DO CHANGES IN THE MINIMUM WAGE AFFECT YOUNGER AND OLDER WORKERS DIFFERENTLY? EVIDENCE FOR PARAGUAY USING SEMI-PARAMETRIC METHODS

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Abstract

Semiparametric methods have been used to assess the impact of policies such as changes in the minimum wage on the distribution of wage earnings. While the methods are in the spirit of the Blinder-Oaxaca decomposition, they help to differentiate impacts according to where individuals are located in the distribution of wages, and thereby to measure impacts on wage inequality apart from average wages. In this paper, using recent repeated cross-section data from Paraguay for 1993 and 2001, we show how to use semiparametric methods to assess impacts on different groups, such as younger and older workers. We find that changes in the minimum wage have much larger mean and distributional effects on younger than older workers.

Resumen

Métodos semi-paramétricos han sido utilizados para medir el impacto de políticas tales como el cambio en el salario mínimo sobre la distribución de los ingresos salariales. Si bien los métodos están en el espíritu de Blinder-Oaxaca, estos nos ayudan a diferenciar los impactos de acuerdo al lugar que ocupan los individuos en la distribución de salarios, y de esta forma tener medidas de impacto sobre la desigualdad salarial además de los salarios promedios. En este trabajo, usando datos de corte transversal repetidos para Paraguay en los años 1993 y 2001, mostramos como el usar métodos semi-paramétricos para medir el impacto sobre diferentes grupos, tal como trabajadores jóvenes y viejos. Encontramos que los cambios en el salario mínimo tienen un efecto mayor sobre los trabajadores más jóvenes que sobre aquellos más viejos.

JEL classification: D33, J38, C21

Key words: *Minimum Wage, Wage inequality.*

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1. Introduction

Econometric work for the evaluation of the impact of social programs and policies typically assumes that the impact is the same throughout the distribution of the indicator under review. For example, the impact of a social program or policy is often assumed to be the same throughout the distribution of income. This assumption stems from the fact that in a traditional regression setting, parametric methods of estimation often yield only one parameter estimate for the impact of the program or policy. This is the case whether the program or policy is captured in the data by a continuous or categorical (e.g., dichotomous) variable. Even when analysts use interaction effects in their specification, which helps in enriching the analysis, the estimates of the impact are generally assumed to be the same for all those with a given value of the variable used for the interaction effect. But this need not be the case in reality. Some individuals or households may benefit (or suffer) more than others from the implementation of specific programs or policies, and to the extent feasible this should be considered in the analysis.

To avoid imposing strong assumptions in the estimation of program or policy impacts, one may rely on semi-parametric methods. In this paper, we build on work by DiNardo et al. (1996) who applied semi-parametric methods to the evaluation of the impact of the minimum wage and unionization on the distribution of earnings in the US. The impact of policies is estimated by applying kernel density methods to appropriately weighted samples. The procedure provides a visual representation of where in the density of earnings policies exert the greatest impact. The procedure is in the spirit of the Blinder-Oaxaca decomposition. However, while the Blinder-Oaxaca decomposition focuses on mean impacts, the method of DiNardo et al. allows for differentiating impacts according to where individuals are located in the distribution of wages, and thereby for assessing impacts on wage inequality as well as mean wages.

The choice of the minimum wage as a topic of analysis is interesting because minimum wage policy implies trade-offs. Raising the minimum is likely to result in an higher increase in the level of earnings for workers at the lower tail of the wage distribution than for better off workers, thus promoting equality (Mincy, 1991, Card and Krueger, 1995; and Horrigan and Mincy, 1993). However, under perfect competition, a minimum wage set above the market-clearing price of labor may lead employers to move back along their demand curves, causing a reduction in employment opportunities. As some workers may loose their job, there may be an increase in inequality (Brown, Gilroy and Kohen, 1982 and Card and Ashenfelter, 1999). The overall impact thus depends on the particularities of minimum wage policy in any given country (e.g. enforcement and level with respect to the mean/median wage) and on the composition of the low-skilled labor force (e.g. whether minimum wages constitute an important source of income for different groups of individuals).

