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ABSTRACT

This paper provides an approximation to the measurement of public sector wage gaps in Spanish regions. By using data from the *European Community Household Panel*, it is shown that the balance between what private firms pay in the local market and what the public sector pays, differs substantially in different areas of the country. Public sector wage differences among Spanish regions are mostly due to differences in returns, not to differences in characteristics or to selection effects, and are not constant across gender, educational levels, or occupations. Moreover, in those regions where Regional Governments have a higher weight in public employment, public wage gaps are higher and public employers pay higher returns. There also seems to be a cross-regional positive correlation between public wage gaps and unemployment, and a negative one between labour productivity and public wage gaps. Hence, a tentative conclusion is that the incentives to select into the public sector are higher in the low productivity regions, precisely those where scarcity of human capital in the private sector may be the most important factor for explaining economic backwardness.

JEL Codes: J31, H73, H83

Keywords: public sector, wage differentials, switching regressions, Spanish regions

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1.   Introduction

In Spain one out of every five employees, one out of every four female employees, and about one out of every three employees with a university degree work for the public sector (see Table 1). Despite the high incidence of public sector employment, there is a lack of studies identifying the impact of the public sector segment of the labour market onto the private one. For instance, the voluminous empirical literature estimating gaps between wages in the public and private sectors has only a few entries for Spain.[1]

Public sector wage gaps are relevant in many dimensions. First, regarding fiscal policy, public wages constitute the main bulk of government consumption. Secondly, work organisations in the public sector differ in many senses from the private sector, as stressed by the literature on incentives in public organisations.[2] Because of the relatively higher strength of trade unions in the public sector and also due to incentive/equity considerations, wage structures use to be less unequal in the public sector. In this regard, the study of the wage structure in the public sector provides evidence on the institutional factors determining the pay practices of public employers. Thirdly, as skilled biased technological progress, international integration and changes in labour supply patterns are very much affecting the wage structure of the private sector, there are also reasons to believe that the wage structure is also changing in the public sector. Fourthly, there could be spill-over effects from public wages to private wages. Apart from "demonstrations effects", wages and employment conditions in the public sector affect labour supply to the private sector, and, hence, to the composition of employment and wages that prevail in the private sector. For instance, if the public sector pays above the private sector the latter may feel compelled to raise the rates it pays certain types of labour to match those offered in the public sector. The resulting higher private sector costs lower competitiveness of the traded goods sector in the regions where public sector wage gaps are higher. Thus, if in a particular region incentives to select into public employment are particularly intense, then there could be a lack of human capital in the private sector lowering regional competitiveness and growth.

In this paper we estimate public sector wage gaps in Spanish regions. Cross-regional wage inequality within the public sector is typically lower than in the private sector. Hence, public sector wage gaps ought to be higher in those sectors where private sector wages are lower. The Spanish labour market provides a very interesting case study for the issues at hand when discussing the consequences of the public sector for regional labour markets and, in particular, the impact of the public sector employment practices onto regional development. A tentative list of reasons is the following:

- First, besides the scope of the segment of the public sector labour market, Spain is one of the countries where there are typically several hundred, even thousands, applicants for each

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[1] As for the international literature see, for instance, Gregory and Borland (1999) for a survey, Borjas (2002) for the US experience, and Lucifora and Meurs (2004) for analysis of public sector wage gaps in Great Britain, Italy and France. A recent reference for Spain is Albert et al. (1999).

[2] See, for instance, Dixit (2000) and Prendergast (1999).

public sector job in offer, while in some occupations employers in the private sector find it difficult to hire new workers.

- Secondly, there are noticeable and persistent regional differences in the Spanish labour markets. Employment and unemployment rates, the incidence of "atypical" (i.e., temporary, seasonal, part-time) employment, wages, and other employment conditions differ significantly across Spanish regions.[3] In spite of these differences, there is not much mobility across regions, although intraregional labour mobility has noticeably increased along the 1990s.[4]

- Thirdly, Spain has a quasi-federal structure with a continuously increasing weight of regional and local governments. After the transition to a democratic regime in the late 1970s, a process of political devolution, that is not yet completely resolved, produced a significant transfer of human resources from the Central Administration to Regional Governments and Local Corporations. While the wages and employment conditions of Central Administration's employees do not typically change across Spanish regions, Regional Governments and Local Corporations can introduce some differences in wage and employment conditions of their employees. This, together with the previous point, suggests that there is significant cross-regional variability in wage and other employment conditions of public sector employees.

- Finally, along the 1980s and 1990s there had been some relevant changes in the institutional configuration of the labour market, mostly affecting to the private sector but also with some consequences for the public sector. As a result of these changes, there could be expected significant shifts in the wage structures of both sectors, on top of the shifts which conceivably could have been produced by the usual suspects in the literature regarding the evolution of wage inequality during the 1980s and 1990s (biased-technological progress, international trade, changes in the composition of labour supply, etc.)

The structure of the paper is as follows: Section 2 describes the institutional framework of the public and private labour markets in Spain, highlighting some recent reforms which have resulted, first, in a large increase of temporary employment in the private sector during the 1980s and early 1990s, and, then some decrease in the private sector and a rise in the public sector of that kind of employment after the mid-1990s. It also provides a first comparison of wages in the public and private sectors in Spanish regions using average data from National Accounts and the administrative registers of public employees, and some information about the regional variation of the composition of employment across regions to qualify, in some dimensions, the sizes of the gaps. Section 3 describes the data, taken from the *European Community Household Panel* (ECHP, henceforth), and the estimation procedure used in our microeconometric analysis of regional public sector wage gaps. Section 4 presents our main results, showing that the balance between what private firms and what the public sector pay in the local markets, differs substantially in several areas of Spain so that, after controlling for individual characteristics and sorting of workers into sectors, public sector wages relative to private sector wages increase with unemployment and decreases with labour productivity across Spanish regions. We also find that the higher the weight in public employment of regional governments is, the higher public sector wage gaps are. Finally, Section 5 contains some concluding remarks.

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[3] See Bentolila and Jimeno (1998).
[4] See Arellano and Bover (2002).

2.   Institutional framework of the Spanish labour market

This section provides institutional details of the pay-setting arrangements in the public and private sectors in Spain, focusing in particular on the degree of centralisation and decentralisation in these arrangements and in recent labour market reforms that have changed the incidence of permanent employment. It also presents descriptive statistics of 'raw', unadjusted, regional pay differentials in the public and private sectors, according to information from National Accounts and administrative registers of public employees. The regional variation of these statistics is put into perspective by offering also some analysis of the regional variation in the composition of public employment along several dimensions such as age groups, gender, educational attainments and employment status.

2.1. The public sector

In Spain the employment conditions of public sector employees may be regulated either by administrative legislation or by the labour legislation. The employment conditions of civil servants (*funcionarios*) are regulated by administrative legislation. Access to employment is by public and open examinations, and civil servants enjoy full employment security. Their wages are determined by the corresponding employer, which may be the Central Administration, Regional Governments and Local Corporations. There are several components of civil servants' wages depending on the occupational level (5 groups ranked by the educational attainment level required for the post), job position (30 categories), remuneration for special dedication, ability, responsibility or risk (up to 150 categories), seniority, productivity, and compensation for extraordinary services, working overtime, or special working time schedules. Civil servants working for the Central Administration receive the same wage package regardless of the region of residence. However, Regional Governments and Local Corporations have some flexibility at adjusting the remuneration of civil servants working for them. Although there are informal negotiations with trade unions and employees representatives, formal collective bargaining agreements are not in effect and changes in the employment conditions are implemented by changes in the corresponding administrative legislation.

There is a second class of public sector employees, named *personal laboral,* whose employment conditions are determined by the same labour legislation which applies to employees in the private sector, and that we sketch in the next section. In this case, employment conditions are determined by formal collective bargaining, and the proportion of this type of public sector employees may differ depending on the characteristics of the public sector employer, not only on its geographical scope (Central Administration, Regional Governments, etc) but also on the activity being provided (health, teaching, etc.)

It is also important to note that the distribution of government functions among the Central Administration, Regional Governments and Local Corporations have dramatically changed in the last two decades. From a situation in which the Central Administration was in charge of almost all public services, nowadays there are several services which are completely transferred to Regional Governments and Local Corporations. For instance, the provision of education (even at the university level) and the health system is a responsibility of regional

governments.[5] This leads us to pay a particular attention to these two sectors below in our microeconometric analysis of public sector wage gaps.

2.2 The private sector

The employment conditions at the private sector of the Spanish labour market are mostly determined through collective bargaining between employers and employees representatives. Negotiations take place at different levels (nations, sector of activity, firm, plant) and the coverage rate of collective bargaining agreements are above 80%, although only about 15% of employees are covered by a firm-level collective agreement. The main law regulating collective bargaining was passed in 1980. Since the mid-1980s, there have been very few changes regarding the structure and contents of the Spanish collective bargaining system.

Besides the regulation of collective bargaining, the Spanish labour law is very stringent regarding Employment Protection Legislation. The usual indicators of EPL strictness rank Spain at the top of OECD countries regarding firing restrictions of permanent employees. In this respect, labour market reforms since the early 1980s have been addressed at changing the nature and incidence of "atypical" employment contracts (fixed-term, temporary, part-time). In 1984, fixed-term contracts were promoted by allowing firms to hire employees under this type of contracts for any kind of job, seasonal or not. Very soon, the proportion of employees with fixed-term employment contracts surpassed 30% and the proportion of new hires under this type of contract was about 95%. In the 1990s, several reforms have tried to reduce the scope of temporary employment. In 1994 the reasons for "fair dismissals" were widened, while in 1997 a new permanent contract with lower firing costs for objective dismissals was put in place.[6]

Both the regulation of collective bargaining and EPL provisions apply to private sector employees and to public sector employees who are not civil servants, that is, who are hired under the labour code. After the EPL reforms of the 1990s, the proportion of employees with fixed-term contracts have diminished in the private sector (by about 6 p.p. since the mid 1990s) but have increased in the public sector (by 5 p.p. in the same time period). While the reduction of fixed-term employment in the private sector is though to be related to the lowering of non-wage labour costs under permanent contracts implied by the reforms[7], the rise of temporary employment in the public sector is thought to be related to the higher incidence of subsidised employment in the public sector, as a form of Active Labour Market Policies, and further restrictions for hiring civil servants due to budgetary reasons.[8]

2.3. Public sector wage gaps in Spanish regions: Some preliminary comparisons

The distribution of public employment at the three layers (Central Administration, Regional Governments and Local Corporations) at each Spanish region is plotted in Figure 1.[9] As can be seen, there are noticeable differences in the structure of public employment in Spanish regions. Not surprisingly, in Madrid the Central Administration employs about 45% of public

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[5] There is more discussion of the composition of public employment at the regional level in Section 2.3.
[6] There are many papers documenting and analysing temporary employment in Spain. See, for instance, Dolado et al. (2002) for a survey.
[7] Kugler et al. (2004)
[8] Dolado et al. (2002)
[9] Regions are classified according to the EUROSTAT's NUTS2 codes.

