Minimum Wage: empirical evidence for Uruguay

Fernando Borraz  Nicolás González
Abstract

Since the end of the nineties, as most of Latin American countries, Uruguay has observed a trend toward wage inequality. In order to explain the increasing inequality prior research focused on several issues such as trade openness, technological change and labor policies. In this research we focus on minimum wage and its effects on wage structure, applying the DiNardo, Fortín and Lemieux semi-parametric approach which implies counterfactual exercises assuming zero employment effect. For the period 1986-2003, where minimum wage decreases by 66% in real terms (3.7% the yearly average), we find that it contributes slightly to wage inequality only for males. For the period 2004-2009, where minimum wage increases by 153% (25.4% the yearly average), we find that it contributes to decrease wage inequality for females. These results enable us to conclude: i) it is not clear that the erosion of minimum wage during the nineties is responsible for the increase in wage inequality; and ii) the re-introduction of minimum wage helps to decrease only female wage inequality. Nothing can be said about efficiency of this policy and further research is required on the issue of employment effect.

Keywords: Minimum wage, labor demand

JEL classifications: J38, J23.

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Introduction

Uruguay introduced the national minimum wage in 1969 in order to establish a wage floor for private workers over 18 years old, with the exception of rural and domestic workers. The government has the authority to discretionally modify it. During the nineties we observe a gradual decline in the national minimum wage and also a tendency toward wage inequality (see Figure 1). This fact motivates us to address the question about the role of the minimum wage as a redistributive tool. In particular, we analyze if the variation in minimum wage could explain the observed changes in wage inequality in the Uruguayan labor market.

From a theoretical perspective the impact of minimum wage on wage inequality could go in either direction. In the “competitive supply-and-demand model” minimum wage choice implies trade-offs. On the one hand, an increase in minimum wage could produce an increase in the wage of individuals who are in the lower tail of the wage distribution. On the other hand, a minimum wage set above the “market-clearing price” could lead to an employment reduction, usually called “employment effects” of minimum wage, and thus offsetting the gains and rising inequality. In contrast with the competitive model, when the employer has monopsony power the predictions are conflicting. In this case, we expect an increase in employment and wages when minimum wage is set between the monopsony and the competitive level. Therefore, the impact of the minimum on wage inequality can be positive, negative or null.

In what concerns to the effect of minimum wage on wage inequality in Uruguay, González and Miles (2001) analyze the effect of a 56% decrease in real terms of the minimum wage (4.7% the yearly average) in the wage structure during the period 1986 - 1997. Following a nonparametric quantile regression approach, they conclude that the decrease in minimum wage did not explain the increase in wage inequality. What is more, they observe an upward movement of the lower conditional quantile which implies a negative link between the lower tail of the distribution and minimum wage. They argue that this result could be explained by the effect of sector bargaining, or by the low level
of compliance with the minimum wage. Instead of using the statutory minimum wage as a redistributive tool, the government used it as a policy instrument to reduce government’s expenditure since it was indexed to social security variables such as unemployment insurance, pensions and income taxes. Between 1985 and 1991 the effective (real) minimum wage resulted from a sectorial wage bargaining process between employers and employees. In 2005, with the introduction of the BPC (Bases de Prestaciones y Contribuciones)\(^2\), the statutory minimum wage began to be used as a redistributive tool. Furthermore, the statutory minimum wage has increased dramatically since 2005 (see Figure 1).

Based on that, the objective of this paper is to analyze the effect of minimum wage on the wage inequality observed during the period 1986-2009. We focus on two sub-periods. First, we analyze the 1986-2003 sub-period, where the minimum wage falls 66% in real terms (3.7% the yearly average), to study if the decline of the minimum wage is responsible for the increase of the observed wage inequality. As we mention above, prior literature does not support the hypothesis of minimum wage as the main source of inequality throughout the nineties (González and Miles, 2001). Second, we analyze 2004-2009 sub-period, where the minimum wage increases 153% in real terms (25.5% the yearly average). In other words, in this case we analyze the contribution of the “new minimum wage” to wage inequality. We want to study the effectiveness of the recent increase of the minimum wage as a redistributive tool.

