Título:

Payroll tax reductions and wage differences

Resumen:

The Spanish labour market has a high degree of temporary employment. One of the policies implemented to mitigate this is the application of payroll tax reductions to permanent contracts. Using a sample constructed from administrative data, this paper shows that a wage gap exists in favour of permanent workers that do not benefit from payroll tax reductions. This differential does not remain constant across the wage distribution and increases as we move towards its upper tail. Using a distributional version of the Oaxaca-Blinder decomposition that takes into account the possible presence of a selectivity bias, it is found that the wage gap is mainly determined by the different characteristics between the workers that benefit from payroll tax reductions and those that do not. In addition, it is shown that neglecting the effects of sample selection leads to the overestimation of the share of the wage gap attributed to the different returns for these characteristics.

Códigos JEL: **C14, C31, J31, J32, J38.**

Autor 1:

Jesús Clemente López. Universidad de Zaragoza.

Tel: (+34) 976762408. E-mail: clemente@unizar.es

Autor 2:

Inmaculada García Mainar. Universidad de Zaragoza.

Tel: (+34) 976762635. E-mail: igarcia@unizar.es

Autor 3:

Marcos Sanso-Navarro. Universidad de Zaragoza.

Tel: (+34) 976761000 Ext. 4629. E-mail: marcossn@unizar.es

Dirección Postal:

Departamento de Análisis Económico

Gran Vía 2

50005 Zaragoza (Spain)

Fax: **(+34) 976761996**

Payroll tax reductions and wage differences

Jesús Clemente-López
Inmaculada García-Mainar
Marcos Sanso-Navarro*

Universidad de Zaragoza

Abstract

The Spanish labour market has a high degree of temporary employment. One of the policies implemented to mitigate this is the application of payroll tax reductions to permanent contracts. Using a sample constructed from administrative data, this paper shows that a wage gap exists in favour of permanent workers that do not benefit from payroll tax reductions. This differential does not remain constant across the wage distribution and increases as we move towards its upper tail. Using a distributional version of the Oaxaca-Blinder decomposition that takes into account the possible presence of a selectivity bias, it is found that the wage gap is mainly determined by the different characteristics between the workers that benefit from payroll tax reductions and those that do not. In addition, it is shown that neglecting the effects of sample selection leads to the overestimation of the share of the wage gap attributed to the different returns for these characteristics.

JEL codes: C14, C31, J31, J32, J38.
Keywords: Payroll tax reductions, Wage gap, Quantile regression, Selectivity bias.

* Corresponding author. Address: Departamento de Análisis Económico. Gran Vía 2. 50005 Zaragoza (Spain). Tel: (+34) 976 761 000 Ext. 4629, Fax: (+34) 976 761 996. e-mail: marcossn@unizar.es.

1. Introduction

The average expenditure allocated to active labour market policies (ALMPs) in the European Union (EU) was around 0.64% of the GDP in 2004. This percentage varies greatly across EU countries, ranging from more than 1% in Denmark, Sweden or the Netherlands to less than 0.20% in Greece and the UK. The figure is 0.55% in Spain. Employment subsidies are the most commonly implemented ALMP, Spain and Italy being the EU countries with the highest share of total expenditure on these policies (around the 40%). For this reason, it is interesting to analyze not only what motivates the use of these subsidies, but also their consequences. In Spain, these incentives are intended to promote permanent contracts in order to reduce the excessive number of fixed-term ones. Nonetheless, they can also affect a broad range of aspects like the labour history of workers, wages and human capital accumulation. In this paper the possible influence on wages is analyzed.

Fixed-term contracts allowing unrestricted dismissals were introduced into the Spanish labour market in 1984 and quickly accounted for most new jobs. In order to mitigate the incidence of temporary employment, payroll tax and dismissal costs reductions for permanent contracts were established in 1997. Since then, a great deal of the Spanish labour market policy has been associated with labour costs reductions for permanent contracts. One noteworthy related policy measure consists of direct subsidies to firms. There are also permanent contracts that benefit from payroll tax reductions. These policies have been progressively extended to cover different groups of workers depending on their age, gender, unemployment duration and other personal characteristics. In addition, conversions of fixed-term contracts into permanent ones have also been subsidized.

As a consequence of this legislation, most newly-hired permanent workers in the last decade have benefited from payroll tax reductions. There are differences in the extent to which different groups of workers enjoy these reductions. The percentages of the reductions varied between 20% and 100%[†] in 2005 and the first half of 2006. The way in which payroll tax reductions were applied changed in June 2006. After that, they

[†] The most common benefit was 55% for men and 65% for women.

consist of a fixed amount so payroll tax reductions do not depend on the worker's wage. This introduces a progressive pattern because workers with lower wages enjoy proportionally larger reductions.