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employees. In contrast, Regional Governments and Local Corporations account for the largest bulk of public employment (75% or higher) in most of the rest of the country.

Regional wage differences in Spain are noticeable and persistent. Average compensation per employee in 2002 ranged from about 20.300 euros/year in Extremadura to more than 29.000 euros/year in the Basque Country (see Table 2). Furthermore, there are no signs of convergence across regions in this regard. As a first approximation to measuring public sector wage gaps in Spanish regions, we rely on National Accounts data. We compare average compensation per employee in the non-market sector of the economy (mostly, the public sector) to the same variable in the market sector (mostly, the private sector). Within the former we consider four branches: education, health and social services, non-market services, and public administration.

As seen in Figure 2, there is a wide regional variation in public wages gap defined along these lines. In education the gap between average compensation per employee between the non-market and the market sector ranges from 0.92 in the Valencian Community to about 1.7 in Navarra; in health and social services it ranges from 1.2 in Catalonia to about 2 in Extremadura. Wages gaps between the non-market and market service sectors range from 0.69 in Madrid to about 1.09 in Canary Islands, while for compensation per employee in Public Administration relative to total compensation per employee (excluding the non-market sector) the range is between 0.73 in Madrid and 1.3 in the Basque Country.[10]

Another relevant fact of the evolution of public employment over the recent years is the rapid expansion of temporary employment, whose incidence in the public sector was about 16% in the mid-1990s and is nowadays above 22%. This rise was mainly due to the increasing use of temporary contracts by Regional Governments and Local Corporations, although the proportion of fixed-term public employees also increased in Central Administrations. As already mentioned, budget restrictions imposed by fiscal consolidation and the widespread use of short-term contracts in programmes associated to Active Labour Market Policies seem to explain such a development (Dolado et al. 2002). There are also wide differences in the incidence of temporary employment across population groups (by age, gender and skills), regions and sectors of activity. And there is empirical evidence of a relatively stable wage gap of about 9% between permanent and temporary workers (once individual characteristics and job attributes are controlled for).[11] Given the heterogeneous composition of public employment and the different selection effects which may be present at the regional level, the comparison of average wage gaps across regions is not very informative. As an illustration, we have estimated the probability of having a temporary contract in the public sector (conditional on working for the public sector). The sample is from the European Community Household Panel (ECHP) for the 1995-2001 period, which is also the one used for the estimation of public sector wage gaps below.[12]

The results are in Table 3. As can be seen, even after controlling for individual characteristics some regional differences remain. In Andalusia, Asturias, Canary Islands, Castilla-La Mancha. Comunidad Valenciana, Extremadura, Galicia, Murcia, Navarra and the Basque Country temporary employment is more prevalent within the public sector. To some extent this

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[10] All these values refer to the mean throughout the period 1995-2001.
[11] See, for instance, Jimeno and Toharia (1993) de la Rica (2004) and Davia and Hernanz (2004).
[12] More details on the construction of the sample are given in Section 3.

resembles regional differences in temporary employment in the private sector, where Andalusia, Aragon, Castilla and León, Castilla-La Mancha, Extremadura, Galicia and Murcia are the regions with a higher proportion of temporary employees.[13]

3. Microeconometric analysis

3.1. Data

The analysis of the Spanish wage structure is hindered by lack of appropriate data. The structural wage survey collected by the Statistical Office (*Encuesta de Estructura Salarial*) only covers the private sector and is only for 1995 and 2001. The Labour Force Survey does not collect information on wages. Hence, for information on wages of public sector employees, we are left with occasional surveys, which give information not comparable, neither across time nor across units. The only statistical source that provides some microeconomic information on this matter is the European Community Household Panel survey (ECPH). The ECHP is based on a survey that is annually carried out on a sample of households. It has a panel dimension so it allows us to follow the labour market performance of individuals through time. Individual characteristics, employment status and economic variables are obtained together with some characteristics of the household. Most of the variables describe the individual's and household's situation at the moment of the interview or refer to the current month of the interview. However, some variables related to individual and household annual earnings refer to the previous year. Another important feature of the survey is that individuals are requested to indicate labour earnings, among other income sources.

For the sake of this analysis, this data set has some advantages (comparability across countries, sufficient information on individual, family and job characteristics, a panel structure, etc.) and one main disadvantage, a small sample size, which prevents from estimating public wage gaps with a high degree of precision.[14]

Thus, we use the European Community Household Panel survey (ECPH) from 1995 to 2001 to estimate characteristics-adjusted public sector wage gaps. Wages are measured in real terms and in an hourly basis (using the CPI to deflate nominal monthly earnings provided by the ECHP and normal working hours to convert monthly earnings into hourly wages), and are expressed in euros (at constant prices, 2000).

We start off by taking a look at the main sample characteristics of our data for public and private sector workers. Table 4 shows some descriptive statistics of our sample. *Level of studies* consists of three dummy variables that classify the levels of studies as university, secondary, and primary education. *Gender* is a dummy variable that takes value one if the worker is male; *Marital Status* takes value one if the worker is married and zero otherwise; *other unemployment experience* takes value one if, before the previous job, the individual experienced a spell of unemployment; *Tenure* in the previous job is measured in years and has been divided into four categories. The sample has roughly a similar percentage of public employees as the LFS, with women having a higher weight in public employment than in

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[13] García-Pérez and Rebollo (2004) find that regional differences in labour costs and in productivity explain the largest bulk of the regional differences in the incidence of temporary employment.

[14] Also, unfortunately, the survey does not provide information on the characteristics of the public employer (Central Administration, Regional Government or Local Corporation).

private employment, and public employees being relatively more educated, with longer tenure, and occupying professional positions. As for regions, public employment has an incidence above the average in Andalusia, Aragón, Asturias Castilla-La Mancha and Extremadura. Hourly wages are about 44% higher in the public sector, on average. This is the result of three factors: i) higher earnings in the public sector, ii) longer working hours in the private sector, and iii) an employment composition of public employment characterised by more educated, longer tenured workers, and professionals. The hourly wage gap is even higher for women, and for employees in Andalusia, Cantabria, Galicia and the Canary Islands.

Finally, Table 5 shows some interesting facts regarding how public sector wage gaps depend on the characteristics of the public employer. In this regard, the best examples are the health and the education systems, whose management was transferred from the Central Administration to Regional Governments in all the regions but at the different moment in time. Thus, whereas there are some regions which have this competence since the early eighties, others have only acquired it at the end of the nineties. In Table 5 it is shown that those regions which had these competences for a longer period show, in average, larger wage gaps between the public and the private sectors, both in health and education. Moreover, in the case of education, public sector wage gaps noticeably increased after competences were transferred from Central Administration to Regional Governments.

3.2. Model Specification

Pay differentials between the public and the private sectors have been traditionally measured by estimating earnings/wage equations (see Mincer, 1974) using microeconomic databases. However, since some individual and job characteristics are not observed, an omitted variable bias is likely to be present in the estimation of Mincerian equations. Another bias which can arise in the estimation of these equations is the well known self-selection bias, arising form the fact that the employment status of a given individual depends on variables which also affect wages.

To eliminate the selectivity bias, we follow the traditional approach. We specify the probability of an individual being in a certain employment status as a function of individual characteristics. This probability acts as the selection equation in a Switching Regression Model for wages in both the public and the private sector. In this framework, the source of endogeneity is the existence of unobservable variables that could be correlated with the observable and non-observable characteristics in the wage equation and that simultaneously influence the likelihood of a given worker being in the public sector.[15]

We consider a situation where for each sampled observation only one among the two dependent variables W_j – wages– is observed. Specifically, the observations on our dependent variable can be classified into two regimes, *public* and *private sector* respectively, which are generated by different probability laws:

$$W_j = X_j \beta_j + u_j , j=1,2 \tag{1}$$

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[15] Other papers applying this methodology to different aspects in the field of labor studies are, for example, Carrasco (2001), Pezzin and Schone (1999), Dustmann and van Soest (1998) or Prescott and Wilton (1992).

where W_j represents potential wages for a worker in state 1 (public sector) or 0 (private sector), X_j is the set of observable determinants of wages and u_j represents the unobservable component of wages, which are assumed to be normal with variance $\sigma^2_{u_j}$. The selection mechanism is described through a latent variable model that describes the propensity towards being in one of the two possible states. As it is common in the latent variable approach, it is not possible to observe I^*, but only its realization:

$$I = 1 \Leftrightarrow I^* > 0$$
$$I = 0 \Leftrightarrow I^* \leq 0$$
(2)

that is, the worker will be observed in one state if the total value associated with this state is greater than the value in every other possible state. The latent variable model may be interpreted as a reduced form approach, where supply and demand side effects mix and cannot be disentangled. This implies that the behaviour of the worker and the functioning of the labour market jointly generate what we observe, I. The estimated coefficients of the explanatory variables therefore capture the joint effect of genuine preferences of the worker and the employer's preferences as regards the worker's characteristics. And therefore we have that:

$$W = W_1, \;\; if \;\; I^* > 0$$
$$W = W_2, \;\; if \;\; I^* \leq 0$$
(3)

We assume that I_j depends on observable and unobservable variables:

$$I^* = Z\gamma + \varepsilon$$
(4)

where Z represents a vector of individual specific explanatory variables that describes the determinants of the selection process, γ is the corresponding vector of unknown parameters to be estimated and ε is the random component of the selection equation. This equation can be easily estimated using a *probit* specification. The basic assumption in this model is that the error terms in both the wage and the selection equations may be correlated (the correlation coefficients between these two elements are denoted, respectively, by $\rho_{\varepsilon u_1}$ and $\rho_{\varepsilon u_2}$).

Given the fact that we are interested in estimating jointly the wage equations and the selection process, the likelihood function has to add the information relative to the wage process and to take account of the endogeneity of the selection process. We estimate the endogenous switching model by full maximum likelihood[16] because this method is more efficient than the two step estimation method proposed by Heckman (1979).[17] The likelihood function to be estimated has the following form:

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[16] An alternative is to estimate the model by simulated maximum likelihood. However, difficulty is usually encountered in the estimation of both mean equation and covariance parameters.
[17] The two-step estimators are never fully efficient in the sense that they never attain the Cramer-Rao lower bound. The efficient estimator is the full information maximum likelihood, which estimates the earnings and type of transition equations jointly.

$$L\left(\beta_j, \gamma, \sigma_{u_1}^2, \sigma_{u_2}^2, \rho_{\varepsilon u_1}, \rho_{\varepsilon u_2} \mid W, X, Z, I\right) = \prod_{I^*>0} \varphi(W_1)\Phi\left(I^* > 0/W_1\right) \prod_{I^* \leq 0} \varphi(W_2)\Phi\left(I^* \leq 0/W_2\right) \quad (5)$$

where the term $\varphi(W_j)$ describes the density function of wages ($j=1,2$) and $\Phi(I^*/W_j)$ the cumulative distribution function of the selection process conditional on wages.