In order to analyze the impact of the minimum wage, we use a semi-parametric approach developed by DiNardo, Fortín and Lemieux (1996) denoted as DFL. We quantify the impact of the increase in minimum wage on the wage distribution and wage inequality. The DFL methodology enables us to quantify the gains of an increase in minimum wage by counterfactual exercises. That is, we compare the actual distribution with the counterfactual distribution, the wage distribution that will occur if no increase in the minimum wage is observed.

\(^2\) Since then, the government’s expenditures are indexed to the BPC.
One limitation of the DFL methodology is the assumption of zero employment effect. For developed countries, the empirical evidence on this matter is not unanimous. Card and Krueger (1994) and Dickens and Manning (2002) do not find negative effects of the minimum wage on employment in US and UK respectively. The former authors consider that the standard competitive model fails to predict labor market outcomes because it relies on a “number of simplifying assumptions”. In addition, Manning (2003) argues that employers have monopsony power because of “frictions in the labor market”, and questioned if the standard model of perfect competition properly predicts labor market outcomes. Recently, Addison, et al (2009) find robust positive employment effects for the U.S. Retail-Trade Sector. In contrast, Neumark and Wascher (2007) reviewing the existing literature for the US and other countries find evidence of negative employment effects -disemployment effects- on low-wage workers. For some Latin American countries\(^3\), almost all the literature reviewed by Neumark et al. (2007) suggest the presence of employment effect.

For instance, Fajnzylber (2001) analyze the case of Brazil for the period 1982-1997 using the Brazilian Monthly Employment Survey (longitudinal data). He finds employment elasticity of around -.10 for low-wage workers in the formal sector, and between -.25 and -.35 for low-wage workers in the informal sector. With the same survey, but considering a larger period 1982-2000 and a different methodology, Lemos (2005) finds employment elasticity from -.12 to .02 and from -.29 to .12 using OLS and IV, respectively. Neumark et al. (2006) realize a similar research than Lemos (2005) for the period 1996-2001, finding an estimated employment elasticity of -.07 for household heads and positive results for other family members. On the other hand, Lemos (2009) finds no evidence of employment effects in the formal and the informal sector. Bell (1997) analyzes the case of Colombia. Using time series data (Annual Industrial Survey 1980-1987), she finds an estimated employment elasticity of -.34. When she uses panel data (Minimum Wage Commission 1980-1987), the results are from -.03 to -.24 for skilled workers and from -.14 to -.33 for unskilled workers. Maloney and Nuñez (2004), using “panel employment data”, obtain an estimated employment elasticity of -.15. The

\(^3\) Brazil, Chile and Colombia.
final research of this review is for Chile and is conducted by Montenegro and Pagés (2004) using “repeated cross-section household surveys” (1960-1998) for Santiago. They find negative employment effects for young and unskilled worker, but positive effects for women.

Furtado (2005) analyze the Uruguayan case for the period 1986-2001 by estimating employment elasticities. Using a cointegration vector, she does not find robust employment effects arguing that the national minimum wage is a useless redistributive tool. This result is also in line with the findings of González and Miles 2001. Moreover, Kristensen and Cunningham (2006) elaborates a minimum wage ranking for Latin American and Caribbean countries (adjusted by a US$ PPP) for 1998. Out to 19 countries, Uruguay was in the last position of the ranking. This could be another explanation of the absence of employment effects. So, although the zero employment effect hypothesis’ seems to be reasonable for Uruguay, further research on this issue is required.

To carry out this research we use the National Household Survey (cross-sectional data), from 1986 to 2009. Assuming zero employment effect, we only find significant positive effects of the increase of the minimum wage for females in the 2004 to 2009 period. The Gini coefficient for the counterfactual distribution is greater than the Gini coefficient for the actual distribution, and their difference is statistically different from zero at the 5% level or better.