As has been noted before, payroll tax reductions aim to promote permanent contracts as opposed to fixed-term ones. That is to say, they try to increase job stability. In this paper, we analyze whether this higher security implies costs associated with wages or whether, on the contrary, the monetary transfer is shared between the firm and the worker. To this end, we analyze wage differentials between workers with permanent contracts depending on whether or not they benefit from payroll tax reductions. This is done by the application of Oaxaca-Blinder (1973) type decompositions that allow us to determine the proportion of the wage gap that is due to job and personal characteristics and the proportion that is not explained by them and, hence, related to the type of contract.

Wage gaps between workers with different types of contracts in the Spanish labour market have been analyzed in Davia and Hernanz (2004) and De la Rica (2004), among many others. In addition, this issue has already been studied for permanent workers in Clemente-López et al. (2008). However, the latter study has two clear limitations. First, the monthly wage information they work with is censored. Second, the presence of biases related to sample selection is not controlled for. Using a more recent version of the database from which their sample is constructed, we have been able to avoid working with incomplete wage information. This has allowed us to control for the presence of a selectivity bias by using an extension of the distributional approach in Gardeazábal and Ugidos (2005) in line with Buchinsky (1998) and Neuman and Oaxaca (2004). This approach is suitable in the present context because the widespread use of employment subsidies could mean that some characteristics of workers are determinant in the hiring process. Consequently, neglecting the presence of the selectivity bias could lead us to conclude incorrectly that wage discrimination is present.

Our results suggest that there is a wage differential in favour of permanent workers who do not benefit from payroll tax reductions. Moreover, it is shown that this gap increases

as we move towards the upper tail of the wage distribution. The importance of controlling for the presence of sample selection effects in this context is also made evident. When this feature is neglected, the component of the wage gap that can be attributed to the different remuneration of the workers' characteristics is overstated. Therefore, the wage gap between permanent workers in the Spanish labour market is mainly explained by their different characteristics. Nevertheless, the discriminatory component still explains an important part of the wage differential found in the upper tail of the distribution.

The rest of the paper is organized as follows. Section 2 explains how the Spanish system of payroll tax reductions works and describes the database used. It also details how the sample has been constructed, the variables analyzed and how monthly wages have been approximated from yearly fiscal information. Section 3 presents the Oaxaca-Blinder type decompositions applied in this paper with an emphasis on the extension proposed to the distributional version that allows us to correct for sample selection. Section 4 describes and interprets the results obtained. Finally, Section 5 concludes.

2. The Spanish system of payroll tax reductions, sample construction and description

2.1. The Spanish system of payroll tax reductions

Several labour market reforms have been undertaken in Spain since the 80s. All of them have focused on measures aiming at creating more jobs, reducing fixed-term employment relationships and promoting employment for groups of workers with difficulties in the labour market. One of these measures consists of payroll tax reductions for employers that give workers with a certain characteristics a new permanent contract or transform a fixed-term contract into a permanent one.

[Insert Table 1 here]

Table 1 details the existing payroll tax reductions for employers in terms of the worker's characteristics and type of contract for the year 2007. It should be noted that

the labour market reform in June 2006 modified the duration and quantity of these reductions. While in the previous system the duration was generally two years and the quantity was a percentage of the wage, now reductions generally last four years and consist of fixed amounts[‡].

There is a wide spectrum of circumstances under which female workers benefit from payroll tax reductions. These incentives are also intended to promote initial permanent contracts among young workers and for people over 45, in a situation of social exclusion or who have been unemployed for more than six months. The lowest duration, of three years, corresponds to permanent contracts signed before 2007 that implied a conversion to a fixed-term one. The benefit has no temporal limits for initial permanent contracts of workers over 45. The minimum monthly reduction is 50 euros for men who have been unemployed for more than six months and workers in a situation of social exclusion. The reduction increases for young workers and conversions, followed by unemployed women and reaches a maximum of 100 euros for the rest of the subsidized groups in the Table. Broadly speaking, it can be stated that the group that benefits most from payroll tax reductions is that workers over 45.

2.2. The Continuous Sample of Working Histories

The data analyzed in this paper has been extracted from the 2007 "Continuous Sample of Working Histories" (*Muestra Continua de Vidas Laborales*, MCVL hereafter). It is a dataset that includes administrative records from the Social Security system with the entire labour history of 1.2 million people (around 4% of all affiliated workers). Moreover, this individual data is complemented with information from municipalities and the fiscal authorities. Therefore, the amount of data for each worker is quite large and includes personal characteristics, labour characteristics for all the employment spells in her labour history, the payroll tax basis, pensions and taxes.

