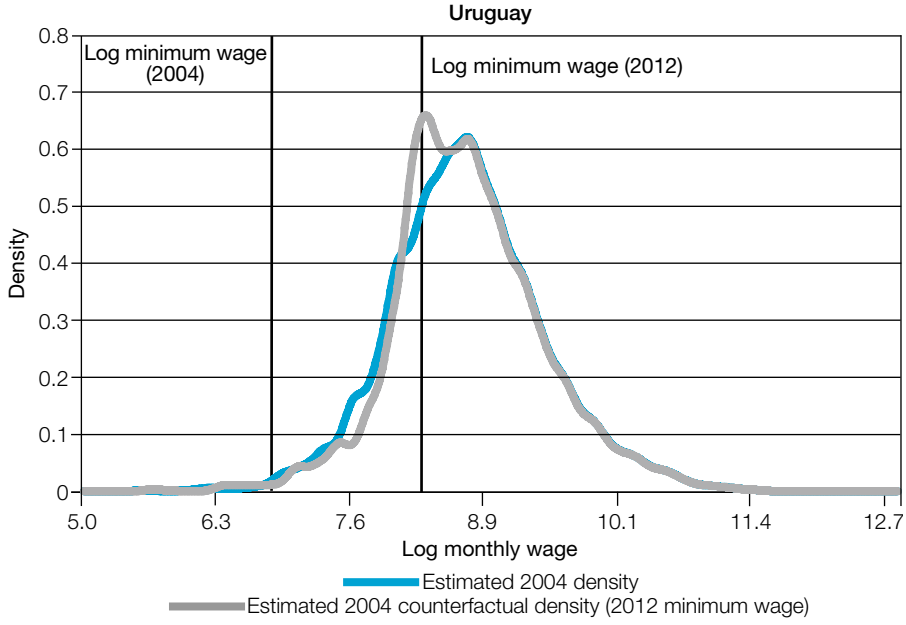
Source: Authors' own calculations, based on data from household surveys/Brazilian Institute of Geography and Statistics.

(continued overleaf)

Figure 3. Estimated hourly wage densities *(concl.)*



Source: Authors' own calculations, based on data from household surveys/Ministry of Social Development.



Source: Authors' own calculations, based on data from household surveys/ National Institute of Statistics.

factor in reducing wage inequality is associated, at least in part, with the fact that this decrease was essentially the result of greater wage compression at the lower tail of the distribution, i.e. where the effects of the minimum wage operate.[7] Again, figure 3 shows the effect of the minimum wage on the original wage density function. As previously mentioned, compliance with the minimum wage appears to be greater in Brazil than in the other countries studied. This can be seen first through the very low original density below the 2003 minimum wage and, second, by the mass that accumulates around the value of the minimum wage. This increased level of "effectiveness" of the minimum wage is also reflected in the strong shift in the distribution from the lower tail up to the new minimum wage.

In Uruguay, the equalizing effects appear to be smaller than in Argentina and Brazil. The Gini index decreased by 0.8 per cent, and changes in the minimum wage account for about 12 per cent of the decrease in this indicator between 2004 and 2012 (table 4). Similar results are observed with the Theil index. Again, the reduction in the gap between the ninetieth and tenth distribution percentiles reflects exclusively what happened in the lower tail of the distribution, where the minimum wage accounted for 116 per cent of the decrease. Figure 3 shows that, as in Argentina, the minimum wage was not "effective" at the start of the period, because of its very low real value. However, the shift to the right of the counterfactual density means that its mode of distribution corresponds to that of the new minimum wage (as in Brazil).

Finally, in the case of Chile, the very slight effects that changes in the value of the minimum wage had on the inequality indicators were not statistically significant. It will be remembered that the increase in real terms in the minimum wage in this country was lower than in the other countries studied (about 40 per cent, while in the other countries the increases were between 100 and 200 per cent). Also, as was shown, the minimum wage appears to become less "effective" in the second half of the period considered. These are some of the reasons why the increase in the minimum wage was not enough to bring about a significant change in the inequality indicators, which decreased less sharply than in the other three countries. Consequently, figure 3 shows a smaller displacement of the density function than those seen previously.