Data

This research is based on the yearly Uruguayan National Household Survey (Encuesta Continua de Hogares, ECH) from 1986 to 2009, which is conducted by the National Statistical Office of Uruguay (Instituto Nacional de Estadística, INE). The surveys were carried out on metropolitan areas of the country, which represent around the 85% of the total population, and they included household socio-economic information and its members. The samples from 2006 to 2009 include rural areas. However, we do not take
them into account in order to have a comparable sample. In addition, we only consider urban areas with 5,000 inhabitants or more because for some years urban areas with fewer inhabitants were not included. The selected sample is composed by wage earners, male and females, between 14 (minimum legal working age) and 65 years old. Despite the fact that the government sets a different monthly minimum wage for the rural and domestic sector\(^4\), we do not exclude them because: 1) We only consider urban areas, so there is a small proportion of rural workers and their minimum wage is similar to the national minimum wage; 2) the minimum wage in the domestic sector is set just above the national minimum wage, thus there is not an important difference between each other (see Furtado 2005 for a similar discussion). We keep out the public sector because the national minimum wage is not relevant for those workers.

The government sets a (nominal) monthly national minimum wage. We divide it by 172 in order to calculate the hourly minimum wage\(^5\). The Uruguayan National Household Survey has information of salaries net of social security and income taxes. Therefore, we consider minimum wage after taxes. Finally, we divide it by the consumer price index (\(\text{CPI}, \text{with base in March 1997}\)) so we have the real hourly minimum wage in 1997 prices:

\[
\text{Real Hourly } MW = \left[\frac{\text{Monthly } MW}{172} \times \frac{100}{\text{CPI}}\right]x(1-t)
\]

where \(t\) is the social security tax rate. To be consistent with the prior definition of real minimum wage, we calculate the (log) real hourly wage (in 1997 prices) as follows:

\(^4\) In 1978 the government started setting a minimum wage for the rural sector by categories. Since 1990, the government sets a minimum wage for the domestic service that varies by region (the capital and rest of the country), which is set approximately 20% above the national minimum.

\(^5\) \((8 \text{ hours per day } \times 5 \text{ days per week } \times 4.3 \text{ weeks per month}) = 172 \text{ hours per month. The decree considers 200 worked hours in a month to calculate the hourly minimum wage, which represent 48 weekly worked hours. But in practice, the majority of work contracts are based on 40 weekly worked hours.}\)
The males and females real hourly wage fluctuated with a positive trend until 2000 and then started to decrease sharply until 2004. After that, it increased gradually until 2009 (see Table 1 and 2). In addition, we show the ratio of the minimum wage to the average real hourly wage (MW / Average RHW). The male minimum wage in 1986 represented nearly two fifths of the average real hourly wage, while for female it represented approximately 70%. The ratio decreased until 2004 because of the erosion of minimum wage. In 2005, with the re-introduction of minimum wage, it increased dramatically reaching a maximum in 2008. By 2009, both males and females had nearly the same value as in the beginning of the nineties. Overall, the minimum wage is far away from the average of the wage distribution. For instance, Paraguay and Colombia had a ratio of just over 0.70 and 0.5 respectively in 1998 (Kristensen and Cunningham, 2006). In addition, the summary statistics reported in Table 1 show that the proportion of workers earning below the minimum wage decreases as minimum wage falls. In 2005, the proportion of workers earning under the minimum increased again as a result of the increase of the minimum wage.

When analyzing the effects of minimum wage, informality is an issue to take into account. For example, Maloney and Nuñes (2001) and Kristensen and Cunningham (2006) find that for many Latin American, the minimum wage has a potential impact on the formal (or covered) sector and also on the informal (or non-covered) sector. They argue that the minimum wage seems to have a stronger effect on the informal than on the formal sector. They use a kernel density estimation of the (log) real hourly wage distribution to see if the minimum wage has or not an effect on wages. This is called the “lighthouse effect” and it occurs when minimum wage is relevant for the informal sector (where minimum wage law does not apply). Additionally, in a recent paper, Khamis (2009) finds that minimum wage has stronger effects on the informal labor market.