The analysis below has been restricted to full-time permanent workers whose labour relationship lasts, at least, the whole month of October 2007. Only those affiliated to the

[‡] Most of the contracts that receive benefits in our sample do so as a fixed quantity. Only 1.2 % of these contracts were signed before June 2006.

general regime of the Social Security system have been taken into account. Workers in the agricultural sector as well as the disabled or those in a situation of social exclusion have not been included so as to obtain a homogeneous sample.

For each permanent worker selected using the previous criteria, we have extracted their personal and job characteristics, the monthly payroll tax basis and the annual labour income[§]. The distinction between benefited and non-benefited contracts has been introduced using the codes in the register of the Social Security. Benefited contracts are encoded as 109 and 150. The former corresponds to conversions from fixed-term to permanent contracts while the latter refers to initial permanent contracts. Non-benefited contracts have codes 100 (ordinary permanent contract) and 189 (conversion from fixed-term to permanent that does not comply with the requirements for payroll-tax reductions).

[Insert Table 2 here]

The sample contains data for 251,815 permanent workers. 211,106 (84%[**]) do not benefit from payroll tax reductions, while the remaining 40,709 (16%) have contracts with reduced payroll taxes. 89% of the non-benefited contracts are ordinary ones and, among those benefited, 43% are initial permanent contracts.

2.3. An indirect estimation of monthly wages

One important limitation of the information from the Social Security records included in the MCVL is that it includes incomplete monthly wages data. The wages data consists of the basis for the payroll tax calculations, which can be considered to be the "legal" monthly wage. Because a minimum and a maximum values for this tax basis are established, monthly wage information in the MCVL is censored[††]. The latest versions

[§] Details about how these latter two variables have been used to approximate monthly wages are reported in the following subsection.
[**] This percentage refers to the stock of contracts and not to those newly signed.
[††] That is to say that, apart from these two extreme values and their implied thresholds, the payroll tax basis is equal to the monthly wage.

of the MCVL, which include fiscal information about the worker's annual labour income, allow us to overcome this problem.

We have proceeded in a two-step approach in order to obtain an indirect estimation of monthly wages from the annual fiscal data. First, the (log) monthly payroll tax basis of all the workers in the database whose information is not censored has been regressed on the (log) annual labour income:

$$\log(\text{monthly payroll tax basis}) = a + b \cdot \log(\text{annual labour income}) \qquad (1)$$

The OLS estimated values for the parameters in (1) have been used in a second step to adjust the payroll tax basis for the permanent workers with censored information using their observed annual labour income. Although the estimation results are not reported[‡‡], it should be noted that both parameters are statistically significant and the adjusted coefficient of determination is 0.87. Figure 1 displays the censored distribution of the monthly payroll tax basis and the distribution with the adjusted values in the tails. The latter will be analyzed in the rest of the paper because it can be considered to be a reasonable approximation of the monthly wages distribution.

[Insert Figures 1 and 2 here]

Figure 2 represents the adjusted monthly wages distributions for permanent workers depending on whether or not they benefit from payroll tax reductions. It can be observed that they are different. Specifically, non-benefited permanent workers receive higher wages than benefited ones. The main aim of this paper is to find the determinants of this wage gap.

[‡‡] They are available from the authors upon request.

2.4. Wage determinants and descriptive analysis

We have used a set of personal and job characteristics as wage determinants. The variables related to personal characteristics are gender, age, seniority, educational level, country of origin, past unemployment and region of residence[§§]. Variables related to job characteristics are the productive sector, employer size and whether or not the job is in the public sector[***].

Table 2 shows a description of the whole sample of permanent workers and the two sub-samples that distinguish them with respect to their type of contract. Some of the continuous wage determinants have been grouped for expositional purposes. In line with Figure 2, it can be observed that there is a mean wage differential in favour of workers with non-benefited contracts of around 30%. As is also the case for all the wage determinants, this differential is significant at the 1% level.

Therefore, it can be concluded from the mean statistics reported in Table 2 that these two types of workers have different characteristics. This can partly be explained by the conditions required to benefit from payroll tax reductions which are associated with personal, firm and regional factors. Specifically, it is observed that the biggest firms tend to use benefited contracts less. Furthermore, the incidence of these reductions is lower for the more educated workers. The sectoral distribution of workers is also interesting, the construction sector being the one with the most intensive use of benefited contracts.

3. Oaxaca-Blinder type wage decompositions

Wage differentials between two type of workers are commonly analyzed using Oaxaca-Blinder (1973) type decompositions. In their simplest version, wage determination equations are estimated using OLS and the mean wage gap is decomposed into two terms: one related to the different characteristics of the workers that belong to each

[§§] Navarra and País Vasco are not included because their regional governments have different competences about these data.