To test for the endogeneity of the switching model, the parameters of interest are the correlation coefficients between the error term of each wage equation and the error term of the selection equation. If these parameters are different from zero, then the selection process is not exogenous and the estimation of the wage equations by OLS would give inconsistent estimators of the parameters of the model.

From the estimation of this model we obtain unconditional and conditional wage predictions. The unconditional prediction is defined as the average predicted wage for all individuals in the sample. The conditional wage prediction represents the mean predicted wage for each worker type. Thus, we have:

$$E\left(W_1 / I > 0\right) = X_1\beta_1 + \rho_{\varepsilon u_1} \frac{\phi(\gamma Z)}{\Phi(\gamma Z)} \quad (6)$$

$$E\left(W_2 / I < 0\right) = X_2\beta_2 - \rho_{\varepsilon u_2} \frac{\phi(\gamma Z)}{1 - \Phi(\gamma Z)} \quad (6')$$

These are the equations underlying our estimation of public sector wage gaps in Spanish regions. We will also use them to breakdown total wage differences in differences in returns, differences in individuals' characteristics, and differences due to self-selection.[18]

4. Results

4.1. Wage regressions

We perform estimation of the previous model on five different samples: all workers, males, females, and workers in the education sector and in the health and social service sector, separately. The dependent variable is the log of hourly gross wage.[19] As co-variates, we introduce individual characteristics, such as gender, age, tenure, occupation, marital status and number of children, besides time and regional dummies and the interactions of the latter with education and occupation.[20] [21]

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[18] An alternative to identify "pure" public sector wage gaps would be to focus on "movers", that is individual changing jobs from the public to the private sector and viceversa. However, in our sample the proportion of movers is too low (3.1% from the private to the public sector and 10.0% from the public sector to the private sector) as to allow for estimation of regional public sector wage gaps.

[19] There are about 7% of moonlighters in our sample (4.58% of public employees and 2.44% of private employees). For the definition of employment status, we have used the declared main job, while the hourly wage also corresponds to the main job.

[20] We have not considered to introducing some kind of regional dependence across the parameters for each region, as, for instance, in a Geographically Weighted Regression. This technique weights each observation depending upon the points in space where the parameter estimates are expected to have more influence on the dependent

Regarding the selection equation, we need some identifying assumption, as that implied by some variable affecting the propensity of being in the public sector, but not wages. For this, we have used two types of variables. First, we thought of the spouse's level of education and sector of affiliation as one important determinant of the propensity of being in the public sector. Secondly, we explore the idea that individuals in the public sector are likely to have a lower time discount rate and higher capital income. The justification for this is that, being entry into the public sector regulated through public examinations which typically involve several years of preparation, individuals who discount less the future and those who do not have financial constrains, are more likely to be in the public sector. Thus, we use the savings rate and capital income, as proxies of the time discount rate and of financial constraints, to predicting the likelihood of working in the public sector.[22]

The estimation results are compiled in Appendix A, and are briefly summarised in what follows. Beginning with the selection equation for the full sample, females, singles, and those with a university degree are more likely to work in the public sector. The variables identifying the selection into the public sector (education level and employment status of the spouse, the saving rate, and capital income) are all statistically significant; especially noteworthy is that those individuals with the spouse working in the public sector are the most likely to work also in this sector.

With respect to the wage equations, we find that the difference between males and females is larger in the private than in the public sector, where the gender gap is below 10% after controlling for observable characteristics.[23] Returns to education are larger in the public sector, especially for those with a university degree.[24] Also, the returns to a permanent contract are higher in the public sector. With respect to the household type, we find larger wages for married workers with children, both in the public and in the private sector. Finally, selection into both sectors seems to be driven by horizontal distribution of abilities. Since $\rho_{\varepsilon u_1}$ is estimated to be negative, the mean wage of public workers is higher compared to the mean wage that a randomly selected group of the population would have earned, were they employed in the public sector. Similarly, since $\rho_{\varepsilon u_2}$ is estimated to be negative, the mean wage of private workers is lower (see equation 6') compared to the mean wage that a randomly selected group

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variable that observations further away. In principle, labour mobility in response to wage differentials (both in the public and private sector) could imply some geographical dependence among the parameters of each region. But, a priori, it is quite difficult to anticipate the main patterns of this dependence as to impose it in the estimation procedure.

[21] We have also estimated alternative specifications with other co-variates, such as interaction terms between tenure and education, and tenure and type of contracts, without significant changes in the regional dummies we are interested in.

[22] As most identifying assumptions, these are not uncontroversial. The main problem is that we observe spouse characteristics and saving rates and capital income, not at the moment of joining either the public or the private sector, but at the current date. However, these variables are statistically significant for explaining the probability of being employed in the public sector, and the estimates of the wage equation do not qualitatively change when some of them are dropped from the selection equation.

[23] The same is obtained in Albert *et al.* (1999).

[24] Van der Gaag and Vijverberg (1987) find the opposite result for a developing country. In the case of Spain, the main source of differences in the returns to a university degree between the public and the private sectors apply to women (See Tables A.2 and A.3).

of the population would have earned, were they employed in the private sector. Below we correct for these sorting effects when estimating public sector wage gaps in Spanish regions.

As for regional differences, all the regions, but one (the Basque Country), have lower wages in the public sector than Madrid. While, relative to Madrid, Ballearic Islands, Canary Islands, Castilla and León, Catalonia, and Navarra do not display statistically significant different wages in the public sector, Andalusia, Aragon, Asturias, Cantabria, Valencian Community, and, especially, Extremadura, Galicia, Murcia, and La Rioja, have lower wages in the public sector. In contrast, in the private sector, wages in Catalonia, the Basque Country and Navarra are higher than in Madrid, while the regions with the lowest wages are Cantabria, Murcia and Galicia.[25]

Also noteworthy are the cross-regional differences in wage structures between sectors. Overall, managers, professionals, and clerks are relatively better paid in the private sector, whereas semi-skilled workers receive relatively better wages in the public sector. There are larger returns to a university degree in the public sector in the Center and in the Southern regions, while Clerks, Professionals and Semi-skilled workers have relatively higher returns outside the Center regions in the public sector, but not in the private sector. On the contrary, the private sector in the Center regions is the one with better wages for managers and professionals.

Regarding the returns to individual characteristics from separate estimation of wage equations for males and females, the most noteworthy result is that returns to education and to tenure are higher for women than for men in the public sector. Other than that, we continue finding the main features obtained with the whole sample. As for regional differences, they are larger for women than for men, both in the public and in the private sectors. Finally, the correlation coefficients of non-observables in both groups show some interesting differences: although both coefficients are negative, the one for the public sector is more negative for males than for females, what shows that the negative self-selection into the public sector is more important for males than for females.

We are particularly interested on regional public sector wage gaps in two particular occupations (teaching and health and social services) with a significant presence both in the public sector and in the private sector. As commented in Section 2, within the public sector, during the sample period these activities were to some extent transferred to Regional Governments and, hence, they are those where the scope for regional differentiation of wages is wider. We offer a separate estimation of our switching model for these two categories of workers. As for the teaching sector we find that the gender wage gap is not statistically significant in the public sector where it is about 11%, higher for men, in the private sector. Returns to education and to a permanent contract are higher in the public sector. Interestingly, in most regions wage in the public sector are higher than in Madrid, while it happens the contrary in the private sector. Finally, in the Health and Social Services sector we find a positive wage gap for males in both sectors.[26] Moreover, the returns to tenure and to a permanent contract are lower in this sector for public workers. We find no regional differences for these workers both in the public and the private sector.

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[25] With the EHCP data, Ceuta and Melilla are included into Andalusia.
[26] For this case, it is not possible to include all regional dummies due to sample size problems. Thus, we group all regions into four aggregate zones.

To confirm whether the wage gaps estimated with a switching regression model are robust to specification issues, we also consider the results from an alternative estimation of wage gaps using a random effects approach (see Table B.1 in Appendix B). Under this specification, the effects of all regressors are almost unchanged. Hence, the estimated wage gap and the breakdown between differences in characteristics and differences in returns are more or less the same under both approaches.

We are also interested in whether the wage gaps between public and private sector workers are different depending on the level of the wage. That is, we want to observe gaps at different segments of the wage distribution, since it can be expected some smoothing of returns and of wage differences within the public sector. Hence, we have carried out three quartile regressions, at the 25%, 50% and 75% quartiles, in order to verify this hypothesis. The results from these regressions are shown in the Appendix (Tables B2-B4 in Appendix B), while the corresponding regional differences are plotted in Figure 3. As expected, public sector wage gaps are lower in the top tale of the wage distribution (11% in the 75% quartile) than in the bottom one (21.3% in the 25% percentile). Moreover, when we estimate separately these quartiles for workers in the public and in the private sector, we obtain that males are better paid in the private sector, being this difference the biggest in the top quartile. With respect to education, its return increases over the wage distribution, especially for those with a university degree in the South and in Madrid, whereas these differences are almost zero in the rest of the country. Finally, there exist also some interesting regional differences in this regard. For the top quartile, the differences with respect to Madrid in the public sector are the biggest in the South, whereas in the private sector, the main difference with respect to Madrid arises in the Northern regions that seem to pay less than Madrid along the whole wage distribution.

4.2. A summary of estimated public wage gaps in Spanish regions

Given the wage regressions commented above, we break down public sector wage gaps in differences of characteristics, returns, self-selection, and perform some regional analysis of "adjusted" public sector wage gaps. We consider, respectively, the deterministic component of log-wages, and the deterministic component plus the conditional expectation of the stochastic component of log-wages, where the deterministic component is computed using the estimates from the joint estimation. Hence, with the decomposition of unconditional expectations we are applying the typical Oaxaca (1973) decomposition method to wage differentials adjusted for the selection bias (see Yun, 1999), so that it can be observed the main predictions of our switching regression model in terms of predicted conditional wages, both for public and private sector workers. The main results are reported in Table 6.

According to our estimation results, the predicted conditional difference between public and private wages, in logs, is a bit larger (45.7%) than the observed statistical difference of wages between the public and the private sector (40.4%). This difference is due to the estimated negative effect of self-selection. Thus, the unobserved characteristics that make a given worker to be in the public sector will lower his expected conditional wage. On the contrary, non-observables affect to private sector workers making their wages to be higher than for the mean worker. Hence, without considering that the sample of workers in each sector is not a random sample, we would underestimate the difference between working in the public and in the private sector.

Discounting sorting effects reduces significantly public sector wage gaps, as can be seen in the last column of Table 6. After this adjustment for sorting, the wage gap between public and private sector can be explained by differences in their characteristics, by about 51 percentage points, whereas only 21.1 percentage points is due to different in returns to specific characteristics. Very interesting results are obtained when we split our sample between males and females. Firstly, we have that the wage gap is much larger for females (59.1%) than for males (39.7%).[27] Moreover, we obtain a more significant effect of self-selection for males than for females. The former seem to suffer a more negative self-selection into the public sector that makes the real wage gap to be larger than when endogeneity is correctly taken into account. Women also suffer a negative self-selection into the public sector although the effect of self-selection is smaller.