Therefore, the increase in the value of the minimum wage during the 2000s appears to have contributed to substantially reducing wage inequality in three of the four countries studied. It should be borne in mind, however, that here we are only evaluating the effects on the subset of full-time workers in urban areas, who are not necessarily representative of all employees in each country.

[7] As already stated, Bosch and Manacorda (2010) also found that in Mexico, the changes in the lower tail of the distribution were explained exclusively by the erosion of the minimum wage in the 1990s.

Sensitivity analysis

Restriction of the group affected by changes in the minimum wage

As explained in the methodology section, the simulation exercises conducted involve modifying the section of the original wage distribution that is below the real minimum wage of the final point in time ($t = 1$). This involves both wages that are higher and those that are lower than the minimum wage at the initial point in time ($t = 0$). It could be argued, however, that these exercises may overestimate the effect of the minimum wage, since it is assumed that changes to the minimum wage also reach those (mainly informal) employees for whom the minimum wage was not originally implemented.

To address this concern, table 5 shows new exercises to estimate the distribution effects, in which the increase in the minimum wage was assumed to affect only that portion of the wage distribution above the original value of the minimum wage and below the final value. As shown, overall the general distribution results do not change substantially. The values of the inequality indicators for Argentina,[8] Brazil and Uruguay are only slightly lower than before, but are still statistically significant. In Chile, the increase in the minimum wage now appears to have equalizing effects, as measured by the Gini and Theil indexes, albeit of a small magnitude – 1 and 2 per cent, respectively.

Incorporating other dimensions in the analysis of distribution effects

While our decompositions are adequate for the purposes of estimating the distribution effects of the minimum wage, and those of other factors of interest, the results are not insensitive to the order in which the counterfactual exercises are carried out. In the exercises so far, we started with the original wage distribution, and simulated the effects of a rise in the value of the minimum wage, followed by those of changes in the structure of employment.[9] To reconfirm the robustness of these findings, new estimates were carried out, changing the above order.

Following DiNardo, Fortin and Lemieux (1996), we started by estimating the effects of changes in the structure of employment and then the effects of the minimum wage. Because of the extent of informal employment in the region, we first estimated the effect of other attributes (counterfactual density 1) and then the effect of this specific dimension (counterfactual density 2). On this last counterfactual density function, we simulated the effects of an increase in the value of the minimum wage (minimum wage counterfactual density). The results are shown in table 6.

[8] For this country, however, the effects on the percentile ratios are not significant.

[9] Owing to space constraints, only the results obtained after simulating the effects of the minimum wage are shown. The complete set of exercises is available from the authors upon request.

Table 5. Estimated distribution effects of the minimum wage. Restricted analysis.

Argentina (2003–12)

Indicator	Initial year	Counterfactual	Final year	Absolute difference	Relative difference (%)	Percentage of total change explained by increase in minimum wage
Kaitz index	769.057 17.435	783.031 17.772	1 030.657 12.482	13.974*** 3.276	2	5
90/10 wage percentile ratio	5.107 0.298	5.268 0.360	3.750 0.144	0.161 0.335	3	–12
50/10 wage percentile ratio	2.143 0.108	2.195 0.137	2.000 0.000	0.052 0.137	2	–36
90/50 wage percentile ratio	2.383 0.078	2.400 0.079	1.875 0.072	0.017 0.021	1	–3
Variance	0.464 0.016	0.436 0.017	0.308 0.010	–0.028*** 0.006	–6	18
Gini index	0.378 0.011	0.363 0.011	0.293 0.005	–0.015*** 0.003	–4	17
Theil index	0.278 0.039	0.263 0.038	0.149 0.006	–0.015*** 0.003	–5	12
Observations	5095	4166	7244			

*, ** and *** indicate significance at the 10, 5 and 1 per cent levels, respectively.

Note: Bootstrap standard error shown under each estimate (1,500 sub-samples).

Source: Authors' own calculations, based on data from household surveys/National Institute of Statistics and Censuses.