[***] Only about 4% of workers in the database belong to the public sector because civil servants do not need to be registered in the Social Security.

group and another that is a consequence of the different remuneration for these characteristics received by these two groups.

Let g denote the group to which a worker belongs. It will be equal to nb for permanent workers who do not benefit from payroll tax reductions and b for those who do. Therefore, the (log) wage determination equation of a given individual i in group g is:

$$w_{ig} = X'_{ig}\beta_g + u_{ig} \qquad (2)$$

X_{ig} is a vector of wage determinants (personal and job characteristics) and u_{ig} are i.i.d. error terms. Taking expectations and after some algebraic modifications[†††], mean wage differentials can be expressed as:

$$\overline{w}_{nb} - \overline{w}_b = \overline{X'}_b(\hat{\beta}_{nb} - \hat{\beta}_b) + (\overline{X'}_{nb} - \overline{X'}_b)\hat{\beta}_{nb} \qquad (3)$$

$\overline{w}$s are mean wages, $\overline{X}$s are mean wage determinants and $\hat{\beta}$s their estimated vectors of returns. As has already been noted, the mean wage differential in (3) is decomposed as the sum of two terms. The first one is related to the different remuneration received by each group of workers for their characteristics and the second is associated with the different characteristics of the individuals in these groups.

Analyzing mean wage differentials might be restrictive because this gap need not be equal for low and high earners. For this reason, Gardeazábal and Ugidos (2005) proposed an extension of the standard Oaxaca-Blinder decomposition to analyze the wage gap across the whole distribution applying a quantile regression approach to (2) and (3). In order not to rely on such restrictive assumptions, we have implemented a

[†††] The wage structure of non-benefited permanent workers has been considered to be that not affected by the presence of discrimination.

slightly modified version of their proposed algorithm[‡‡‡] to obtain a sample counterpart of the quantile wage gap decomposition:

1. The θth unconditional quantile of the wage distribution for group g $\left(\overline{w_{g\theta}}\right)$ is estimated as the $[\theta \cdot N_g]$th order statistic. N_g is the number of workers in group g and $[\cdot]$ is the closest integer operator.
2. Parameters in (2) are estimated using quantile regression techniques $(\hat{\beta}_{g\theta})$. That applied in this paper is the Least Absolute Deviations (LAD) method of Koenker and Bassett (1978).
3. $\overline{X}_{g\theta}$ in the quantile version of (3) is the mean wage determinants for the individuals in group g whose estimated wage $\left(X'_{ig}\hat{\beta}_{g\theta}\right)$ is $\overline{w_{g\theta}}$ [§§§].

An important question to take into account when analyzing wage differentials is the presence of a selectivity bias. The way this feature is introduced into the empirical model is by jointly specifying the wage determination equation with a selectivity equation of the following form:

$$I_i^* = Z_i'\alpha + v_i \qquad (4)$$

In our context, I_i^* is a binary variable that takes the value 1 if the permanent worker benefits from payroll tax reductions, and 0 otherwise. Z_i is a vector of the determinants of benefiting from payroll tax reductions and α is the parameter vector. Following the two-step procedure suggested by Heckman (1979), and detailed in Neuman and Oaxaca (2004) for the Oaxaca-Blinder mean wage decomposition, expression (2) can be further augmented with the Inverse Mills Ratio (IMR). This latter term is related to the selectivity bias:

[‡‡‡] Using this alternative makes the obtained results more similar to those derived from the application of the technique in Machado and Mata (2005).
[§§§] The tolerance allowed for the difference with this value has been set to 0.01.

$$w_{ig} = X'_{ig}\beta_g + \lambda_{ig}\rho_g + e_{ij} \quad (5)$$

The IMR is calculated as $\lambda_i = \frac{\phi(Z_i'\hat{\alpha})}{\Phi(Z_i'\hat{\alpha})}$. $\phi(\cdot)$ is the standard normal density function and $\Phi(\cdot)$ its corresponding cumulative density function. This extension of the wage equations leads to an additional term in the mean wage decomposition.

$$\overline{w}_{nb} - \overline{w}_b = \overline{X'}_b(\hat{\beta}_{nb} - \hat{\beta}_b) + (\overline{X'}_{nb} - \overline{X'}_b)\hat{\beta}_{nb} + (\hat{\rho}_{nb}\overline{\lambda}_{nb} - \hat{\rho}_b\overline{\lambda}_b) \quad (6)$$

$\overline{\lambda}$s are the mean IMRs and $\hat{\rho}$s the estimated parameters that accompany them in the two wage equations.