The results for the samples of workers in the health and teaching sectors reflect that the self-selection is even more negative in the first group whereas the effect for the latter group is less important. The wage gap in the sector of Health and Social Services is the lowest (all the observed difference is due to returns but it is completely compensated with a huge negative self-selection into the public sector). On the contrary, in the teaching sector the wage gap is more significant, being around 36.0%, because both the difference in returns and the self-selection effect are smaller for these workers.

Our main motivation for this exercise is to identifying differences between public and private sector wages across regions.[28] In the second panel of Table 6 we show that the biggest wage gap is observed in the Northern and Southern regions, and that these differences in wage gaps are mostly due to differences in returns. Differences in characteristics and in sorting effects of self-selection, particularly noticeable in the high wage regions, such as the Basque Country, Navarra, Madrid, and Catalonia, are also noticeable (see Figure 4).[29] The regions with the largest public sector wage gaps due to differences in returns are Cantabria, Galicia, Canary Islands, Asturias, Castilla-La Mancha, and Castilla and León.

Finally, the bottom panel of Table 6 and Figure 5 show that the regional wage differences with respect to Madrid are lower in the public sector than in the private one, confirming our prior that the wage structure in the public sector is more compressed than in the private sector. This is particularly true for the Northern regions (Asturias, Cantabria, Galicia) and for the Canary and Ballearic Islands where the ratio between both differences is larger than 1.8, that is, whereas the public sector in the North pays 10% less than in Madrid, in the private sector, where productivity should be taken much more in consideration, this ratio is almost 18% lower. The same happens in the South (Castilla-La Mancha, Murcia and Andalusia), although in this case the ratio between both differences is much lower, less than 1.4.

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[27] The same is obtained in Albert *et al.* (1999) where, for 1994, the first wave of the ECHP, these gaps are, respectively, 49.3% and 41.2%. In fact, public sector wage gaps for females seem to have increased during the last years of the Twentieth Century.

[28] We have checked that there are sufficient observations in each cell so that comparisons between public and private sector wages rely on estimates with a common support.

[29] The regions where the self-selection effect is more important are the ones with larger wages in the private sector (Catalonia, Navarra, the Basque Country and Madrid). Hence, in these regions public sector wage gaps are hided by the negative self-selection into the public sector.

4.3. Economic patterns in the cross-regional variation of public wage gaps

Having broken down public sector wage gaps in different sources, we now search for some patterns in the cross-regional variation of public sector wage gaps. We consider the total wage gap and the gap due to returns, being the latter the best measure of how the same skills are rewarded differentially in the public and private sectors. We relate these gaps to regional differences in the composition of public employment, labour productivity and unemployment.

Previously, we have already noticed that with the transfer of public services from the Central Administration to Regional Governments, public wage gaps have tended to increase. Data plotted in Figure 6 suggest that there is indeed a positive correlation across regions between public sector wage gaps (both total and its component due to differences in returns) and the proportion of public employment under regional governments, although, admittedly, this correlation is somewhat blurred by three outliers (Extremadura, La Rioja and Navarra). This positive correlation can be interpreted in several ways. First, as stressed in the political economy literature, the closer the management of public employment to its political constituency is, the easier for public employees to extract rents is. Secondly, a lower fiscal responsibility of the regional governments could have softened their budget constraints, giving some leeway for additional wage increases for public employees. Finally, as public employment expands, public employers need to pay higher wages to attract more employees. Our conjecture is that all these three explanations play some role at explaining the correlation highlighted above. Unfortunately, with the data available we cannot attribute weights to each one of these hypothesis.

Two important determinants of wages are productivity and unemployment. Higher productivity leads to higher wages both in the public and private sector, but, theoretically, to lower public wage gaps, insofar as public wages are conceivably less responsive to productivity. On the other hand, as stressed in the introduction, higher public wage gaps could create incentives for workers to enter into the public sector leaving less human capital available for the economic development of the private sector. In fact, Figure 7 shows that across Spanish regions there is a negative correlation between production per employee and public wage gaps, both regarding the total gaps and their component due to differences in returns.

As for unemployment, there are several channels which could create a significant relationship with public wage gaps. Higher unemployment reduces workers' reservation wages and, hence, tends to lower wages. Insofar as wages in the private sector are conceivably more affected by unemployment that public sector wages, a positive correlation between unemployment and public wage gaps should be expected. But there is an alternative explanation of this type of correlation, going from higher public wage gaps to higher taxes to financing public wages, and to lower employment creation in the private sector. In the Spanish case, as shown in Figure 8, there is a clear positive correlation between unemployment and public wage gaps (here the outliers seem to be Andalusia and Extremadura), regardless of whether the gap is measured by its total amount or by the component estimated as differences in returns.

5. Concluding remarks

This paper provides a first approximation to the measurement of public sector wage gaps in Spanish regions. We believe that this exercise is informative in several respects. First, since public sector wages in Spain can be differentiated across regions mostly by the action of Regional Governments and Local Corporations, it provides some information about how the wage structure in the public sector may change depending upon the scope of the public employer. We have shown that there are indeed sizeable public sector wage differences among Spanish regions which are mostly due to differences in returns, and to a lesser extent to differences in characteristics and to selection effects.

Secondly, we have also shown that the differences among regions are not constant across gender, educational levels, or occupations. In those regions where Regional Governments have a higher weight in public employment, public wage gaps are higher and public employers pay higher returns. Despite significant differences in public and private sector wages across regions, there is however no trend towards reduction of regional wage differences in Spain.

Finally, we have also found a cross-regional positive correlation between public wage gaps and unemployment and a negative one between labour productivity and public wage gaps. Although, there are alternative explanations of these two findings which could only be tested with more detailed data, the evidence do not reject the view that pay setting in the public sector could be creating some barriers for regional development, being by adjusting to a less extent to economic factors diverging across regions or by creating incentives for the selection of human capital into the public sector.

References

Albert, C. J.F. Jimeno, and G. Moreno (1999): "Pay determination in the Spanish Public Sector", in R. Elliott, C. Lucifora, and D. Meurs, eds., *Public sector pay determination in the European Union*. London: McMillan Press Ltd., pp. 191-239.

Arellano, M. and O. Bover (2002): "Learning About Migration Decisions from the Migrants", *Journal of Population Economics*, 15.

Bentolila, S. and J.F. Jimeno (1998): ""Regional Unemployment Persistence: Spain, 1976-1994" (joint with S. Bentolila), *Labour Economics*, 1998, vol. 5/1, 25-42.

Borjas, G. (2002): "The wage structure and the sorting of workers into the public sector" NBER working paper no. 9313.

Carrasco, R. (2001). "Binary Choice with Binary Endogenous Regressors in Panel Data: Estimating the Effect of Fertility on Female Labour Participation", *Journal of Business and Economics Statistics*, 19 (4): 385-394.

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,* vol 6:4, 291-318.

Dolado, J.J., C. García-Serrano, and J.F. Jimeno (2002) "Drawing lessons from the boom of temporary jobs in Spain", *Economic Journal*, vol. 112, no. 480, June 2002, F270-F295.

Dustmann, C. and A. van Soest, (1998): "Wage structures in the private and public sectors in West Germany", *European Economic Review,* 42(8), pp. 225-247.

García.-Pérez, J.I. and Y. Rebollo (2005): "Diferencias en temporalidad entre regiones españolas: Un análisis con datos individuales", en *Cuestiones Clave de la Economía Española, Perspectivas Actuales 2004* (García Pérez y Pérez García Eds.), Editorial Comares, Granada, 207-235.

Gregory, R.G. and J. Borland (1999): "Recent developments in public sector labor markets" in O.C. Ashenfelter and D. Card, *eds.*, *Handbook of Labor Economics,* volume 3C. Amsterdam: North-Holland, pp. 3573-3630.

Jimeno, J.F. and L. Toharia (1993) "The Effects of Fixed-Term Employment on Wages: Theory and Evidence from Spain", *Investigaciones Económicas*, vol XVII(3), 475-94.

Kugler, A., J.F. Jimeno, and V. Hernanz (2003): "Employment consequences of restrictive permanent contracts: Evidence from Spanish labor market reforms", FEDEA working paper 2003-14.

Mincer, J. (1974), *Schooling, Experience, and Earnings*, New York: Columbia University Press.

Oaxaca, R. (1973): "Male-Female Wage Diferentials in Urban Labor Markets", *International Economic Review*, 14, 693-709.

Pezzin, L. and B.S. Schone (1999). "Intergenerational Household Formation, Female Labor Supply and Informal Caregiving: A Bargaining Approach". *Journal of Human Resources*, vol. 34(3), pp. 475-503.

Prescott, D. and D. Wilton (1992). "The Determinants of Wage Changes in Indexed and Nonindexed Contracts: A Switching Model", *Journal of Labor Economics*, Vol. 10(3), pp. 331-355.

Rica, S. de la (2004): "Wage gaps between workers with indefinite and fixed-term contracts: The impact of firm and occupational segregation", *Moneda y Crédito*, 219, 43-68.

Van der Gaag, J. and W. Vijverberg (1988): "A switching regression model for wage determinants in the public and private sectors of a developing country", *The Review of Economics and Statistics,* 70(2), pp. 244-252

Yun, Myeong-Su (1999): "Generalized Selection Bias and The Decomposition of Wage Differentials", IZA Discusión Paper No. 69.

Table 1. Proportion of public sector employees, Spain, 2004

	All	Primary Education	Secondary Education	Tertiary education
All	20.0%	9.0%	13.5%	35.4%
Males	16.5%	8.3%	12.3%	29.7%
Females	25.1%	10.4%	15.4%	41.4%

Source: Labour Force Survey.

Table 2: Average compensation per employee, 1995-2002

	1995	1996	1997	1998	1999	2000	2001	2002
Andalusia	17,943	18,235	18,686	19,082	19,637	20,212	20,825	21,708
Aragon	20,002	21,204	21,515	22,149	22,939	23,728	24,560	25,431
Asturias	20,437	21,130	21,712	22,518	22,831	23,583	24,308	25,150
Balearic Islands	20,108	21,167	22,012	22,379	22,973	23,658	24,418	25,558
Canary Islands	19,380	20,107	20,475	20,800	21,083	21,890	22,638	23,743
Cantabria	20,116	21,083	21,830	22,738	23,566	24,155	25,089	25,915
Castille and León	18,843	20,158	20,547	21,294	22,138	23,148	23,968	24,800
Castille-La Mancha	17,076	18,222	18,220	18,633	19,480	20,229	21,082	21,964
Catalonia	20,976	21,801	22,337	22,958	23,447	24,454	25,558	26,617
Comunidad Valenciana	17,547	18,536	19,045	19,633	19,989	20,698	21,733	22,527
Extremadura	15,466	16,582	16,983	17,505	17,833	18,731	19,480	20,315
Galicia	17,114	18,439	18,834	19,312	19,845	20,377	21,183	22,149
Madrid	22,581	23,350	24,322	25,163	25,765	26,852	27,894	28,866
Murcia	16,393	17,386	17,490	17,829	18,379	19,325	20,280	21,167
Navarra	21,555	23,184	23,551	24,350	24,918	26,071	27,137	28,192
Basque Country	23,153	24,224	24,881	25,648	26,452	27,387	28,273	29,285
La Rioja	19,003	20,160	20,625	21,581	22,542	23,680	24,846	25,645

Source: National Accounts.