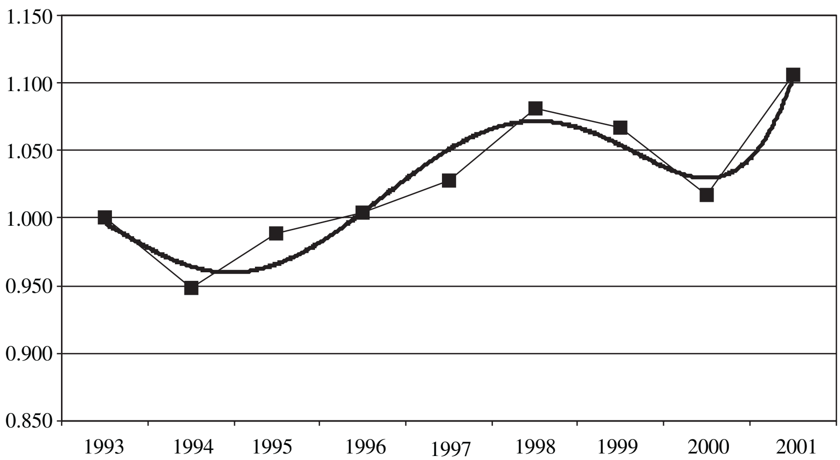
The contribution of this paper is that we apply the methodology developed by DiNadro et al. to different groups of workers, thereby assessing distributional impacts on different groups of individuals, such as younger and older workers. Specifically, using repeated cross-section data from Paraguay, we assess the impact of increases in the minimum wage not only on the mean level of wages, but also on wage inequality among both younger and older workers.

Between 1993 and 2001, the period on which we focus here, the minimum wage increased by about 6 percent in real terms (Figure 1).[1] We find that due to this increase in the minimum wage, mean wages in Paraguay increased more among younger workers than among older workers, and the inequality in wages also decreased more among younger workers than it did among older workers.

The fact that changes in the minimum wages have especially strong impacts on younger workers is not surprising. First, the impact from changes in the minimum wage tends to be largest for workers at the lower tail of the distribution of wages (e.g., Neumark et al., 2000; Maloney and Nuñez, 2001; Fajnzylber, 2001; and Angel-Urdinola and Wodon, 2004), or at least for workers with a longer history of low-wage employment (Yuen, 2003). Since younger workers tend to have lower wages than older workers, they are more likely to be affected by changes in the minimum wage. For instance, while two of every ten adults in Paraguay have wage earnings below or at the minimum wage, four out of ten youngsters do. Also, while young workers in Paraguay account for 28 percent of all wage earners, they represent 45 percent of all workers earning below the minimum wage. Second, while increases in the minimum wage may lead to

FIGURE 1

REAL MINIMUM WAGE INDEX IN PARAGUAY [INDEX = 1.00 IN 1993]



Source: Government data.

[1] The minimum wage was introduced in Paraguay on October 2nd 1943, when Congress decreed that all workers should receive a fair remuneration enabling them to meet their basic needs. For details on minimum wage policy in Paraguay, see Carosini (2000). As noted by Maloney and Nuñez (2001), the level of the minimum wage in Paraguay is high in relationship to the mean wage-in a sample of 31 countries, Paraguay had the fourth highest minimum wage after Venezuela, Italy and El Salvador.

higher wages, they may also have negative impacts on employment, with again especially large effects on younger workers since these tend to be less protected (on the relationship between minimum wages and youth employment, see among others Abowd et al., 2000; Montenegro and Pages, 2003; Neumark and Wascher, 2004; and Pereira, 2003).

One last point: as in the original paper by DiNardo et al. (1996), we do not consider here the issue of the potential negative employment effects of increases in the minimum wage: we focus only on wage effects. The rest of the paper is structured as follows. Section 2 presents our methodology. Section 3 provides the empirical results. A brief conclusion follows.

2. Methodology

The method presented here relies on comparing two wage densities (estimated non-parametrically) to analyze the impact on the distribution of wages of a change in the minimum wage between two years. The basic idea is that two types of factors may affect the distribution of wages: changes in the minimum wages, and all other factors. In order to isolate the impact of changes in the minimum wage, we produce an estimate of what the distribution of wages in year *t* would look like if the minimum wage had remained at the level observed in year *t*-1. Our key assumption is that only those individuals with earnings below the minimum wages will be affected by changes in the minimum wage. This means that we essentially combine the part of the density function for earnings located below the minimum wage in year *t*-1 with the part of the density function in year *t* above the minimum wage to construct our counterfactual new density. A probit model is used in this process to correct the population weights of the individuals in the sample, so that we properly take into account changes in the population size and characteristics between the two time periods.