To the best of our knowledge, the only existing method that allows these two extensions to standard mean wage decompositions (distributional approach and sample selection) to be taken into account is that of Albrecht et al. (2009). These authors have extended the distributional wage gap decomposition in Machado and Mata (2005) to control for the presence of sample selection. Their objective is to analyze the gender wage gap in the Netherlands and, hence, they only needed to control for the presence of selectivity bias in the wage equation of female workers. On the contrary, sample selection when analyzing wage differentials between permanent workers depending on whether or not they benefit from payroll tax reductions must be controlled for in the wage equation of both groups. This can be done more easily using an extension of the quantile wage gap decomposition by Gardeazábal and Ugidos (2005) in line with Neuman and Oaxaca (2004).

In order to do so, and following the wage determination model in the presence of sample selection of Buchinsky (1998), equation (4) is specified as a semiparametric single-index model:

$$E(I^{*}|Z=z)=G(z'\alpha) \qquad (7)$$

where G is an unknown function. Related studies[****] have estimated this discrete choice model using the method proposed by Ichimura (1993). However, it seems more appropriate to use that of Horowitz and Härdle (1996) where some of the wage determinants are discrete. This has been the method applied in this paper.

When wage equations are estimated using quantile regressions, and as an alternative to the above mentioned IMR, selectivity effects are introduced using a series expansion with the estimation results from (7). Also in line with previous studies, we have used a second order expansion of the estimated index:

$$\hat{h}(z'\hat{\alpha})=\delta^{0}+\delta^{1}\cdot(z'\hat{\alpha})+\delta^{2}\cdot(z'\hat{\alpha})^{2} \qquad (8)$$

One of the difficulties in estimating wage equations that include the series expansion in (8) is how to identify the intercept. This has been done following the proposal in Heckman (1990). Given that the estimated value of the index $z'\hat{\alpha}$ has a positive correlation with the estimated probability of benefiting from payroll tax reductions, the intercept of the wage equation for workers whose contracts enjoy reductions has been obtained by carrying out the estimation without the expansion term with only those benefited workers in the upper quartile of the estimated index and, hence, less affected by sample selection issues. On the contrary, the constant term for non-benefited workers has been obtained from the members of this group whose estimated index is in the lowest quartile.

4. Results

The results obtained from the Oaxaca-Blinder type wage decompositions described in the previous section are reported in Table 3. In line with the descriptive analysis in Table 2, the mean wage differential is equal to 0.30 in favour of those non-benefited

[****] Buchinsky (1998), Martins (2001) and Albrecht et al. (2009).

workers. This difference is higher than that found in most related studies for the Spanish labour market analysing differences by gender or type of contract and, consequently, it is an indicator of the importance of the topic considered in this paper.

[Insert Table 3 here]

As is shown in the second column of Table 3, the average wage differential is almost equally divided between the components related to the characteristics and their returns. More interestingly, the application of the distributional version of the Oaxaca-Blinder decomposition allows us to conclude that the wage gap in the median of the distribution is slightly lower than in the mean. Similar to the findings for the mean decomposition, the magnitude of the two components is the same.

Reported values in the third row of Table 3 reflect that the differential increases as we move towards the right of the wage distribution. For instance, the wage differential in the ninth decile more than doubles that in the first one. In addition, the percentage of the wage gap that can be attributed to the remuneration for the characteristics also increases with the wage level, starting at 25% and reaching 56%. This indicates that differences in the returns of characteristics decrease as wages increase and, therefore, the discriminatory component is relatively more important for lower wages. These results provide evidence of the convenience of adopting a distributional approach because the discriminatory phenomenon is not homogeneous for all wage levels.

[Insert Figure 3 here]

The results and conclusions described above change significantly when the presence of sample selection is taken into account. Following the description of the Spanish system of payroll tax reductions in Section 2 and the findings regarding regional differences in this respect in García-Pérez and Rebollo (2009), the determinants of the selection equation used are: the share of contracts intended to encourage permanent employment at a regional level, the age group (under 30, over 45), an interaction term between being

a woman and younger than 45 and an indicator variable of being unemployed just before the present job.

As can be observed in the lower panel of Table 3, the average wage gap that is determined by the different characteristics remains almost the same as that in the previous case without selectivity correction. However, the term that can be attributed to the different remunerations is halved when this feature is taken into account. More interestingly, this effect is maintained across the wage distribution when both the quantile regression approach and sample selection are considered. That is, while the percentage of the wage differential due to the different characteristics is similar to that estimated when the presence of sample selection is neglected, that related to the different returns is clearly reduced. Moreover, this component has a negative contribution to the wage differential in some lower quantiles. Nonetheless, the part of the wage differential due to the different remuneration maintains some importance in the upper tail of the wage distribution. These results clearly contrast with those obtained when the selectivity bias is not considered. Therefore, it can be stated that the conclusions change when using this new empirical approach.