Table 3. Probability of holding a temporary job

Variables	PUBLIC SECTOR		PRIVATE SECTOR	
	Coefficient	t-Stat.	Coefficient	t-Stat.
Male	-0.439	-8.71	-0.069	-2.74
Secondary Education	-0.289	-3.72	-0.135	-4.55
University Education	-0.400	-5.35	-0.187	-5.70
Married	-0.356	-4.56	0.036	1.03
Number of children	0.031	1.09	-0.026	-1.85
Age	0.004	0.19	-0.046	-6.13
Age (square)	0.000	-1.28	0.000	4.01
Big firm (+500 e.)	0.046	0.79	-0.326	-7.44
Part-time job	0.325	2.94	0.489	11.09
Tenure	-0.386	-28.38	-0.434	-63.11
Tenure (square)	0.014	21.77	0.018	55.42
Managers	0.372	2.06	-0.803	-8.84
Professionals	0.016	0.18	-0.524	-14.35
Clerks	-0.278	-2.82	-0.624	-13.49
Semi-skilled workers	0.060	0.59	-0.294	-9.72
Andalusia	0.308	3.19	1.172	3.41
Aragón	0.159	1.27	0.923	2.12
Asturias	0.599	4.71	0.877	1.97
Ballearic Islands	-0.068	-0.37	-1.075	-2.91
Canary Islands	0.291	2.63	0.223	0.72
Cantabria	0.122	0.74	0.457	1.43
Castilla y León	0.168	1.34	1.129	2.39
Castilla-La Mancha	0.265	2.13	1.337	2.57
Catalonia	-0.023	-0.20	-0.077	-0.14
Comunidad Valenciana	0.489	4.32	0.417	1.20
Extremadura	0.578	4.80	1.479	2.37
Galicia	0.238	2.02	0.924	2.26
Murcia	0.375	2.79	1.044	2.85
Navarra	0.301	2.18	1.045	1.49
Basque Country	0.617	4.76	1.002	1.84
La Rioja	-0.400	-1.94	0.824	1.28
Spouse with University Education	0.045	0.58	-0.211	-4.67
Spouse with Secondary Education	0.061	0.74	-0.204	-5.02
Spouse in the Public Sector	0.006	0.08	-0.120	-2.06
Industry			-2.224	-0.72
Construction			2.061	0.66
Services			4.212	1.36
Non profit services			-11.297	-2.31
Constant term	1.262	3.40	1.320	0.53
Number of observations	6.925		21.313	
Log likelihood =	-1,874.925		-8,804.115	

Note: Time dummies included. The constant term represents a woman with primary education, single, working in Madrid in a firm with less than 500 employees and in an unskilled position.

Table 4. Descriptive Statistics and mean hourly wages (in euros 2000)

	PUBLIC SECTOR		PRIVATE SECTOR			
	% TOTAL	(log) WAGE	% TOTAL	(log) WAGE	WAGE GAP	# OBSERV.
All	**24.52%**	**2.23**	**75.48%**	**1.78**	**44.37%**	**28,238**
Males	21.32%	2.24	78.68%	1.86	38.43%	18,201
Females	30.34%	2.21	69.66%	1.63	57.78%	10,037
Permanent employment contract	30.44%	2.32	69.56%	1.96	35.90%	18,417
Fixed-term employment contract	13.43%	1.85	86.57%	1.52	32.72%	9,821
tenure<=3	13.07%	1.91	86.93%	1.59	31.75%	11,955
tenure 3-15	28.61%	2.26	71.39%	1.86	39.18%	7,722
tenure>15	36.84%	2.37	63.16%	2.08	28.83%	8,561
Primary studies	12.85%	1.91	87.15%	1.66	25.47%	13,525
Secondary studies	22.98%	2.09	77.02%	1.81	27.78%	5,963
Tertiary studies	43.62%	2.42	56.38%	2.06	35.81%	8,75
Andalusia	27.42%	2.17	72.58%	1.65	52.01%	3,545
Aragon	30.73%	2.25	69.27%	1.88	37.02%	1,292
Asturias	34.72%	2.26	65.28%	1.79	46.61%	844
Balearic Islands	20.69%	2.25	79.31%	1.74	50.21%	759
Canary Islands	25.51%	2.18	74.49%	1.62	56.06%	1,776
Cantabria	25.03%	2.29	74.97%	1.68	61.45%	931
Castilla y León	25.94%	2.26	74.06%	1.78	48.05%	1,577
Castilla-La Mancha	27.51%	2.15	72.49%	1.64	51.12%	1,265
Catalonia	18.96%	2.32	81.04%	1.96	35.43%	3,212
Comunidad Valenciana	18.85%	2.16	81.15%	1.69	46.88%	2,419
Extremadura	34.50%	1.94	65.50%	1.63	30.96%	974
Galicia	25.47%	2.22	74.53%	1.57	65.35%	1,763
Madrid	25.80%	2.38	74.20%	2.01	36.16%	3,271
Murcia	23.87%	2.07	76.13%	1.59	48.41%	1,328
Navarra	24.24%	2.32	75.76%	1.91	41.02%	1,023
Basque Country	18.30%	2.41	81.70%	2.04	37.18%	1,519
La Rioja	17.03%	2.06	82.97%	1.82	23.93%	740
Managers	16.25%	2.64	83.75%	2.61	2.85%	714
Professionals	45.80%	2.38	54.20%	1.94	43.42%	9,604
Clerks	30.80%	2.01	69.20%	1.89	11.89%	3,149
Semi-skilled workers	7.25%	2.02	92.75%	1.73	29.04%	10,34
Unskilled workers	15.57%	1.72	84.43%	1.50	22.67%	4,431

Source: ECHP.

Table 5. Average wage gaps by region:
Effect of having the competence on Health and Education

	HEALTH		EDUCATION		
	YEAR of transfer	wage gap (average 1995-2001)	YEAR of transfer	Average wage gap (before the transfer)	Average wage gap (after the transfer)
Andalusia	1984	16,0%	1982		51,8%
Aragon	2002	2,3%	1998	35,4%	48,2%
Asturias	2002	6,9%	1999	35,3%	60,4%
Ballearic Islands	2002	26,5%	1997	58,5%	61,9%
Canary Islands	1994	61,4%	1983		52,9%
Cantabria	2002	45,4%	1998	28,6%	71,8%
Castilla and León	2002	49,3%	1999	51,6%	58,5%
Castilla-La Mancha	2002	23,5%	1999	71,1%	42,3%
Catalonia	1981	15,1%	1980		30,7%
Valencian Community	1987	38,6%	1983		34,0%
Extremadura	2002	12,0%	1999	23,5%	38,2%
Galicia	1990	36,3%	1982		50,5%
Madrid	2002	21,0%	1999	16,0%	24,4%
Murcia	2002	20,8%	1999	43,2%	55,3%
Navarra	1990	33,6%	1990		27,9%
Basque Country	1987	34,5%	1980		42,1%
La Rioja	2002	2,4%	1998	18,7	56,5

Note: For the education sector, the year of the transfer refers to the year in which the non-university education system began to be managed by the corresponding Regional Government.

Table 6. Breakdown of Public Sector Wage Gaps in Spanish Regions

	Public sector (in logs)	Private sector (in logs)	Total Wage Gap	Due to returns	Due to characteristics	Due to self-selection
Spain	2,24	1,78	**45.7%**	**51.07%**	**21.12%**	**-26.51%**
Men	2,25	1,85	39.7%	60.24%	19.95%	-40.53%
Women	2,21	1,62	59.1%	44.81%	28.11%	-13.83%
Health	2,46	2,27	18.8%	53.84%	20.90%	-55.94%
Teaching	2,49	2,13	35.7%	34.06%	15.04%	-13.40%
Spain (Random Effects)	2,19	1,76	43.2%	22.89%	20.30%	

REGIONAL ANALYSIS:	Public sector (in logs)	Private sector (in logs)	Total Wage Gap	Due to returns	Due to characteristics	Due to self-selection
Andalusia	2,17	1,70	47.1%	51.89%	14.47%	-19.22%
Aragón	2,19	1,81	37.3%	47.25%	20.38%	-30.35%
Asturias	2,29	1,75	54.1%	52.52%	21.19%	-19.65%
Ballearic Islands	2,32	1,81	51.0%	51.04%	23.05%	-23.12%
Canary Islands	2,27	1,69	57.5%	55.71%	17.97%	-16.17%
Cantabria	2,28	1,66	62.2%	58.62%	17.60%	-14.00%
Castilla and León	2,23	1,73	49.9%	54.64%	20.90%	-25.60%
Castilla-La Mancha	2,18	1,67	51.7%	54.21%	14.48%	-16.99%
Catalonia	2,34	1,92	41.7%	48.32%	31.62%	-38.27%
Valencia	2,22	1,75	46.3%	50.11%	18.38%	-22.24%
Extremadura	1,98	1,66	31.3%	44.02%	5.54%	-18.31%
Galicia	2,18	1,59	59.3%	58.09%	9.71%	-8.51%
Murcia	2,13	1,64	48.9%	51.94%	9.62%	-12.81%
Navarra	2,32	1,93	39.0%	47.07%	32.64%	-40.69%
Basque Country	2,41	1,95	46.0%	51.51%	40.18%	-45.72%
La Rioja	2,11	1,79	31.7%	45.13%	19.18%	-32.62%
Madrid	2,34	1,90	44.4%	47.04%	35.37%	-38.02%

	Public sector	Private sector	Private sector/Public sector
Andalusia vs Madrid	-16.04%	-18.41%	1.148
Aragón vs Madrid	-14.31%	-8.08%	0.565
Asturias vs Madrid	-5.28%	-13.92%	2.635
Ballearic Islands vs Madrid	-2.31%	-8.53%	3.701
Canary Islands vs Madrid	-7.20%	-18.71%	2.597
Cantabria vs Madrid	-6.24%	-21.56%	3.452
Castilla and León vs Madrid	-10.57%	-15.42%	1.459
Castilla-La Mancha vs Madrid	-14.79%	-20.81%	1.407
Catalonia vs Madrid	-0.29%	2.40%	-8.311
Valencia vs Madrid	-11.91%	-13.62%	1.144
Extremadura vs Madrid	-30.74%	-20.96%	0.682
Galicia vs Madrid	-15.08%	-26.80%	1.777
Murcia vs Madrid	-19.31%	-22.75%	1.178
Navarra vs Madrid	-2.31%	3.14%	-1.364
Basque Country vs Madrid	6.72%	5.09%	0.757
La Rioja vs Madrid	-20.65%	-10.03%	0.486

Appendix A: Estimated wage regressions
Table A.1a. Estimation of wage equations (switching model, full sample)