Thus, we wish to estimate the counterfactual wage density that would have prevailed at time *t*, denoted by $f_t^{m_{t-1}}(w)$, if the level of the minimum wage in *t* had stayed at the level m_t observed in *t-1*. Denoting individual characteristics by $z \in \Omega_z$, with Ω_z representing the set of all such individual characteristics, the density function for wages at time *t*, denoted by $f_t(w)$, can be expressed as:

$$f_t(w) = \int_{z \in \Omega_z} f(w \mid t_w = t, z, m_t) \; dF(z \mid t_z = t) \tag{1}$$

The counterfactual density of wages at time *t* had the level of the minimum wage remained equal to m_{t-1} can be expressed as:

$$f_t^{m_{t-1}}(w) = \int_{z \in \Omega_z} f(w \mid t_w = t, z, m_{t-1}) \; dF\,(z \mid t_z = t) \tag{2}$$

The density $f(w \mid t_w = t, z, m_{t-1})$ is not observed and needs to be estimated. To do so, we follow Dinardo et al. (1996) and assume i) that the change in the minimum wage from between *t*-1 and *t* has no ripple effects on the distribution of wages above the minimum wage and ii) that our best estimator of

$f(w \mid t_w = t, z_t, m_{t-1})$ is proportional to the *t*-1 density $f(w \mid t_w = t-1, z, m_{t-1})$, which we do observe, for wages below the highest minimum wage observed in the two periods.[2]

Using these two assumptions, denoting the highest value of the minimum wage observed between *t*-1 and *t* as $\overline{mw}$, and denoting by *I( )* the indicator function that take the value of 1 when the condition in parenthesis is satisfied and a value of zero otherwise, we can express the counterfactual density $f_t^{m_{t-1}}(w)$ as:

$$f_t^{m_{t-1}}(w) = I(w \le \overline{mw}) \int_{z \in \Omega_z} \theta(z,\ m_{t\text{-}1}) \text{x}\, f(w \mid t_w = t-1, z, m_{t-1})\, dF(z \mid t_z = t-1)$$

(3)

$$+ I(w > \overline{mw}) \int_{z \in \Omega_z} f(w \mid t_w = t, z, m_t) dF(z \mid t_z = t)$$

where $$\theta(z,\ m_{t\text{-}1}) = \frac{\Pr(w \mid t_w = t, z, m_t)\Pr(z \mid t_z = t)}{\Pr(w \mid t_w = t-1, z, m_{t-1})\Pr(z \mid t_z = t-1)}$$

(4) $$= \frac{\Pr(w \le m_t \mid z, t_w = t) \times [\Pr(t_z = t \mid z) / \Pr(t_z = t)]}{\Pr(w \le m_{t-1} \mid z, t_w = t-1) \times [\Pr(t_z = t-1 \mid z) / \Pr(t_z = t-1)]}$$

The role of the reweighting function θ (*z, m_{t-1}*) is essentially to insure that the counterfactual density integrates to one. By applying Bayes' rule to the first terms of the numerator and the denominator of (4) and simplifying, we can rewrite θ (*z, m_{t-1}*) as:

(5) $$\theta(z, m_{t-1}) = \frac{\Pr(t_w = t \mid z, w \le m_{t-1})}{\Pr(t_w = t-1 \mid z, w \le m_{t-1})} \frac{\Pr(t_z = t-1)}{\Pr(t_z = t)}$$

The density functions in (3) are estimated non-parametrically using kernel density estimators. The estimate $\hat{f}(w)$ of the wage density is based on a set of point estimates $\{w_i\}_{i=1}^n$ such that:

(6) $$\hat{f}(w) = \sum_{i=1}^{N} \frac{\delta_i}{h} K\left(\frac{W_i - w}{h}\right), \text{ where } \textstyle\sum_i \delta_i = N$$

where W_i, $w > 0$, *h* is the bandwidth, and *K*(.) is the kernel function, δ_i is the sample weight, and $\sum_i \delta_i = N$, where *N* represents the total population. The selection of the bandwidth follows Silverman (1986), so that:

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2 Positive spillover effects above the minimum wage could be significant below the distribution's mean/median (see Card and Krueger, 1995). Allowing for such spillover effects above the minimum wage but below the mean/median would increase the positive effects of changes in the minimum wages and thereby further decrease inequality (see Addison and Blackburn, 1999). Our first assumption is thus a conservative one. Our second assumption, borrowed from DiNardo et al (1996), arises from the fact that employers choose to comply or not with the minimum wage based on its level, on some probability of being caught and penalized, and on their own risk aversion.