Brazil (2003–11)

Indicator	Initial year	Counterfactual	Final year	Absolute difference	Relative difference (%)	Percentage of total change explained by increase in minimum wage
Kaitz index	837.341 5.541	851.565 5.516	1 048.050 6.011	14.224*** 0.257	2	7
90/10 wage percentile ratio	6.667 0.113	4.468 0.073	5.505 0.000	–2.198*** 0.045	–33	189
50/10 wage percentile ratio	2.083 0.000	1.396 0.000	1.835 0.000	–0.687 0.000	–33	276
90/50 wage percentile ratio	3.200 0.054	3.200 0.052	3.000 0.000	0.000 0.012	0	0
Variance	0.604 0.006	0.540 0.006	0.493 0.004	–0.064*** 0.001	–11	58
Gini index	0.477 0.003	0.456 0.003	0.446 0.002	–0.021*** 0.000	–4	68
Theil index	0.467 0.007	0.442 0.007	0.417 0.007	–0.025*** 0.000	–5	51
Observations	69357	59053	82471			

*, ** and *** indicate significance at the 10, 5 and 1 per cent levels, respectively.

Note: Bootstrap standard error shown under each estimate (1,500 sub-samples).

Source: Authors' own calculations, based on data from household surveys/Brazilian Institute of Geography and Statistics.

(continued overleaf)

Table 5. Estimated distribution effects of the minimum wage. Restricted analysis *(concl.)*

Chile (2000–11)

Indicator	Initial year	Counterfactual	Final year	Absolute difference	Relative difference (%)	Percentage of total change explained by increase in minimum wage
Kaitz index	249761.552 4609.120	252530.159 5027.885	276914.898 3969.276	2768.607* 1958.796	1	10
90/10 wage percentile ratio	6.250 0.146	5.970 0.171	4.551 0.165	–0.280* 0.179	–4	16
50/10 wage percentile ratio	2.000 0.047	1.910 0.060	1.497 0.030	–0.090* 0.066	–4	18
90/50 wage percentile ratio	3.125 0.073	3.125 0.073	3.040 0.097	0.000 0.066	0	0
Variance	0.566 0.028	0.556 0.028	0.480 0.012	–0.011*** 0.004	–2	13
Gini index	0.451 0.008	0.446 0.008	0.429 0.006	–0.005*** 0.001	–1	22
Theil index	0.421 0.023	0.414 0.023	0.395 0.019	–0.007*** 0.001	–2	25
Observations	26005	21100	30051			

*, ** and *** indicate significance at the 10, 5 and 1 per cent levels, respectively.

Note: Bootstrap standard error shown under each estimate (1,500 sub-samples).

Source: Authors' own calculations, based on data from household surveys/Ministry of Social Development.

Uruguay (2004–12)

Indicator	Initial year	Counterfactual	Final year	Absolute difference	Relative difference (%)	Percentage of total change explained by increase in minimum wage
Kaitz index	8012.358 77.309	8019.564 85.443	11094.225 49.547	7.206 41.350	0	0
90/10 wage percentile ratio	6.000 0.069	5.203 0.114	4.795 0.089	–0.797*** 0.128	–13	66
50/10 wage percentile ratio	2.320 0.032	2.012 0.054	2.055 0.038	–0.309*** 0.053	–13	116
90/50 wage percentile ratio	2.586 0.039	2.586 0.048	2.333 0.014	0.000 0.032	0	0
Variance	0.601 0.020	0.572 0.021	0.427 0.005	–0.029*** 0.008	–5	17
Gini index	0.422 0.004	0.414 0.004	0.355 0.002	–0.007*** 0.002	–2	11
Theil index	0.340 0.011	0.332 0.010	0.218 0.003	–0.008*** 0.002	–2	7
Observations	11072	10014	22833			

*, ** and *** indicate significance at the 10, 5 and 1 per cent levels, respectively.

Note: Bootstrap standard error shown under each estimate (1,500 sub-samples).

Source: Authors' own calculations, based on data from household surveys/ National Institute of Statistics.