	Public sector		Private sector		Selection equation (public sector)		
	Coef.	t-stat	Coef.	t-stat		Coef.	t-stat
Male	0.099	10.25	0.240	40.32	Male	-0.226	-12.14
Secondary Education	0.110	2.84	0.121	6.08	Secondary Education	0.389	5.53
University Education	0.305	8.04	0.250	11.64	University Education	0.758	12.06
Permanent Contract	0.187	14.51	0.140	20.24	Married	-0.176	-6.02
Tenure	0.018	6.63	0.018	10.81	Number of children	0.016	1.53
Tenure (square)	-0.001	-4.37	0.000	-3.91	Age	0.096	14.70
Managers	0.644	6.92	0.694	15.33	Age (square)	-0.001	-10.26
Professionals	0.199	3.73	0.345	12.48	Spouse with University	0.271	9.78
Clerks	-0.058	-1.02	0.235	7.73	Spouse with Second. Educ.	0.154	5.50
Semi-skilled workers	0.117	1.97	0.107	4.10	Spouse in the Public S.	0.375	11.62
Married	0.051	4.12	0.039	5.02	Capital Income	0.106	4.79
Number of children	0.013	2.85	0.027	8.43	Saving rate	-0.218	-1.26
Age	0.009	2.27	0.029	15.52	Industry	-1.445	-0.61
Age (square)	0.000	-1.71	0.000	-13.98	Construction	1.633	0.70
North x Second. Edu.	-0.144	-2.85	-0.049	-1.74	Services	-0.222	-0.93
x Univers. Educ.	-0.177	-3.76	0.001	0.05	Non profit services	5.130	1.41
x Managers	-0.074	-0.60	-0.121	-1.73	North x Second. Edu.	0.186	1.94
x Professionals	0.209	3.11	-0.197	-5.25	x Univers. Educ.	0.164	1.98
x Clerks	0.209	2.87	-0.031	-0.70	East x Second. Edu.	0.055	0.68
x Semi-skilled	0.122	1.67	-0.051	-1.52	x Univers. Educ.	0.224	3.18
East x Second. Edu.	-0.111	-2.52	-0.029	-1.29	South x Second. Edu.	0.143	1.80
x Univers. Educ.	-0.207	-5.03	-0.026	-1.09	x Univers. Educ.	0.243	3.48
x Managers	0.024	0.22	-0.128	-2.50	Constant term	-3.025	-1.57
x Professionals	0.175	2.91	-0.166	-5.37			
x Clerks	0.158	2.43	-0.058	-1.66			
x Semi-skilled	0.056	0.83	-0.049	-1.71	σ_{u_1}	0.367	37.00
South x Second. Edu.	-0.068	-1.60	-0.032	-1.37	σ_{u_2}	0.380	171.37
x Univers. Educ.	-0.071	-1.79	0.014	0.55	$\rho_{\varepsilon u_1}$	-0.618	-13.69
x Managers	-0.369	-3.45	-0.120	-2.12	$\rho_{\varepsilon u_2}$	-0.304	-11.71
x Professionals	0.077	1.36	-0.207	-6.68			
x Clerks	0.149	2.39	-0.056	-1.59			
x Semi-skilled	-0.061	-0.96	-0.036	-1.27	Number of obs =	28,238	
Constant term	6.738	57.61	5.758	143.89	Wald chi2(54) =	3,823.52	
					Prob > chi2 =	0	
					Log likelihood	-24,114	

Notes: Time and regional dummies (see Table A.1b) included. The constant term represents a woman with primary education, single, working in Madrid in a firm with less than 500 employees and in an unskilled position. Regional aggregation: NORTH (GALICIA, ASTURIAS, CANTABRIA), EAST (PAIS VASCO, COMUNIDAD FORAL DE NAVARRA, LA RIOJA, ARAGON, CATALONIA, COMUNIDAD VALENCIANA, BALLEARIC ISLANDS), CENTER (CASTILLA AND LEON, CASTILLA-LA MANCHA, EXTREMADURA), SOUTH (ANDALUSIA, MURCIA, CANARY ISLANDS)

Table A.1b. Estimation of wage equations (switching model, full sample).
Regional dummies

	Public sector		Private sector		Selection equation (working in the public sector)	
	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
Andalusia	-0.162	-3.06	-0.115	-4.48	-0.275	-1.06
Aragon	-0.158	-2.77	0.004	0.14	-0.140	-0.41
Asturias	-0.121	-1.91	-0.066	-2.02	0.000	0.00
Ballearic Islands	-0.090	-1.49	-0.023	-0.80	0.288	1.00
Canary Islands	-0.090	-1.67	-0.126	-4.78	-0.096	-0.40
Cantabria	-0.115	-1.82	-0.153	-4.79	-0.103	-0.41
Castilla y León	-0.083	-1.53	-0.076	-2.81	-0.372	-1.02
Castilla-La Mancha	-0.148	-2.72	-0.146	-5.27	-0.265	-0.66
Catalonia	-0.029	-0.52	0.105	4.01	0.008	0.02
Comunidad Valenciana	-0.142	-2.51	-0.061	-2.37	-0.066	-0.24
Extremadura	-0.335	-6.14	-0.143	-5.00	-0.387	-0.84
Galicia	-0.192	-3.09	-0.217	-6.98	-0.247	-0.78
Murcia	-0.220	-4.03	-0.175	-6.5	-0.160	-0.56
Navarra	-0.032	-0.55	0.117	4.12	-0.105	-0.19
Basque Country	0.113	1.92	0.149	5.43	-0.447	-1.06
La Rioja	-0.189	-3.08	-0.006	-0.21	-0.421	-0.84
Constant	6.738	57.61	5.758	143.89	-3.002	-1.57

Table A.2a. Estimation of wage equations (switching model, males)

	Public sector		Private sector		Selection equation (public sector)		
	Coef.	t-stat	Coef.	t-stat		Coef.	t-stat
Second. Educ.	0,139	2,71	0,127	5,16	Second. Educ.	0,328	3,65
University Educ.	0,231	5,00	0,268	10,34	University Educ.	0,645	8,27
Permanent Contract	0,182	9,76	0,123	14,48	Marital Status	-0,202	-5,28
Tenure	0,017	4,68	0,015	7,29	Number of children	-0,006	-0,52
Tenure (square)	0,000	-3,08	0,000	-1,77	Age	0,074	9,12
Managers	0,677	6,05	0,688	13,11	Age (square)	-0,001	-5,81
Professionals	0,270	3,79	0,320	8,53	Spouse with University	0,330	9,65
Clerks	-0,058	-0,72	0,258	5,66	Spouse with Second. Educ.	0,186	5,76
Semi-skilled workers	0,117	1,57	0,121	3,43	Spouse in the Public S.	0,269	6,83
Marital Status	0,070	3,74	0,055	5,62	Capital Income	0,082	3,13
Number of children	0,024	3,94	0,030	8,01	Saving rate	-0,270	-1,15
Age	0,003	0,60	0,027	12,30	Industry	-2,501	-0,9
Age (square)	0,000	-0,39	0,000	-10,80	Construction	-0,166	-0,06
North x second. Edu.	-0,216	-3,26	-0,072	-2,08	Services	-0,425	-0,15
x univers. Educ.	-0,232	-3,86	-0,037	-1,05	Non profit services	6,943	1,61
x Managers	0,022	0,15	-0,180	-2,28	North x second. Edu.	0,206	1,71
x Professionals	0,213	2,43	-0,216	-4,35	x univers. Educ.	0,135	1,31
x Clerks	0,167	1,70	-0,089	-1,39	East x second. Edu.	0,088	0,86
x Semi-skilled	0,140	1,55	-0,104	-2,40	x univers. Educ.	0,155	1,75
East x second. Edu.	-0,175	-3,00	-0,056	-2,01	South x second. Edu.	0,199	1,99
x univers. Educ.	-0,229	-4,41	-0,044	-1,52	x univers. Educ.	0,286	3,26
x Managers	0,067	0,50	-0,142	-2,40	Constant term	-3,660	-1,62
x Professionals	0,096	1,21	-0,142	-3,39			
x Clerks	0,117	1,30	-0,057	-1,10			
x Semi-skilled	0,046	0,55	-0,065	-1,71	σ_{u_1}	0,417	35,02
South x second. Edu.	-0,146	-2,60	-0,020	-0,71	σ_{u_2}	0,375	136,75
x univers. Educ.	-0,089	-1,76	-0,015	-0,50	$\rho_{\varepsilon u_1}$	-0,778	-30,98
x Managers	-0,420	-3,31	-0,074	-1,15	$\rho_{\varepsilon u_2}$	-0,313	-9,15
x Professionals	-0,049	-0,65	-0,208	-5,02			
x Clerks	0,147	1,70	-0,049	-0,95			
x Semi-skilled	-0,090	-1,13	-0,064	-1,71			
Constant term	7,093	53,71	6,003	117,84			

Number of obs =	18201
Wald chi2(54) =	2108,5
Prob > chi2 =	0
Log likelihood	-15.172,51

Notes: Time and regional dummies (see Table A2.b) included. The constant term represents a worker with primary education, single, working in Madrid in a firm with less than 500 employees and in an unskilled position.

Table A.2b. Estimation of wage equations (switching model, males)
Regional dummies

	Public sector		Private sector		Selection equation (working in the public sector)	
	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
Andalusia	-0.099	-1.31	-0.080	-2.26	-0.235	-0.77
Aragon	-0.134	-1.64	0.035	0.92	0.192	0.48
Asturias	-0.074	-0.85	-0.019	-0.43	0.391	0.96
Ballearic Islands	-0.063	-0.74	-0.049	-1.2	0.194	0.57
Canary Islands	-0.054	-0.7	-0.143	-3.89	-0.260	-0.92
Cantabria	-0.105	-1.21	-0.076	-1.79	0.181	0.6
Castilla y León	0.013	0.17	-0.023	-0.63	-0.110	-0.26
Castilla-La Mancha	-0.103	-1.32	-0.126	-3.36	-0.043	-0.09
Catalonia	0.069	0.86	0.137	3.72	0.428	0.89
Comunidad Valenciana	-0.076	-0.94	-0.045	-1.24	0.202	0.63
Extremadura	-0.295	-3.77	-0.144	-3.75	-0.302	-0.56
Galicia	-0.205	-2.41	-0.172	-4.1	0.080	0.21
Murcia	-0.178	-2.3	-0.186	-5.02	0.132	0.39
Navarra	0.018	0.22	0.138	3.54	0.519	0.81
Basque Country	0.140	1.69	0.206	5.42	0.015	0.03
La Rioja	-0.148	-1.67	0.020	0.5	0.058	0.1
Constant	7.093	53.71	6.003	117.84	-3.660	-1.62

Table A.3a. Estimation of wage equations (switching model, females)