(7) $$h = 0.9 \times min(std, \frac{q75 - q25}{1.349}) \times n^{-0.2}$$

where *std* is the standard deviation of the distribution of wages, *n* is the number of point estimates, and *q25* and *q75*, are the 25th and 75th centiles of the wage distribution. After applying this rule to the Paraguay data for years 1997/98 and 2000/01, we obtain bandwidths of 0.124 and 0.141 respectively. Using this result, we rely on a bandwidth of 0.13 for both years in order to make densities comparable at every point. We estimate $f_t^{m_{t-1}}(w)$ by combining the time t estimate of the conditional density above m_t, and the t-1 estimate of the conditional density below it. Equation (3) then becomes:

(8) $$\hat{f}_t^{m_{t-1}}(w) = I(w \leq \overline{mw}) \sum_{i=1}^{N} \frac{\delta^{t-1}{}_i}{h} \times \hat{\theta}(z, m_{t-1}) K\left(\frac{W_i - w}{h}\right) + I(w > \overline{mw}) \sum_{i=1}^{N} \frac{\delta^t{}_i}{h} K\left(\frac{W_i - w}{h}\right).$$

Note that in (5), the conditional probabilities on the numerator and denominator of θ (z, m_{t-1}) for an observation to be below the minimum wage, namely $\Pr(t \mid z, w \leq m_{t-1})$, can be estimated using a probit regression on the pooled data sets with observations below the minimum wage in t and t-1 and estimating

(9) $$\Pr(t \mid z, w \leq m_{t-1}) = \Pr(\varepsilon > -\beta' H(z)) = 1 - \Phi(-\beta' H(z))$$

where *H()* denotes a vector of covariates that is a function of such characteristics and $\Phi(.)$ represents the cumulative distribution function for the standard normal distribution.

Once the counterfactual density of wages at time t has been estimated, it can be compared to the density at t-1 in order to assess the impact of the change in the minimum wage. In the empirical section, the kernel estimates are used to provide a visual representation of the results, but our conclusions regarding changes in inequality are instead based on the raw data (not the kernels estimates.) That is, the estimated Gini coefficients rely on all the data points available for both the observed and counterfactual (re-weighted) distributions (estimating the inequality measures from the kernels would entail measurement errors.) In this paper, we look at the impact of changes in the minimum wage on the level of wages and on wage inequality. As noted in the introduction, we implement the methodology not only for the samples as a whole, but also for sub-samples in order to assess whether there are differences in the impact of changes in the minimum wages on different groups of workers, with a focus on the comparison of impacts on younger and older workers in Paraguay during the 1990s.

3. Data and Results

The methodology is applied to data from Paraguay, using the 1993 and 2000/01 *Encuestas Integradas de Hogares* (Integrated Household Surveys - EIH hereafter) carried out by the General Secretariat of Census and Statistics. The 1993 data were collected between March and September 1993, while the 2000/01 data were collected between September 2000 and March 2001. The survey collects information on general attributes of the entire population, including personal characteristics and labor market variables for the working age population. We restrict our sample to public and private wage earners who are between 16 and 65 years of age, whose salary is positive, and who reside in Asuncion and other urban areas sampled in both surveys. Domestic employees, self-employed workers, unpaid family workers and firm owners are excluded from the sample because their wage determination process is likely to be fairly different from that governing wage earners. Within our sample, we distinguish between adult workers (between 26 and 60 years old) and young workers (aged 16 to 25). In 1993, our sample consists of 1,930 observations (428,603 individuals using the population weights available in the survey). For the year 2000/01, we have 1,010 observations (350,478 individuals using population weights). Using the weighted samples is necessary due to the fact that the sample is not random, but rather stratified. In both years, young workers account for 28 percent of the observations.