Table 6. Estimated effect of distribution effects of the mínimum wage. Alternative sequence of simulations

Argentina (2003–12)

Indicator	Initial year	Counter-factual density 1	Counter-factual density 2	Minimum wage counter-factual density	Final year	Absolute difference	Relative difference (%)	Percentage of total change explained by increase in minimum wage
Kaitz index	769.057 17.359	779.399 17.032	812.431 17.991	780.777 17.680	1 030.657 12.100	–31.654*** 8.430	–4	–12
90/10 wage percentile ratio	5.107 0.304	5.357 0.350	5.000 0.098	4.185 0.332	3.750 0.143	–0.815*** 0.329	–16	60
50/10 wage percentile ratio	2.143 0.109	2.143 0.133	2.000 0.026	1.756 0.135	2.000 0.000	–0.244** 0.138	–12	171
90/50 wage percentile ratio	2.383 0.078	2.500 0.072	2.500 0.049	2.383 0.108	1.875 0.072	–0.117 0.107	–5	23
Variance	0.464 0.016	0.476 0.016	0.460 0.016	0.385 0.021	0.308 0.010	–0.076*** 0.021	–16	48
Gini index	0.378 0.011	0.382 0.010	0.377 0.011	0.358 0.011	0.293 0.005	–0.019*** 0.005	–5	23
Theil index	0.278 0.038	0.280 0.033	0.275 0.035	0.257 0.033	0.149 0.007	–0.018*** 0.005	–6	14
Observations	5095	3858	3858	3858	7244			

*, ** and *** indicate significance at the 10, 5 and 1 per cent levels, respectively.

Note: Bootstrap standard error shown under each estimate (1,500 sub-samples).

Source: Authors' own calculations, based on data from household surveys/National Institute of Statistics and Censuses.

Brazil (2003–11)

Indicator	Initial year	Counter-factual density 1	Counter-factual density 2	Minimum wage counter-factual density	Final year	Absolute difference	Relative difference (%)	Percentage of total change explained by increase in minimum wage
Kaitz index	837.341 5.579	972.553 7.427	1 012.502 7.764	989.680 7.427	1 048.050 6.045	–22.822*** 0.830	–2	–11
90/10 wage percentile ratio	6.667 0.115	8.333 0.000	8.000 0.087	5.586 0.000	5.505 0.000	–2.414*** 0.087	–30	208
50/10 wage percentile ratio	2.083 0.000	2.167 0.040	2.400 0.025	1.433 0.026	1.835 0.000	–0.967*** 0.036	–40	389
90/50 wage percentile ratio	3.200 0.055	3.846 0.070	3.333 0.031	3.899 0.071	3.000 0.000	0.565*** 0.074	17	–283
Variance	0.604 0.006	0.696 0.007	0.679 0.006	0.591 0.006	0.493 0.004	–0.088*** 0.003	–13	80
Gini index	0.477 0.003	0.505 0.003	0.501 0.003	0.484 0.003	0.446 0.002	–0.016*** 0.000	–3	53
Theil index	0.467 0.007	0.505 0.008	0.494 0.008	0.479 0.008	0.417 0.007	–0.016*** 0.000	–3	31
Observations	69357	56741	56741	56741	82471			

*, ** and *** indicate significance at the 10, 5 and 1 per cent levels, respectively.

Note: Bootstrap standard error shown under each estimate (1,500 sub-samples).

Source: Authors' own calculations, based on data from household surveys/Brazilian Institute of Geography and Statistics.

(continued overleaf)

Table 6. Estimated effect of distribution effects of the mínimum wage. Alternative sequence of simulations *(concl.)*

Chile (2000–11)

Indicator	Initial year	Counter-factual density 1	Counter-factual density 2	Minimum wage counter-factual density	Final year	Absolute difference	Relative difference (%)	Percentage of total change explained by increase in minimum wage
Kaitz index	249761.552 4644.248	270779.164 5241.195	275366.702 5133.917	272966.339 5039.019	276914.898 3954.051	–2400.363*** 990.316	–1	–9
90/10 wage percentile ratio	6.250 0.150	5.556 0.259	5.889 0.291	6.209 0.325	4.551 0.169	0.320** 0.179	5	–19
50/10 wage percentile ratio	2.000 0.046	2.000 0.052	2.000 0.024	2.149 0.061	1.497 0.030	0.149*** 0.061	7	–30
90/50 wage percentile ratio	3.125 0.068	2.778 0.119	2.944 0.144	2.889 0.132	3.040 0.100	–0.056 0.051	–2	65
Variance	0.566 0.027	0.596 0.034	0.589 0.035	0.615 0.023	0.480 0.012	0.026 0.035	4	–31
Gini index	0.451 0.008	0.453 0.008	0.450 0.008	0.454 0.008	0.429 0.006	0.003** 0.002	1	–14
Theil index	0.421 0.024	0.411 0.022	0.404 0.019	0.409 0.019	0.395 0.018	0.005** 0.003	1	–19
Observations	26005	19908	19908	19908	30051			

*, ** and *** indicate significance at the 10, 5 and 1 per cent levels, respectively.