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Argentine, Bolivia, Brazil, Chile, Colombia, Honduras, Mexico and Uruguay.
where workers experimented considerably wage increases, than on the formal labor market.

In this research, we use the definition of informality elaborated by the International Labour Organization (Organización Internacional del Trabajo, OIT) in the 15th International Conference of Labour Statisticians (1993), which consider informal workers those who work in the domestic sector, unpaid household members, private wage earners working in a firm with less than five employees and self employed workers (excluding administrative, professionals and technicians)\(^7\). Between 1986 and 2000, the ECH provides information on the size of worker’s firm. Since 2001, the question about the firm’s size is discrete: 1) 1 employee; 2) between 2 and 4 employees; 3) between 5 and 9 employees; 4) between 10 and 49 employees; and 5) more than 50 employees. Therefore, we can identify small companies of 4 or less workers. As our sample only includes private employees, informal workers are defined as those who work in small firms (four or less employees) and workers in the domestic sector. Between 1986 and 2009, around one fourth of the males included in the sample were informal workers, while approximately 45% of the female workers were working in the informal sector. We expect a significant proportion of informal workers earning below the minimum wage because this policy does not apply to them. In the data, considering workers with wages below the minimum wage, the percentage of informal workers is 46% and 65% for males and females respectively. We also expect part time workers to be earning below the minimum wage. However, there is a bigger proportion of full time\(^8\) workers than part time workers for both males and females (79% and 60% in average, respectively). For this reason, Neumark (2008) established that when analyzing data of developing countries he finds that “enforcement of and compliance with minimum wage laws is often erratic”.

We also analyze the data for the formal and informal sector separately using weighted kernel density estimation. As in prior papers, we find that the minimum wage is close to

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\(^7\) Another alternative definition consists on those workers who do not pay social security taxes. Due to the fact that the questions related to social security were added to the Uruguayan National Household Survey (ECH) after the year 2000, we can not use this latter definition in the 1991-2009 period.

\(^8\) We define full time workers as those who work 40 hours or more per week.
the informal wage distribution, mainly for females (see Figure 2). For this reason informal workers could be more sensible to changes associated with minimum wage since it could represent an important feature of the informal labor market. Therefore, we apply the DFL decomposition for the whole workforce, including informal workers.

**Methodology**

The econometric strategy consists on a semi-parametric approach that enables us to analyze the impact of the increase of minimum wage on the wage distribution. This decomposition involves estimating counterfactual densities. In order to construct the counterfactual density of the minimum wage $f_{MW}$, we estimate the density function of year $t$ that would have prevailed if the minimum wage had remained as in year $t-1$.

To do this exercise, the Dinardo, Fortín and Lemieux (DFL, 1996) decomposition relies on three assumptions: 1) only those who earn below the minimum wage will be affected by the minimum wage policy, which implies no spillover effects. Therefore, in this case the conditional density of wages at year $t$ $f(w|z,t_w,m_t)$, where $z$ is a vector of covariates and $t$ is the date, is the same as the conditional density of wages at year $t-1$ $f(w|z,t_w,m_{t-1})$ for wages above the minimum wage at year $t-1$; 2) “the shape of the conditional density of wages at or below the minimum wage only depends on the value of the minimum wage”, which implies that the conditional density of wages $f(w|z,t_w = t,m_{t-1})$ is proportional to the conditional density of wages $f(w|z,t_w = t-1,m_{t-1})$ below the minimum wage at year $t-1$; and 3) the minimum wage does not affect the employment probabilities. Hence, this methodology assumes zero employment effect.

The third assumption could be the most unrealistic because the minimum wage could have positive or negative effects on the probability of being employed. For Latin

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9 This assumption is fairly conservative since it does not consider the positive effect of the minimum wage on higher parts of the wage distribution which could contribute to a bigger reduction of inequality.
America, the empirical evidence supports the model of perfect competition so we might expect employment effects. But as we have seen before, in the Uruguayan case minimum wage seems to be far from the market-clearing prices which enable us to consider a zero employment effect as the most probable scenario.