	Public sector Coef.	t-stat	Private sector Coef.	t-stat	Selection equation (public sector)	Coef.	t-stat
Secondary Education	0.144	2.23	0.103	3.07	Second. Educ.	0.584	5.05
University Education	0.407	6.16	0.212	5.60	University Educ.	1.061	9.89
Permanent Contract	0.198	11.29	0.165	14.03	Married	-0.128	-2.73
Tenure	0.019	4.76	0.026	8.75	Number of children	0.070	3.81
Tenure (square)	-0.001	-3.20	-0.001	-4.54	Age	0.125	10.95
Managers	0.612	3.41	0.715	5.73	Age (square)	-0.001	-7.78
Professionals	0.101	1.19	0.386	9.07	Spouse with University	0.161	3.42
Clerks	-0.067	-0.77	0.211	4.98	Spouse with Second. Educ.	0.099	1.95
Semi-skilled workers	0.118	0.82	0.055	1.21	Spouse in the Public S.	0.475	9.77
Married	0.031	1.86	0.021	1.69	Capital Income	0.142	3.66
Number of children	0.002	0.24	0.019	3.06	Saving rate	-0.031	-0.12
Age	0.022	3.47	0.035	10.29	Industry	0.326	0.08
Age (square)	0.000	-3.05	0.000	-10.00	Construction	4.549	1.15
North x Second. Edu.	-0.103	-1.18	-0.016	-0.32	Services	-7.267	-1.74
x Univers. Educ.	-0.117	-1.41	0.063	1.25	Non profit services	1.979	0.31
x Managers	-0.315	-1.30	0.063	0.35	North x Second. Edu.	0.179	1.08
x Professionals	0.198	1.81	-0.177	-2.96	x Univers. Educ.	0.162	1.12
x Clerks	0.197	1.75	0.021	0.34	East x Second. Edu.	-0.013	-0.10
x Semi-skilled	0.070	0.37	0.070	1.15	x Univers. Educ.	0.297	2.47
East x Second. Edu.	-0.083	-1.11	0.026	0.68	South x Second. Edu.	-0.048	-0.36
x Univers. Educ.	-0.165	-2.30	0.023	0.55	x Univers. Educ.	0.058	0.48
x Managers	-0.094	-0.46	-0.101	-0.74	Constant term	-1.019	-0.31
x Professionals	0.249	2.59	-0.229	-4.84			
x Clerks	0.176	1.78	-0.087	-1.78			
x Semi-skilled	-0.088	-0.50	-0.038	-0.75	σ_{u_1}	0.326	35.29
South x Second. Edu.	-0.045	-0.63	-0.055	-1.37	σ_{u_2}	0.381	102.08
x Univers. Educ.	-0.070	-1.02	0.054	1.24	$\rho_{\varepsilon u_1}$	-0.390	-4.12
x Managers	-0.360	-1.70	-0.387	-2.54	$\rho_{\varepsilon u_2}$	-0.273	-6.36
x Professionals	0.218	2.37	-0.202	-4.11			
x Clerks	0.140	1.48	-0.048	-0.95			
x Semi-skilled	-0.057	-0.34	0.039	0.76			
Constant term	6.339	33.45	5.702	83.98	Number of obs =	10,037	
					Wald chi2(54) =	1,514.97	
					Prob > chi2 =	0	
					Log likelihood	-8,591.4	

Notes: Time and regional dummies (see Table A3.b) included. The constant term represents a worker with primary education, single, working in Madrid in a firm with less than 500 employees and in an unskilled position.

Table A.3b. Estimation of wage equations (switching model, females)
Regional dummies

	Public sector		Private sector		Selection equation (working in the public sector)	
	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
Andalusia	-0.218	-2.98	-0.190	-5.01	-0.447	-0.96
Aragon	-0.179	-2.3	-0.039	-0.94	-1.002	-1.69
Asturias	-0.158	-1.72	-0.124	-2.39	-0.921	-1.51
Ballearic Islands	-0.145	-1.72	0.016	0.38	0.704	1.39
Canary Islands	-0.114	-1.53	-0.094	-2.43	0.295	0.7
Cantabria	-0.099	-1.05	-0.292	-5.69	-0.803	-1.8
Castilla y León	-0.166	-2.22	-0.196	-4.72	-1.072	-1.67
Castilla-La Mancha	-0.183	-2.41	-0.177	-4.06	-0.873	-1.24
Catalonia	-0.130	-1.67	0.074	1.98	-0.858	-1.19
Comunidad Valenciana	-0.188	-2.42	-0.066	-1.77	-0.686	-1.44
Extremadura	-0.351	-4.65	-0.139	-3.02	-0.821	-1
Galicia	-0.173	-1.88	-0.285	-6	-1.085	-1.94
Murcia	-0.246	-3.2	-0.142	-3.5	-0.931	-1.85
Navarra	-0.120	-1.49	0.101	2.41	-1.617	-1.7
Basque Country	0.079	0.97	0.056	1.38	-1.523	-2.06
La Rioja	-0.206	-2.49	-0.026	-0.59	-1.628	-1.86
Constant	6.339	33.45	5.702	83.98	-1.019	-0.31

Table A.4. Estimation of wage equations (switching model, teaching)

	Public sector		Private sector		Selection equation (public sector)		
	Coef.	t-stat	Coef.	t-stat		Coef.	t-stat
Male	-0.009	-0.60	0.116	5.95	Male	-0.097	-2.09
Secondary Education	0.168	3.65	0.170	5.44	Secondary Education	0.554	5.98
University Education	0.441	8.21	0.270	6.15	University education	1.277	14.92
Permanent contract	0.216	8.20	0.184	6.69	Married	-0.151	-1.96
Tenure	0.012	2.40	0.017	2.91	Number of children	0.041	1.63
Tenure squared	0.000	-1.71	0.000	-0.32	Age	0.028	9.91
Married	0.055	2.54	0.039	1.47	Spouse with University	0.166	2.44
Number of children	0.002	0.25	0.046	4.08	Spouse with Second. Educ.	0.053	0.70
Age	0.011	8.58	0.008	5.23	Spouse in the Public S.	0.486	7.17
Andalusía	0.003	0.09	-0.266	-7.17	Capital Income	-0.053	-0.89
Aragón	0.081	2.05	-0.155	-3.46	Saving rate	0.307	0.66
Asturias	0.198	4.32	-0.111	-1.54	Manufacturing	4.963	0.77
Ballearic Islands	0.027	0.54	-0.301	-4.97	Construction	0.030	0.00
Canary Islands	0.136	3.71	-0.166	-3.32	Market services	-3.606	-0.57
Cantabria	0.114	2.46	-0.195	-3.39	Non-market services	-3.378	-0.33
Castilla and León	0.148	3.60	-0.159	-2.66	Andalusia	0.406	0.58
Castilla-La Mancha	0.065	1.66	-0.420	-7.68	Aragón	-1.020	-1.14
Catalonia	0.016	0.52	-0.022	-0.72	Asturias	-0.358	-0.39
Valencia	-0.083	-2.47	-0.134	-3.17	Ballearic Islands	0.887	1.20
Extremadura	-0.011	-0.27	-0.161	-2.84	Canary Islands	1.080	1.66
Galicia	0.005	0.15	-0.264	-5.47	Cantabria	-0.573	-0.86
Murcia	0.032	0.73	-0.317	-5.03	Castilla and León	-0.276	-0.29
Navarra	0.041	0.96	-0.179	-3.15	Castilla-La Mancha	-0.069	-0.06
Basque Country	0.210	5.00	-0.052	-1.27	Catalonia	-1.109	-0.99
La Rioja	-0.117	-2.09	-0.293	-4.88	Valencia	-0.269	-0.37
Constant term	6.400	56.16	6.318	96.01	Extremadura	0.339	0.27
					Galicia	-0.229	-0.27
					Murcia	-0.024	-0.03
					Navarra	-1.447	-1.00
Number of obs =	3,777				Basque Country	-1.315	-1.17
Wald chi2 =	603.94				La Rioja	-1.437	-1.08
Prob > chi2 =	0				Constant term	-0.655	-0.13
Log likelihood	-3,489.05						
					σ_{u_1}	0.302	52.20
					σ_{u_2}	0.400	37.91
					$\rho_{\varepsilon u_1}$	-0.136	-1.06
					$\rho_{\varepsilon u_2}$	-0.317	-2.72

Notes: Time dummies included. The constant term represents a woman with primary education, single and working in Madrid.

Table A.5. Estimation of wage equations (switching model, health and social services)

	Public sector		Private sector		Selection equation (public sector)		
	Coef.	t-stat	Coef.	t-stat		Coef.	t-stat
Male	0.160	5.26	0,150	4.05	Male	-0.926	-14.26
Secondary Education	0.085	0.73	0,255	2.04	Secondary education	-0.478	-1.46
University Education	0.387	4.61	0,356	3.23	Tertiary education	-0.067	-0.25
Permanent contract	0.109	3.9	0,150	4.25	Married	-0.111	-1.02
Tenure	0.023	3.46	0,025	2.98	Number of children	-0.019	-0.53
Tenure squared	-0.001	-3.4	-0,001	-2.65	Age	0.128	5.33
Married	0.026	0.94	0,051	1.4	Age squared	-0.001	-3.57
Number of children	0.005	0.51	0,058	3.46	Spouse with University Educ.	0.350	3.59
Age	0.045	4.73	0,030	2.7	Spouse with Second. Educ.	0.106	1.01
Age squared	0.000	-4.52	0,000	-1.28	Spouse in the Public S.	0.383	4.34
North	-0.014	-0.1	-0,810	1.03	Capital Income	0.008	0.10
North X Second. Educ.	-0.094	-0.51	-0,547	-3.91	Saving rate	-0.313	-0.58
North x Univers. Educ.	-0.209	-1.44	0,168	-3.2	Manufacturing	3.604	1.91
East	-0.041	-0.13	-0,145	-0.09	Construction	6.786	1.43
East x secondary studies	0.082	0.24	-0,065	-0.96	Market services	4.509	2.91
East x tertiary studies	-0.077	-0.24	-0,012	-0.5	Non-market services	1.279	4.17
South	-0.111	-0.69	-0,298	-1.27	North	0.065	0.15
South x secondary studies	0.046	0.23	-0,025	-1.92	North X Second. Educ.	0.659	1.25
South x tertiary studies	-0.040	-0.24	-0,162	-0.18	North x Univers. Educ.	0.683	1.61
Constant term	6.017	25.63	5,864	25.54	East	-1.912	-3.47
					East x Secondary Education	2.725	4.52
					East x University Education	2.553	4.59
					South	-1.073	-2.76
Number of obs =	2,305				South x Secondary Educ.	1.250	2.70
Wald chi2 =	499.57				South x Univers. Educ.	1.671	4.37
Prob > chi2 =	0				Constant term	-8.978	-4.95
Log likelihood	-2,079.27						
					σ_{u_1}	0.302	33.78
					σ_{u_2}	0.410	41.16
					$\rho_{\varepsilon u_1}$	-0.249	-1.60
					$\rho_{\varepsilon u_2}$	-0.229	-2.18

Notes: Time dummies included. The constant term represents a woman with primary education, single and working in Madrid