To sum up, the discriminatory component changes across the wage distribution and depends on selectivity effects. This implies that standard procedures analyzing average wage differentials might be ignoring these two elements. In fact, their joint consideration shows that the component related to the remuneration is only important in the upper tail of the wage distribution and, hence, there are no systematic wage differences due to discrimination between the permanent workers who benefit from payroll tax reductions and those that do not. In line with the predictions of economic theory, these gaps are mainly due to differences in workers' characteristics.

5. Concluding remarks

Employment subsidies are one of the most frequently used ALMPs in OECD countries. In Spain, their use is intended to promote permanent jobs instead of fixed-term ones. Using a sample of Spanish workers constructed from administrative data, this paper shows that there is a wage gap between workers with permanent contracts depending on

whether or not they benefit from payroll tax reductions. Specifically, the wages of permanent workers who do not benefit from payroll taxes are higher than those who do. This wage gap between permanent workers in the Spanish labour market has been analyzed using Oaxaca-Blinder type decompositions. An extension to the distributional approach of Gardeazábal and Ugidos (2005) has been proposed in order to control for the presence of sample selection.

Our results show that, when sample selection is not taken into account, half of the average wage differential can be attributed to the different returns for the characteristics of the worker and the job. When the whole distribution is analyzed, it is observed that the differential increases as we move towards the right of the wage distribution. In addition, the term related to the different remuneration increases its share over the total difference as higher wages are analyzed. However, this component of the wage gap loses importance for most of the wage distribution and is only maintained in the upper tail when the sample selection is taken into account. On the contrary, the wage gap component that is related to the different characteristics is almost the same whether the selectivity correction is introduced or not.

References

Albrecht, J., A. Van Vuuren and S. Vroman, 2009. Counterfactual Distributions with Sample Selection Adjustments: Econometric Theory and an Application to the Netherlands. Labour Economics 16(4), 383-396.

Blinder, A. S., 1973. Wage Discrimination: Reduced Form and Structural Estimates. Journal of Human Resources 8, 436-455.

Buchinsky, M., 1998. The Dynamics of Changes in the Female Wage Distribution in the USA: A Quantile Regression Approach. Journal of Applied Econometrics 13, 1-30.

Clemente, J., I. García-Mainar and M. Sanso-Navarro, 2008. Análisis de las diferencias salariales entre trabajadores indefinidos. Revista de Economía Aplicada 16, 93-135.

Davia, M. A. and V. Hernanz, 2004. Temporary employment and segmentation in the Spanish labour market: an empirical analysis through the study of wage differentials. Spanish Economic Review 6, 291-318.

De la Rica, S., 2004. Wage gaps between workers with indefinite and fixed-term contracts: The impact of firm and occupational segregation. Moneda y Crédito 219, 43-69.

García-Pérez, J. I. and Y. Rebollo, 2009. The use of permanent contracts across Spanish regions: do regional wage subsidies work? Investigaciones Económicas 33(1), 97-130.

Gardeazábal, J. and A. Ugidos, 2005. Gender wage discrimination at quantiles. Journal of Population Economics 18, 165-179.

Heckman, J., 1979. Sample selection bias as a specification error. Econometrica 47, 153–61.

Heckman, J., 1990. Varieties of Selection Bias. American Economic Review 80(2), 313-318.

Horowitz, J. and W. Härdle, 1996. Direct Semiparametric Estimation of Single-Index Models With Discrete Covariates. Journal of the American Statistical Association 91, 1632-1640.

Ichimura, H., 1993. Semiparametric least squares (SLS) and weighted SLS estimation of single-index models. Journal of Econometrics 58, 71-120.

Koenker, R. and G. Bassett, 1978. Regression quantiles. Econometrica 46, 33-50.

Martins, M. F. O., 2001. Parametric and Semiparametric estimation of sample selection models: an empirical application to the female labour force in Portugal. Journal of Applied Econometrics 16, 23-39.

Neuman, S. and R. Oaxaca, 2004. Wage decompositions with selectivity-corrected wage equations: A methodological note. Journal of Economic Inequality 2, 3-10.

Oaxaca, R., 1973. Male-female wage differentials in urban labor markets. International Economic Review, 14(3), 693-710.

Tables and Figures

Table 1. Payroll tax reductions for permanent contracts. Year 2007.