As indicated in Table 1, the average monthly wage for young workers is

TABLE 1
SUMMARY STATISTICS ON INDIVIDUALS IN SAMPLES, PARAGUAY, 2000/01 AND 1993

	2000/01		1993	
	Older workers	Younger workers	Older workers	Younger workers
Number of Observations	733	277	1376	554
Number of weighted observations	307,187	121,416	249,848	100,630
Real minimum wage in Guaranis/hour	2,970.47		2,797.63	
Real minimum wage in US dollars/hour	0.72		0.68	
Average real wage in Guaranis/hour	8,095.41	4,423.751	7,173.614	3,995.194
	[12,509.29]	[5,171.6]	[9,082.56]	[2832.241]
Average real wage in US dollars/hour	1.97	1.08	1.75	0.97
	[3.05]	[1.26]	[2.21]	[0.69]
Share of workers below minimum wage	20.45	43.66	18.11	35.27
Share of all earners below minimum wage	54.24	45.76	56.04	43.96
Average hours of work per week	48	46	49	47
Share males	63	63	70	67
Average age in years	39	21	39	21
Share of workers that are single	28.51	80.54	23.94	74.88
Share with primary or no education	18.55	16.77	31.69	23.44
Share with secondary education	48.92	56.36	46.11	60.55
Share with tertiary education	32.53	26.87	22.20	16.01
Share in agriculture and mining	0.32	0.38	1.42	1.01
Share in manufacture, electricity	19.79	17.47	21.60	25.82
Share in construction, commerce, transport	41.96	48.90	37.53	37.12
Share in services	37.93	33.25	39.45	36.04
Share in capital city of Asuncion	42.06	34.36	47.09	46.98
Percentage in central urban area	57.94	65.64	52.91	53.02

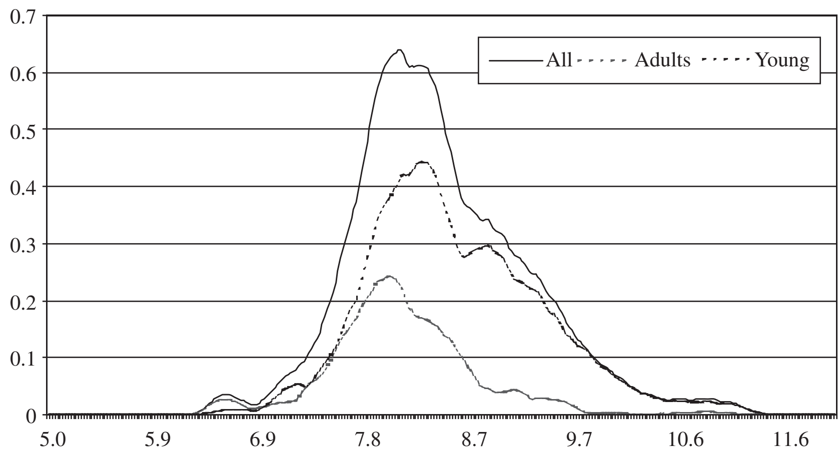
Source: Authors' estimation. Real minimum wage in 2000 in constant Guaranis per month. Standard deviation in brackets. Exchange in January 2001: 1 US$ = 4,107.7 Guaranies.

roughly half of the level obtained by adult workers. The standard deviation of monthly wages is also lower for young workers as compared to adult workers. Kernel density estimates for the distribution of wages in 2001 are provided in Figure 2. Since kernel functions are linear, the estimates for the sample of working individuals as a whole is the sum of the kernels obtained for younger and older workers. Table 1 also provides a number of other basic statistics on the samples. For example, 70 percent and 63 percent of workers in the sample are male in 1993 and 2001 respectively (more females have entered the labor force in recent years). There was an increase in education levels over time (the high proportion of workers with tertiary education is due to the fact that we consider only wage earners, many of whom work in the formal sector-the education levels for the population as a whole are lower). The proportion of young workers with tertiary education is lower than among older workers because many young workers probably had to stop their studies in order to work or have not yet completed their education. However, the share of workers with only a primary education or less is lower among young workers that the equivalent share among adult workers, reflecting the fact that younger cohorts are expected to have a higher level of basic education than older cohorts. Table 1 also shows that services and manufacturing-commerce-industry account for 80 percent of all workers in the samples (both old and young). The remaining 20 percent are employed in agriculture and mining.