Considering assumption (1) and (2), we combine the conditional density of wages \( f(w \mid z, t_w = t, m_{t-1}) \) below the minimum wage at year \( t-1 \) with the density function of year \( t \) which is above the minimum wage at year \( t-1 \). Formally,

\[
f_{\text{low}}(w \mid z, t_w = t; m_{t-1}) = I(w \leq m_{t-1}) \varphi_{w}(z, m_{t-1}) f(w \mid z, t_w = t - 1; m_{t-1})
\]

\[
+ [I - I(w \leq m_{t-1})] f(w \mid z, t_w = t; m_{t-1})
\]

where \( I(\cdot) \) is an indicator that takes the value of one when the condition is satisfied and zero otherwise. Thus, when \( [1 - I(w \leq m_{t-1})] = 1 \) the real hourly wage “\( w \)” is above the minimum wage observed in \( t-1 \); \( \varphi_{w}(z, m_{t-1}) \) is the “re-weighting function”, which makes that the density integrates to one; \( z \) is a vector of covariates (individual characteristics), in which \( z \in Z \) (the set of all the covariates); \( m_w \) represents the minimum wage.

The following step of the formal procedure involves integrating the equation (1) over the distribution of attributes:

\[
f_{\text{low}}(w \mid z, t_w = t; m_{t-1}) = \int_{z} [I(w \leq m_{t-1}) \varphi_{w}(z, m_{t-1}) f(w \mid z, t_w = t - 1; m_{t-1})] dF(z \mid t_z = t)
\]

\[
+ \int_{z} [I - I(w \leq m_{t-1})] f(w \mid z, t_w = t; m_{t-1}) dF(z \mid t_z = t)
\]

Then, defining \( \varphi_{z} (z)^{-1} = dF(z \mid t_z = t) / dF(z \mid t_z = t - 1) \) and multiplying the first factor of the equation (2) by this term we obtain:
\[
f_{mw}(w | z, t_w = t; m_{t-1}) = \int I(w \leq mw_{t-1}) \varphi_{w}(z, m_{t-1}) f(w | z, t_w = t-1; m_{t-1}) \varphi_{z}^{-1}(z) dF(z | t_z = t-1) \\
+ \int_{z} [I - I(w \leq mw_{t-1})] f(w | z, t_w = t; m_{t}) dF(z | t_z = t) \quad (3)
\]

where \( \varphi_{w}(z, m_{t-1}) = \frac{\text{Pr}(w \leq m_{t-1} | z, t_w = t)}{\text{Pr}(w \leq m_{t-1} | z, t_w = t-1)} \) and \( \varphi_{z}^{-1}(z) = \frac{\text{Pr}(t_z = t \mid z)}{\text{Pr}(t_z = t-1 \mid z)} \frac{\text{Pr}(t_z = t-1 \mid z)}{\text{Pr}(t_z = t \mid z)} \).

If we apply Bayes rule to the product of \( \varphi_{w}(z, m_{t-1}) \varphi_{z}^{-1}(z) \), we have:

\[
\hat{\varphi}_{w}(z, m_{t-1}) = \frac{\text{Pr}(t_w = t \mid z, w \leq m_{t})}{\text{Pr}(t_w = t-1 \mid z, w \leq m_{t-1})} \frac{\text{Pr}(t_z = t-1)}{\text{Pr}(t_z = t)} \quad \text{which is the “re-weighting function”}
\]

To estimate the conditional probability for the observations that are below the minimum wage we use a probit model. In the case of the unconditional probability, using the sample weights, we divide the number of observations of year \( t \) by the number observations of year \( t-1 \). In Table 3, we present the output estimation of the probit models, which are necessary to construct the re-weighting function. The coefficients do not have relevance for the research or an interesting meaning.