	Amount	Duration
Initial permanent contracts		
1. Unemployed women	70,83	4 years
2. Women that sign the contract in the 24 months after the birth of their baby	100	4 years
3. Women that have not worked in the last 5 years but with a minimum labour experience of 3 years	100	4 years
4. Women that come back to their work after motherhood	100	4 years
5. Workers older than 45	100	Unlimited
6. Workers between 16 and 30 years old	66,67	4 years
7. Unemployed during more than 6 months and workers belonging to a social group in a situation of exclusion	50	4 years
Conversions from fixed-term to permanent		
8. All fixed-term contracts converted before 1st January 2007	66,67	3 years

Note: Amounts in monthly euros. There are also reductions for self-employed and disabled workers.

Table 2. Sample description. Workers with permanent contracts. October 2007.

Variable	All sample	Reduced payroll taxes	Non-reduced payroll taxes	Difference (%)
Number of observations	251,815	40,709 (16.17%)	211,106 (83.83%)	
Monthly wage (in logs)	12.03	11.78	12.08	-29.60
Demographic characteristics (percentages)				
Male	64.15	61.71	64.62	-2.90
Age				
Under 30	18.33	31.15	15.85	15.30
Between 30 and 44	50.91	35.39	53.90	-18.51
Between 45 and 54	21.42	19.84	21.73	-1.89
Over 54	9.34	13.62	8.52	5.10
Seniority				

Less than 1 year	12.40	16.04	11.70	4.34
Between 1 and 5 years	55.19	73.65	51.62	22.03
Between 5 and 10 years	19.33	7.99	21.51	-13.53
More than 10 years	13.09	2.32	15.16	-12.85
Educational level				
Primary	48.99	57.71	47.31	10.40
Secondary	33.22	25.38	34.73	-9.35
University	17.79	16.91	17.96	-1.05
Migrant	18.44	22.55	17.64	4.90
Past unemployment	7.89	15.39	6.45	8.94
Region of residence				
Andalucia	12.37	12.66	12.32	0.34
Aragón	3.24	3.32	3.23	0.09
Asturias	2.16	2.35	2.12	0.23
Baleares	2.15	2.27	2.13	0.14
Canarias	4.64	3.66	4.82	-1.17
Cantabria	1.28	1.39	1.26	0.12
Castilla - León	5.26	5.29	5.26	0.03
Castilla - La Mancha	3.58	3.88	3.52	0.36
Cataluña	22.35	22.37	22.35	0.02
Comunidad Valenciana	10.98	12.58	10.67	1.91
Extremadura	1.43	1.58	1.40	0.18
Galicia	5.68	6.26	5.57	0.69
Madrid	21.39	18.58	21.93	-3.35
Murcia	2.73	3.20	2.64	2.73
La Rioja	0.76	0.63	0.78	-0.15
		Job characteristics (percentages)		
Productive sector				
Industry	23.30	19.79	23.98	-4.19
Construction	9.09	15.45	7.86	7.59
Services	67.61	64.76	68.16	-3.40
Employer size				
Fewer than 51 workers	54.67	68.17	52.07	16.10
Between 51 and 100 workers	10.01	9.39	10.13	-0.74
Between 101 and 500 workers	19.27	13.84	20.32	-6.47
More than 500 workers	16.04	8.60	17.48	-8.88
Public sector	4.72	1.26	5.39	-4.13

Note: All differences are significant at the 1% significance level.

Table 3. Oaxaca-Blinder wage gap decompositions between permanent workers. October 2007.

	Mean	Quantile								
		0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90
Wage gap	0.30	0.19	0.17	0.18	0.21	0.26	0.32	0.37	0.39	0.41
No selectivity correction										
Returns	0.14	0.05	0.08	0.07	0.09	0.13	0.17	0.19	0.21	0.23
Characteristics	0.16	0.14	0.09	0.11	0.12	0.13	0.15	0.18	0.18	0.18
Selectivity corrected										
Returns	0.07	-0.04	0.04	0.01	-0.03	0.04	-0.01	0.02	0.12	0.08
Characteristics	0.15	0.16	0.1	0.09	0.15	0.12	0.2	0.2	0.17	0.17
Selectivity	0.08	0.07	0.03	0.08	0.09	0.09	0.13	0.15	0.1	0.16

Note: Non-benefited individuals are considered to be the non-discriminatory wage structure. The tolerance allowed for the difference between observed and adjusted unconditional quantile wage is 0.01. The constant term in the wage equation determination has been estimated following Heckman (1990).

Figure 1. Monthly wage (in logs) distributions for permanent workers. Original payroll tax basis (dashed) and that with adjusted values (dark). October 2007.