Table 2 provides the results of the probit regressions used to estimate (9), and thereby (5). While the regressions are needed for the reweighting of the counterfactual density, the interpretation of the coefficient parameters is not very interesting since the parameters essentially provide information related to changes in the characteristics of the individuals below the minimum wage over

FIGURE 2

OBSERVED KERNEL DENSITY ESTIMATES LOG OF HOURLY WAGE BY GROUP, PARAGUAY 2000/01



Source: Authors' estimation.

TABLE 2
PROBIT REGRESSIONS FOR REWEIGHTING FUNCTION,
PR($TW = T \leq W\ M_{T-1}$), VALUE OF ONE FOR 2000/01

	Overall Sample		Younger workers		Older workers	
	dF/dx	Coeff.	dF/dx	Coeff.	dF/dx	Coeff.
Male	-0.068	-0.173	-0.044	-0.111	-0.081	-0.206
	[1.45]	[1.45]	[0.59]	[0.59]	[1.24]	[1.24]
Household Size	0.029	0.074	0.008	0.020	0.022	0.055
	[1.32]	[1.32]	[0.18]	[0.18]	[0.81]	[0.81]
Squared of Household Size	-0.001	-0.002	0.002	0.004	-0.001	-0.003
	[0.56]	[0.56]	[0.54]	[0.54]	[0.66]	[0.66]
Single	-0.008	-0.021	0.059	0.148	-0.078	-0.197
	[0.16]	[0.16]	[0.61]	[0.61]	[1.13]	[1.13]
Hours of Work	-0.003	-0.006	-0.001	-0.002	-0.001	-0.003
	[0.45]	[0.45]	[0.09]	[0.09]	[0.15]	[0.15]
Hours of Work Squared	0.000	0.000	0.000	0.000	0.000	0.000
	[0.03]	[0.03]	[0.46]	[0.46]	[0.00]	[0.00]
Age	0.003	0.008	0.063	0.160	-0.003	-0.007
	[0.30]	[0.30]	[0.31]	[0.31]	[0.11]	[0.11]
Age Squared	0.000	0.000	-0.001	-0.003	0.000	0.000
	[0.04]	[0.04]	[0.23]	[0.23]	[0.18]	[0.18]
Primary Education	-0.064	-0.161	0.218	0.555	-0.047	-0.118
	[0.30]	[0.30]	[2.97]***	[2.97]***	[0.21]	[0.21]
Secondary Education	0.172	0.435	0.334	1.008	0.219	0.559
	[0.82]	[0.82]	[2.78]***	[2.78]***	[1.00]	[1.00]
Tertiary Education	0.185	0.492	-	-	-0.011	-0.027
	[0.86]	[0.86]			[0.04]	[0.04]
Number of Dependents	0.361	0.909	1.051	2.657	-0.031	-0.079
	[1.09]	[1.09]	[1.83]*	[1.83]*	[0.07]	[0.07]
Number of Dependents Squared	-1.034	-2.604	-2.056	-5.196	-0.602	-1.515
	[2.01]**	[2.01]**	[2.08]**	[2.08]**	[0.90]	[0.90]
Agriculture and Mining	-0.400	-1.171	-0.415	-1.210	-	-
	[2.17]**	[2.17]**	[1.94]*	[1.94]*		
Manufacturing, Electricity	-0.082	-0.205	-0.177	-0.448	0.027	0.067
	[1.59]	[1.59]	[2.31]**	[2.31]**	[0.37]	[0.37]
Services	-0.085	-0.214	-0.222	-0.563	0.001	0.003
	[1.44]	[1.44]	[2.48]**	[2.48]**	[0.01]	[0.01]
Government Employee	0.266	0.697	0.133	0.334	0.327	0.885
	[2.22]**	[2.22]**	[0.52]	[0.52]	[2.31]**	[2.31]**
Central Urban Area	0.072	0.182	0.162	0.410	-0.036	-0.092
	[1.61]	[1.61]	[2.33]**	[2.33]**	[0.57]	[0.57]
Constant	-	-0.835	-	-2.780	-	-0.445
		[0.95]		[0.53]		[0.30]
Pr>chi2(Ho: resid. not normal)		0.000		0.080		0.100
Pseudo R^2		0.080		0.136		0.079
Observations	620.0	620.0	285.0	285.0	335.0	335.0