After estimating the re-weighting function, we estimate the following equation which is a weighted kernel function:

\[
f_{mw}(w | z, t_w = t; m_{t-1}) = \int I(w \leq mw_{t-1}) \sum_{i \in S_{t-1}} \frac{\theta_i}{h} \hat{\varphi}_{m}(z, m_{t-1}) K\left(\frac{w - W_i}{h}\right) \\
+ [I - I(w \leq mw_{t-1})] \sum_{i \in S_{t}} \frac{\theta_i}{h} K\left(\frac{w - W_i}{h}\right) \quad (4)
\]

where \( \theta \) represents the sample weights multiplied by the worked hours and normalized to 1. One essential issue related to the estimation of a (weighted) kernel density is the bandwidth selection. The estimation of the kernel density is sensitive to the bandwidth choice because different bandwidth produces different estimations. This does not occur with the kernel function choice \( K(\cdot) \), where different kernel functions produce similar
results. There is a trade-off between setting a small bandwidth for reducing the bias, and setting a large bandwidth in order to ensure smoothness. There is not a rule of thumb, and the different existing methods have both pro and cons (see McCrary 2008 for a useful discussion). In this research we use, as a starting point, the Silverman Plug-in and the Epanechnikov kernel function. The important limitation of the Silverman Plug-in is the assumption that the data is normal distributed. We obtain bandwidths between .09 and .10 for the different cases. To unify the bandwidth selection, and considering the visual inspection, we choose the mean of the interval .09 and .10. In addition, and to avoid part of the problem of setting a fixed bandwidth we use the adaptive kernel density estimator, which is defined as:

\[
\hat{\lambda} = \frac{G(\hat{f}_K(X;h))}{\hat{f}_K(X;h)}, \quad i = 1, \ldots, n
\]

where \(G(\ )\) is the geometric mean over all \(i\). The estimator is based on two stages. The first one consists of estimating a kernel density with a fixed \(h\) to get an overall idea of the density at each point. After that, in the second stage, the factor \(\hat{\lambda}\) enables to stretch or shrink the bandwidth so as to adapt it to each point. Therefore, the adaptive kernel density estimation is defined as:

\[
\hat{f}_K^a(x;w) = \sum_{i=1}^{n} \frac{\theta_i}{h\lambda_i} K\left(\frac{w-W_i}{h\lambda_i}\right)
\]

Once the weighted kernel density is estimated, we plot the actual density of wages at year \(t\) jointly with the counterfactual density of minimum wage in order to have a visual inspection of the possible impact of the minimum wage on the wage distribution. But we also need to calculate some indicators in order to quantify the effect of minimum wage on inequality. We have two alternatives: 1) use the estimated densities to compute the mean, Gini index and Theil’s entropy coefficient of the factual and counterfactual

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10See Dinardo and Tobias (2001).
distribution of wages, and then compare outcomes; and 2) calculate inequality measures using the raw data by means of the re-weighting function. That is, we compute the indicators directly from the factual and counterfactual distribution of wages. The latter option enables us to avoid measurement errors of the weighted kernel density estimation and therefore we use that option.

Results

The DFL decomposition approach has the advantage of providing us with a visual inspection. We analyzed two different periods: 1) 1986 – 2003 where the minimum wage decreases 66% in real terms (3.7% the yearly average); and 2) 2004 – 2009 where the minimum wage increases 153% in real terms (25.5% the yearly average). Figure 3 shows the effect of minimum wage on the wage distribution for the whole workers. According to the visual inspection, the decrease of the minimum wage affects negatively on the wage distribution for males since the counterfactual density (dotted line) seems to accumulate more density than the actual density of 2005 (solid line) below the minimum wage. For females, the decrease of the minimum wage seems to have no effect in the wage distribution. The picture is the same when we only consider informal workers.

In what concerns to the increase in the minimum wage, the visual inspection suggests that it decreases wage inequality both for males and females. The counterfactual density, the density that would have prevailed if no increase has occurred, shows a more unequal wage distribution. In this case, the estimation could be affected by the fact that the effective minimum wage is set by sectorial bargaining. In May of 2005, the collective bargaining system was re-introduced. Therefore, the government was in charge of establishing the national minimum wage for all private workers over 18 years old (excluding rural and housework sectors), and then the collective bargaining agreements set the minimum wage per sector. The national minimum wage established a wage floor in the sector negotiation.