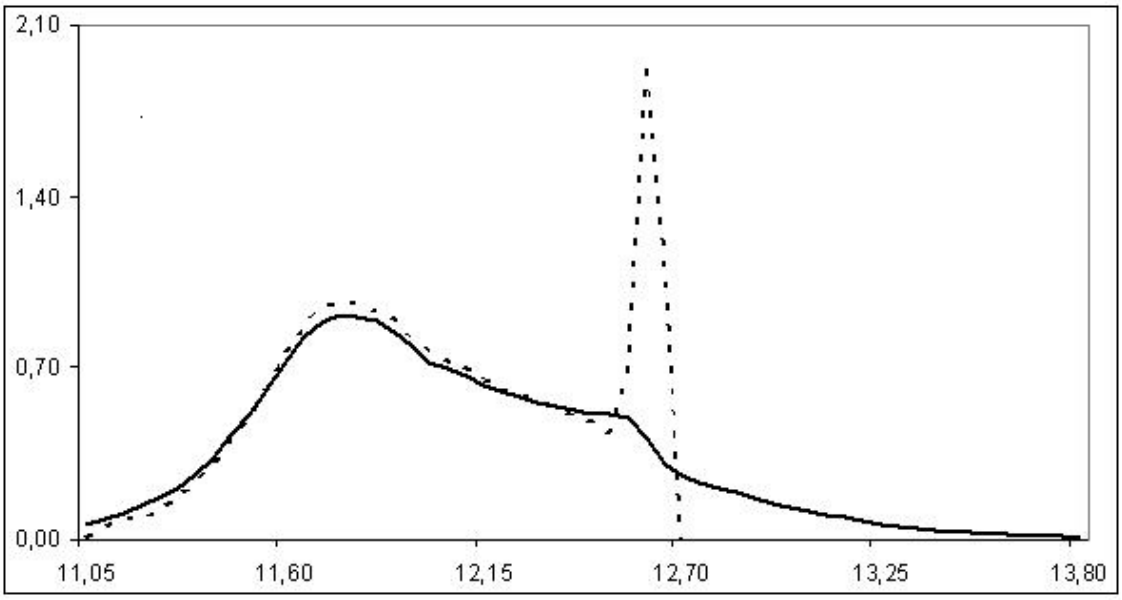

Figure 2. Adjusted monthly wage (in logs) distributions for permanent workers. Benefited (dark) and non-benefited (dashed) with payroll tax reductions. October 2007.

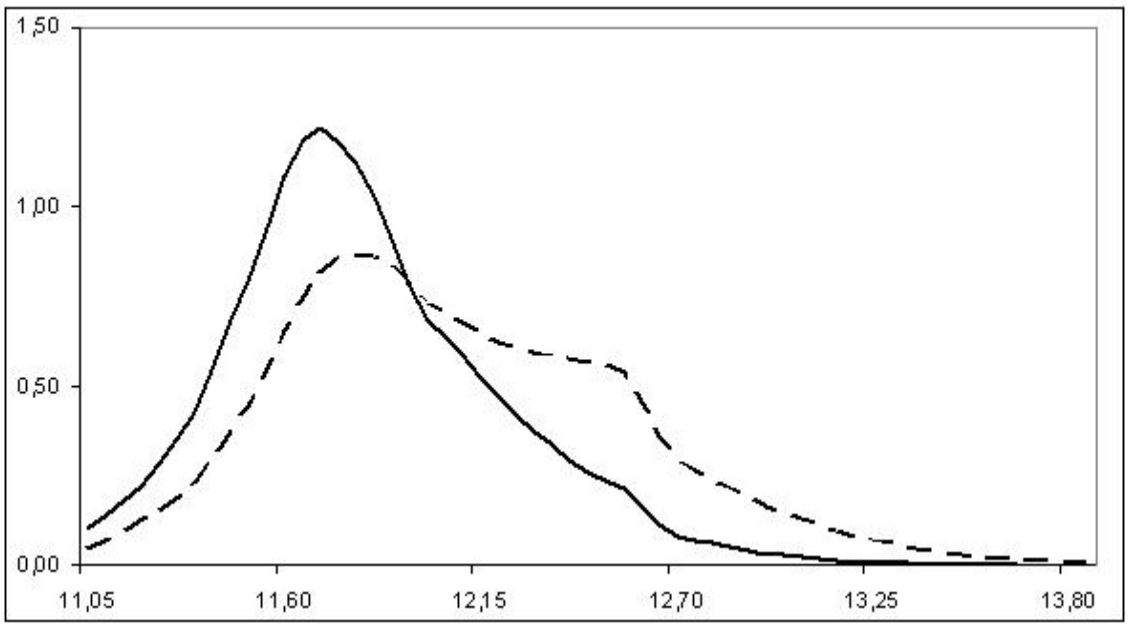

Figure 3. Percentage of the wage gap due to returns and characteristics. Selectivity corrected and non-corrected Oaxaca-Blinder type decompositions.