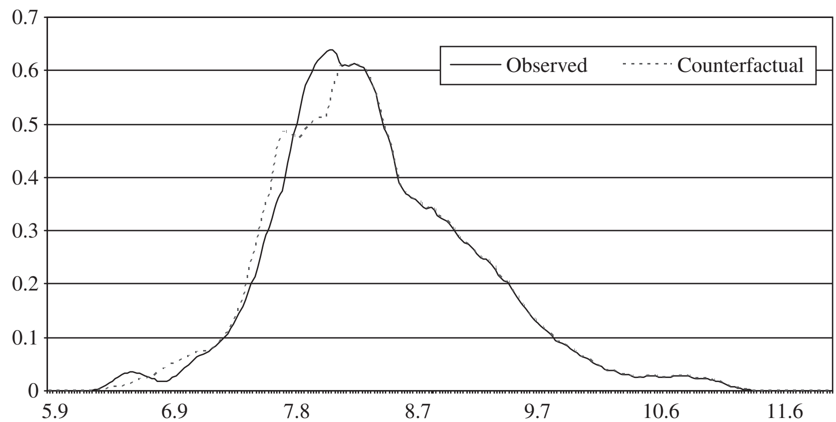
Source: Authors' estimation. Omitted Variables: no education; construction, commerce and transport sectors; Urban Asuncion area. Absolute value of *z* statistics in brackets. * significant at 10% level; ** significant at 5% level; *** significant at 1% level. Dependents is defined as the number of children under 14 and/or persons disabled living in the worker's household.

time which are more due to general patterns of changes in characteristics in the labor force as a whole than changes due to shifts in the minimum wages themselves. For example, the negative coefficients for primary education simply show that the share of individuals with primary education in the samples has decreased over time, while the positive coefficients for secondary and tertiary education suggest that workers have become more educated over time.[3]

Figures 3 to 5 provide the factual and counterfactual distribution of wages. Again, the counterfactual distribution represents what the density of wages would have been if the level of the minimum wage had remained at its 1993 level in real terms. It can be seen that the increase in the minimum wage helped shift the distribution to the right, and the shift was larger for younger workers than for older workers. This shift to the right of the bottom part of the distribution must have led to both an increase in the mean wages received by workers and a decrease in inequality. The magnitude of these effects is measured in Table 3, which suggests that the 6 percent increase in the real minimum wage between 1993 and 2000/01 contributed to a 1.13 percent decrease in the standard Gini index of inequality and a 0.46 percent increase in the average wage. The decrease in inequality observed when more weight is placed at the bottom part of the distribution (using the extended Gini index for measurement) is even larger.

The more interesting results are those obtained for younger and older workers separately. As expected, young workers appear to have gained more

FIGURE 3
IMPACT OF INCREASE IN THE MINIMUM WAGE
OBSERVED AND COUNTERFACTUAL DATA FOR 2000/01

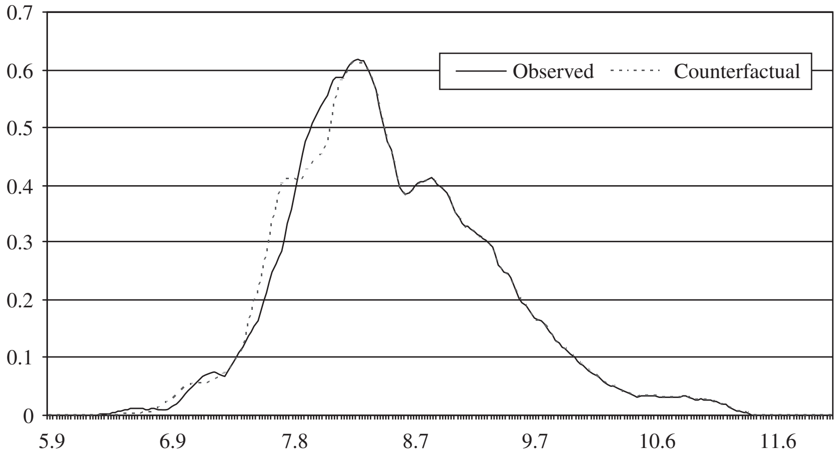


Source: Authors' estimation.

[3] We test for the normality of the residuals using commands in stata reporting skewness and additional information based on kurtosis (see D'Agostino, Balanger, and D'Agostino, Jr., 1990). The two tests are combined into an overall test statistic (χ^2) presented in Table 2.