In addition, we also calculate inequality measures (see Table 3 and 4). For the first considered period (1986-2003), we find that the decrease in minimum wage contributes
to an increase of wage inequality only for males. The Gini Index of the counterfactual distribution, that is the wage distribution if no decrease in the minimum wage is observed, is lower than the Gini index of the actual one (the Gini Index of the actual wage distribution of 2003). The difference between the Gini coefficient of the actual and counterfactual is statistically different from zero only at the 10% level or better. This result is higher if we only consider informal workers but not statistically robust. Using a different methodology, González and Miles (2001) find no connection between minimum wage and wage inequality for males for the period 1986-1997.

For the second period (2004-2009), we find that the increase in the minimum wage has positive impacts on wage inequality for females. That is, if the minimum wage has not been increased, the Gini Index would have grown around one point. The difference between the Gini coefficient of the factual and counterfactual is statistically robust at the 5% level or better. This result is similar to others of the region that uses the same methodology. In Paraguay, Urdinola and Wodon (2005), analyze the increase of minimum wage in 6 percent (in real terms) for the period 1993-2001. They find that the increase in minimum wage contributes to equality mainly for younger workers. He observes that if the minimum wage has not been increased, the Gini Index would have grown around half point. Urdinola (2009) also finds similar results for Colombia.

Conclusions

In this paper we apply the DFL decomposition for two different periods. This methodology enable us to account for the gains (or loss) of minimum wage assuming zero employment effects. In the first period 1986-2003 minimum wage decreased by 66%. We find that minimum wage contributes slightly to the increase in wage inequality for males. In the second period 2004-2009, we find that the increase of minimum wage contributes to the decrease in wage inequality just for females. These results enable us to conclude that: it is not clear whether the erosion of minimum wage during the nineties is responsible for the increase in wage inequality; and if the re-introduction of minimum wage helps to decrease only female wage inequality. We also have to consider that the
DFL decomposition allows us to compute only the gains of this kind of policy. To analyze the net result further research is required on the issue of employment effect. If employment effects are detected, results could change.
References


### Table 1. Summary statistics. Males.

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<td>Gini Index</td>
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Source: Own calculation based on the Uruguayan National Household Survey (ECH) 1986-2009.
Table 2. Summary statistics. Females.

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<td>0.41</td>
<td>0.34</td>
<td>0.27</td>
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<td>0.18</td>
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<td>0.33</td>
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<td>19</td>
<td>15</td>
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<td>3</td>
<td>10</td>
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<td>11</td>
<td>13</td>
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<tr>
<td>Full Time Workers (%)</td>
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<td>56</td>
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<tr>
<td>Informal Workers (%)</td>
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<td>5,352</td>
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<td>5,554</td>
<td>5,733</td>
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<td>5,225</td>
<td>5,285</td>
<td>5,496</td>
<td>18,128</td>
<td>12,962</td>
<td>13,969</td>
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Source: Own calculation based on the Uruguayan National Household Survey (ECH) 1986-2009.
Table 3. Dinardo Decomposition. Males.

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<tbody>
<tr>
<td><strong>Average Yearly Real</strong></td>
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<tr>
<td><strong>MW Variation</strong></td>
<td>-3.7%</td>
<td></td>
<td>25.5%</td>
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</table>

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Actual Density 2003 (1)</th>
<th>Counterfactual Density Minimum Wage (2)</th>
<th>Difference: (1) - (2)</th>
<th>Actual Density 2009 (1)</th>
<th>Counterfactual Density Minimum Wage (2)</th>
<th>Difference: (1) - (2)</th>
</tr>
</thead>
<tbody>
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<tr>
<td>Mean</td>
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<td>20.8</td>
<td>0.0</td>
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<td>27.6</td>
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<td>(0.4)</td>
<td>(0.3)</td>
<td>(0.3)</td>
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<tr>
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<td>0.437</td>
<td>0.016*</td>
<td>0.435</td>
<td>0.447</td>
<td>-0.012</td>
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<tr>
<td></td>
<td>[0.006]</td>
<td>[0.007]</td>
<td></td>
<td>[0.005]</td>
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<td>5,353</td>
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<td>15,509</td>
<td>15,226</td>
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</table>