Note: Bootstrap standard error shown under each estimate (1,500 sub-samples).

Source: Authors' own calculations, based on data from household surveys/Ministry of Social Development.

Uruguay (2004–12)

Indicator	Initial year	Counter-factual density 1	Counter-factual density 2	Minimum wage counter-factual density	Final year	Absolute difference	Relative difference (%)	Percentage of total change explained by increase in minimum wage
Kaitz index	8012.358 80.307	7441.746 86.043	7911.527 94.076	7439.102 91.468	11094.225 59.058	–472.425*** 31.010	–6	–15
90/10 wage percentile ratio	6.000 0.055	5.308 0.218	4.833 0.140	4.744 0.127	4.795 0.088	–0.089 0.075	–2	7
50/10 wage percentile ratio	2.320 0.032	2.269 0.078	2.000 0.007	1.977 0.044	2.055 0.036	–0.023 0.043	–1	8
90/50 wage percentile ratio	2.586 0.037	2.339 0.065	2.417 0.070	2.399 0.072	2.333 0.015	–0.017 0.059	–1	7
Variance	0.601 0.021	0.522 0.026	0.484 0.029	0.460 0.016	0.427 0.006	–0.024 0.031	–5	14
Gini index	0.422 0.004	0.379 0.005	0.367 0.005	0.374 0.005	0.355 0.002	0.006*** 0.002	2	–10
Theil index	0.340 0.011	0.270 0.011	0.255 0.011	0.265 0.011	0.218 0.003	0.010*** 0.002	4	–8
Observations	11072	9961	9961	9961	22833			

*, ** and *** indicate significance at the 10, 5 and 1 per cent levels, respectively.

Note: Bootstrap standard error shown under each estimate (1,500 sub-samples).

Source: Authors' own calculations, based on data from household surveys/ National Institute of Statistics.

Once again, this did not change the initial conclusions. While equalizing effects on Argentina, Brazil and Uruguay are smaller with these simulations, they are only slightly smaller, and in all cases the effects on the inequality indicators remain statistically significant.

Conclusions

The aim of this study was to estimate the distribution effects of a rise in the real value of the minimum wage in Argentina, Brazil, Chile and Uruguay during the 2000s. The results obtained confirm that strengthening this labour institution was one of the factors associated with improvements in the wage distribution in these countries, with the exception of Chile where, although there was a decline in wage inequality associated with the minimum wage, the effects were not strong enough to be statistically significant.

These results contribute to the debate about the causes of the decline in wage inequality in Latin America in the new millennium. Most of the literature has focused on the effects of diminishing returns to education based on the analysis of supply and demand for different qualifications. Our study suggests the importance of extending the analysis to consider also the role of labour institutions in the improved distribution seen in the region. In fact, the diminishing returns to education could also be a result of an increase in the minimum wage and the strengthening of other institutions, such as collective bargaining.

It is important to note that the increase in the minimum wage in the countries studied took place in a period of employment growth and – particularly in Argentina, Brazil and Uruguay – strong employment formalization. The combination of these two trends therefore casts doubt on the arguments calling for more flexible labour markets in the region as a way to encourage job creation, especially formal employment.

Finally, while Latin America has shown highly positive labour market trends, in general the region continues to show high levels of employment precarity and informality, low average wages and marked wage inequality. For this reason, policies to strengthen labour institutions should be accompanied by policies to promote employment formalization, production policies aimed at reducing the structural heterogeneity and systemic inefficiency that characterize the region, and more universal social policies. The aim should be to build a coherent system to ensure that economic growth is translated in practice into improved living conditions for the region's population.

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