FIGURE 4

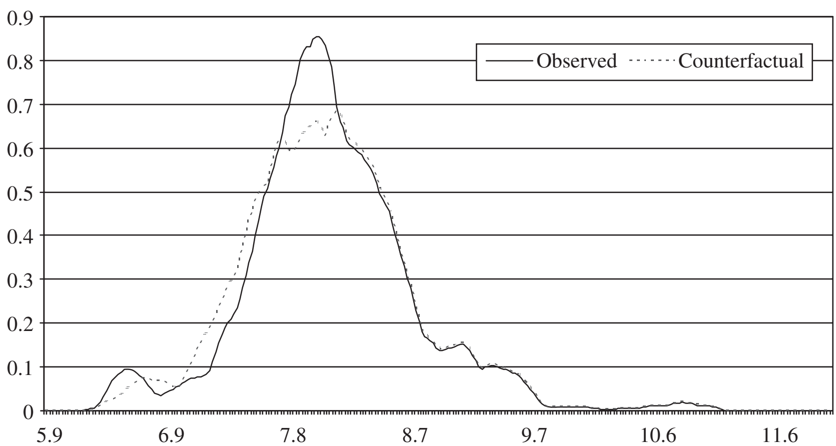
IMPACT OF INCREASE IN THE MINIMUM WAGE FOR OLDER WORKERS
OBSERVED AND COUNTERFACTUAL DATA FOR 2000/01



Source: Authors' estimation.

FIGURE 5

IMPACT OF INCREASE IN THE MINIMUM WAGE FOR YOUNGER WORKERS
OBSERVED AND COUNTERFACTUAL DATA FOR 2000/01



Source: Authors' estimation.

TABLE 3
IMPACT OF INCREASE IN THE MINIMUM WAGE ON
MEAN WAGES AND WAGE INEQUALITY

	All Sample			Young			Adults		
Real Hourly Wage	Observed 2001	Counter-factual	Change in %	Observed 2001	Counter-factual	Change in %	Observed 2001	Counter-factual	Change in %
Mean wage	7055.29	7022.859	0.46	4423.75	4377.68	1.05	8095.41	8072.27	0.29
	[348.13]	[320.07]		[310.73]	[277.00]		[462.04]	[431.30]	
Gini, *v*=2	47.16	47.70	-1.13	38.72	40.73	-4.93	47.14	47.46	-0.67
	[1.82]	[1.98]		[3.04]	[3.40]		[2.11]	[2.18]	
Gini, *v*=4	63.58	64.53	-1.47	54.23	57.62	-5.88	64.03	64.54	-0.79
	[1.53]	[1.61]		[2.94]	[3.01]		[1.82]	[1.87]	
Gini, *v*=6	69.00	70.10	-1.57	60.57	64.40	-5.95	69.49	70.03	-0.77
	[1.41]	[1.48]		[2.92]	[3.00]		[1.66]	[1.69]	

Source: Authors' estimation. Bootstrap Standard errors in brackets. Change in % = {(Observed Counterfactual)/ Counterfactual} x 100.

from the increase in the minimum wage than older workers. While older workers obtained a gain of 0.29 percent in their average wage, the gain for young workers was 1.05 percent. Also, while inequality among older workers was reduced by 0.67 percent, inequality among young workers decreased by 4.93 percent.

4. Conclusion

Semi-parametric methods for the assessment of the impact of policies enable analysts to measure impacts along the whole distribution of key indicators such as wages. This in turn makes it feasible to assess the distributional impacts of policies apart from their mean impact on a target population considered as a whole. In this paper, we have applied a method pioneered by DiNardo et al. (1996) to the analysis of the impact of changes in the minimum wage between years 1993 and 2001 in Paraguay not only on the mean level of wages, but also on wage inequality. The analysis was carried for all workers corresponding to some basic criteria, as well as for younger and older workers separately. The gains in average wages and the reduction in wage inequality resulting from the minimum wage increase during the two periods of study were larger for young workers than for older workers. A further step in the analysis could be to consider also the employment effects of changes in the minimum wage. If these employment effects were to be larger for younger than for older workers, the total effects might cancel out to some extent, so that the overall impacts by age groups might potentially be closer to each other.

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