| **Informal Workers**     |                        |                                        |                       |                        |                                        |                       |
| Mean                     | 12.5                   | 12.8                                   | -0.3                  | 16.5                   | 16.1                                   | 0.4                   |
|                          | (0.3)                  | (0.3)                                  | (0.3)                 | (0.3)                  |                                        |                       |
| Gini Coefficient         | 0.358                  | 0.334                                  | 0.024                 | 0.343                  | 0.353                                  | -0.010                |
|                          | [0.010]                | [0.013]                                |                       | [0.010]                | [0.012]                                |                       |
| Observations             | 1,491                  | 1,356                                  |                       | 3,228                  | 3,204                                  |                       |

Source: Own calculation based on the National Household Survey ECH 1986 - 2009.  
Note: standard error in round parenthesis; bootstrap standard error in square parenthesis (based on 1000 replications).  
* signifies statistically different from 0 at the 10% level or better.  
** signifies statistically different from 0 at the 5% level or better.
Table 4. Dinardo Decomposition. Females.

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Average Yearly Real MW Variation</td>
<td>-3.7%</td>
<td>25.5%</td>
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<table>
<thead>
<tr>
<th>Statistics</th>
<th>Actual Density 2003 (1)</th>
<th>Counterfactual Density Minimum Wage (2)</th>
<th>Difference: (1) - (2)</th>
<th>Actual Density 2009 (1)</th>
<th>Counterfactual Density Minimum Wage (2)</th>
<th>Difference: (1) - (2)</th>
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</thead>
<tbody>
<tr>
<td>Total Workers:</td>
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<td></td>
<td></td>
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<tr>
<td>Mean</td>
<td>18.2 (0.3)</td>
<td>18.5 (0.3)</td>
<td>-0.3 (0.2)</td>
<td>22.8 (0.2)</td>
<td>22.2 (0.2)</td>
<td>0.6** (0.3)</td>
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<tr>
<td>Gini Coefficient</td>
<td>0.415 [0.006]</td>
<td>0.412 [0.006]</td>
<td>0.003 [0.004]</td>
<td>0.408 [0.005]</td>
<td>0.421 [0.006]</td>
<td>-0.013** [0.005]</td>
</tr>
<tr>
<td>Observations</td>
<td>5,225</td>
<td>5,573</td>
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<td>13,692</td>
<td>13,456</td>
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Informal Workers:

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<th>Actual Density 2003 (1)</th>
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<th>Difference: (1) - (2)</th>
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<th>Counterfactual Density Minimum Wage (2)</th>
<th>Difference: (1) - (2)</th>
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<tbody>
<tr>
<td>Mean</td>
<td>12.6 (0.2)</td>
<td>12.9 (0.2)</td>
<td>-0.3 (0.2)</td>
<td>14.6 (0.2)</td>
<td>14.3 (0.2)</td>
<td>0.3</td>
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<tr>
<td>Gini Coefficient</td>
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<td>-0.005 [0.005]</td>
<td>0.331 [0.006]</td>
<td>0.344 [0.005]</td>
<td>-0.013* [0.005]</td>
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</table>

Source: Own calculation based on the National Household Survey ECH 1986 - 2009.
Note: standard error in round parenthesis; bootstrap standard error in square parenthesis (based on 1000 replications).
* signifies statistically different from 0 at the 10% level or better.
** signifies statistically different from 0 at the 5% level or better.
Figures

Figure 1. Gini Index and Real Minimum Wage Index (Base 1986=100).
Figure 2. Wage Factual Density. Formal and Informal Sector.

Males

Female

1986

2004

2009

Formal

Informal
Figure 3. DFL Decomposition. Actual and Counterfactual Wage Density. All workers.

1986 – 2003

2004 - 2009

Males

Females

2004 – 2009