Appendix B: Further results
Table B1.a. Random effects GLS regressions

Variables	FULL SAMPLE		PUBLIC SECTOR		PRIVATE SECTOR	
	Coefficient	t-Stat.	Coefficient	t-Stat.	Coefficient	t-Stat.
Public Sector	0.144	20.66				
Male	0.194	23.51	0.075	4.93	0.237	25.77
Secondary Education	0.116	6.38	0.092	2.27	0.125	6.18
University Education	0.219	10.22	0.219	5.34	0.219	8.87
Permanent Contract	0.088	17.10	0.122	10.74	0.082	14.05
Tenure	0.018	13.27	0.018	6.80	0.018	11.44
Tenure (square)	-0.001	-8.65	0.000	-3.89	-0.001	-7.64
Managers	0.329	8.36	0.279	3.11	0.375	8.43
Professionals	0.200	7.97	0.164	2.89	0.217	7.64
Clerks	0.146	5.24	0.099	1.59	0.162	5.15
Semi-skilled workers	0.058	2.35	0.041	0.64	0.065	2.40
Married	0.042	5.12	0.084	5.51	0.029	3.14
Age	0.045	20.60	0.028	6.07	0.045	18.54
Age (square)	0.000	-17.29	0.000	-4.41	0.000	-15.98
Number of children	0.006	1.69	-0.004	-0.69	0.012	2.88
North x Second. Educ.	-0.036	-1.42	-0.007	-0.13	-0.062	-2.17
x Univers. Educ.	0.014	0.47	0.045	0.82	-0.040	-1.15
x Managers	-0.046	-0.78	-0.049	-0.42	-0.028	-0.40
x Professionals	-0.068	-2.05	-0.022	-0.31	-0.126	-3.30
x Clerks	-0.027	-0.71	-0.043	-0.54	-0.025	-0.55
x Semi-skilled	-0.021	-0.69	-0.019	-0.24	-0.020	-0.58
East x Second. Educ.	-0.037	-1.81	-0.009	-0.19	-0.053	-2.32
x Univers. Educ.	-0.039	-1.62	-0.030	-0.64	-0.054	-1.94
x Managers	-0.078	-1.74	0.083	0.78	-0.122	-2.42
x Professionals	-0.077	-2.77	0.061	0.94	-0.108	-3.43
x Clerks	-0.044	-1.41	0.004	0.05	-0.046	-1.30
x Semi-skilled	-0.015	-0.55	-0.007	-0.09	-0.024	-0.81
South x Second. Educ.	-0.023	-1.12	0.029	0.66	-0.044	-1.88
x Univers. Educ.	0.027	1.10	0.084	1.82	-0.020	-0.69
x Managers	-0.125	-2.59	-0.230	-2.20	-0.112	-2.03
x Professionals	-0.081	-2.90	-0.019	-0.31	-0.133	-4.17
x Clerks	-0.041	-1.31	-0.003	-0.04	-0.049	-1.37
x Semi-skilled	-0.026	-0.97	-0.021	-0.31	-0.030	-1.01
Constant term	5.590	120.28	6.079	57.13	5.577	108.91
σ_u	0.305		0.288		0.306	
ρ (fraction of variance due to u)	0.667		0.735		0.649	
R^2: overall	0.511		0.491		0.450	
No. observations	28,238		6,925		21,313	
No. groups	8,135		2,048		6,740	

Notes: Time and regional dummies (see Table B1.b) included. The constant term represents a worker with primary education, single, working in Madrid in a firm with less than 500 employees and in an unskilled position.

Table B1.a. Random effects GLS regressions.
Regional dummies

	FULL SAMPLE		PUBLIC SECTOR		PRIVATE SECTOR	
	Coefficient	t-Stat.	Coefficient	t-Stat.	Coefficient	t-Stat.
Andalusia	-0.153	-5.46	-0.171	-2.66	-0.153	-4.99
Aragon	-0.029	-0.9	-0.161	-2.23	-0.014	-0.38
Asturias	-0.100	-2.73	-0.096	-1.24	-0.084	-2.07
Ballearic Islands	-0.042	-1.2	-0.095	-1.19	-0.036	-0.96
Canary Islands	-0.141	-4.72	-0.126	-1.89	-0.147	-4.5
Cantabria	-0.144	-4.03	-0.035	-0.44	-0.165	-4.19
Castilla y León	-0.086	-2.77	-0.102	-1.48	-0.091	-2.64
Castilla-La Mancha	-0.162	-5.07	-0.196	-2.82	-0.166	-4.7
Catalonia	0.058	2	-0.081	-1.18	0.093	2.96
Comunidad Valenciana	-0.122	-4.18	-0.200	-2.84	-0.114	-3.61
Extremadura	-0.202	-6.09	-0.341	-5.03	-0.166	-4.43
Galicia	-0.241	-7.25	-0.169	-2.24	-0.251	-6.88
Murcia	-0.197	-6.21	-0.223	-3.19	-0.184	-5.3
Navarra	0.066	1.98	-0.063	-0.84	0.085	2.33
Basque Country	0.092	2.9	0.046	0.61	0.111	3.23
La Rioja	-0.057	-1.6	-0.225	-2.74	-0.024	-0.63
Constant term	5.590	120.28	6.079	57.13	5.577	108.91

Table B2.a. Quartile regressions (25th quartile)

Variables	FULL SAMPLE		PUBLIC SECTOR		PRIVATE SECTOR	
	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	t-Stat
Public Sector	0.225	30.87				
Male	0.173	29.00	0.072	6.52	0.221	25.76
Secondary Education	0.165	7.79	0.165	3.50	0.166	5.75
University Education	0.306	13.31	0.412	9.16	0.240	7.39
Permanent Contract	0.148	19.21	0.227	13.18	0.133	12.65
Tenure	0.019	10.41	0.021	5.58	0.017	6.75
Tenure (square)	0.000	-5.03	-0.001	-3.45	0.000	-3.17
Managers	0.680	13.57	0.792	6.65	0.699	10.40
Professionals	0.204	6.69	0.223	3.16	0.241	5.79
Clerks	0.110	3.40	0.029	0.38	0.181	4.11
Semi-skilled workers	0.104	3.60	0.197	2.47	0.082	2.15
Married	0.038	4.85	0.056	3.71	0.032	2.87
Age	0.031	16.40	0.026	6.03	0.035	13.20
Age (square)	0.000	-14.30	0.000	-4.94	0.000	-11.85
Number of children	0.022	6.95	0.017	3.11	0.021	4.46
North x Second. Educ.	-0.090	-3.04	-0.100	-1.56	-0.120	-2.94
x Univers. Educ.	-0.006	-0.20	-0.125	-2.03	0.013	0.30
x Managers	-0.211	-2.81	-0.198	-1.23	-0.207	-1.98
x Professionals	0.002	0.05	0.141	1.57	-0.146	-2.60
x Clerks	0.046	1.04	0.135	1.42	0.012	0.19
x Semi-skilled	-0.038	-1.03	-0.033	-0.33	-0.013	-0.27
East x Second. Educ.	-0.072	-2.99	-0.047	-0.84	-0.084	-2.56
x Univers. Educ.	-0.059	-2.26	-0.110	-2.10	-0.040	-1.08
x Managers	-0.166	-2.91	-0.194	-1.35	-0.208	-2.74
x Professionals	-0.029	-0.86	0.090	1.12	-0.117	-2.52
x Clerks	-0.008	-0.21	0.037	0.43	-0.030	-0.61
x Semi-skilled	-0.010	-0.31	-0.034	-0.38	-0.018	-0.42
South x Second. Educ.	-0.071	-2.89	-0.053	-1.00	-0.081	-2.40
x Univers. Educ.	0.032	1.21	-0.037	-0.73	0.024	0.64
x Managers	-0.325	-5.29	-0.459	-3.33	-0.262	-3.12
x Professionals	-0.038	-1.11	0.020	0.26	-0.142	-3.03
x Clerks	0.027	0.73	0.095	1.17	0.014	0.27
x Semi-skilled	-0.016	-0.51	-0.173	-2.03	0.015	0.37
Constant term	5.542	129.94	5.674	52.95	5.504	94.37
Num. Obs	28,238		6,925		21,313	
Pseudo R2	0.292		0.332		0.229	

Notes: Time and regional dummies (see Table B2.b) included. The constant term represents a worker with primary education, single, working in Madrid in a firm with less than 500 employees and in an unskilled position.

Table B2.b. Quartile regressions (25th quartile)
Regional dummies

	FULL SAMPLE		PUBLIC SECTOR		PRIVATE SECTOR	
	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	t-Stat
Andalusia	-0.113	-4.07	-0.036	-0.51	-0.137	-3.7
Aragon	-0.006	-0.2	-0.069	-0.92	0.023	0.57
Asturias	-0.084	-2.4	-0.060	-0.72	-0.100	-2.08
Ballearic Islands	-0.003	-0.09	-0.016	-0.2	0.016	0.38
Canary Islands	-0.131	-4.57	-0.023	-0.33	-0.151	-3.95
Cantabria	-0.180	-5.25	-0.071	-0.87	-0.184	-3.98
Castilla y León	-0.095	-3.28	-0.010	-0.14	-0.122	-3.11
Castilla-La Mancha	-0.117	-3.97	-0.013	-0.19	-0.157	-3.91
Catalonia	0.059	2.06	-0.032	-0.44	0.091	2.4
Comunidad Valenciana	-0.065	-2.29	-0.077	-1.04	-0.052	-1.38
Extremadura	-0.179	-5.95	-0.177	-2.48	-0.147	-3.55
Galicia	-0.212	-6.3	-0.138	-1.7	-0.224	-4.95
Murcia	-0.204	-7.03	-0.168	-2.35	-0.202	-5.17
Navarra	0.135	4.41	0.065	0.86	0.189	4.61
Basque Country	0.153	5.09	0.118	1.53	0.167	4.19
La Rioja	-0.061	-1.95	-0.234	-2.96	-0.014	-0.33
Constant term	5.542	129.94	5.674	52.95	5.504	94.37

Table B3.a. Quartile regressions (50th quartile)

Variables	FULL SAMPLE		PUBLIC SECTOR		PRIVATE SECTOR	
	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	t-Stat
Public Sector	0.176	25.33				
Male	0.181	31.05	0.066	6.24	0.227	38.90
Secondary Education	0.120	5.78	0.215	4.59	0.106	5.42
University Education	0.310	14.46	0.490	11.08	0.235	11.15
Permanent Contract	0.114	15.60	0.190	11.42	0.104	15.04
Tenure	0.020	11.32	0.020	5.57	0.018	10.24
Tenure (square)	0.000	-4.74	-0.001	-3.79	0.000	-3.33
Managers	0.755	15.46	0.720	6.13	0.831	18.30
Professionals	0.309	10.57	0.235	3.38	0.370	13.35
Clerks	0.148	4.60	-0.002	-0.03	0.203	6.65
Semi-skilled workers	0.132	4.62	0.175	2.25	0.131	5.01
Married	0.038	4.92	0.057	3.81	0.042	5.57
Age	0.031	16.84	0.025	6.03	0.033	18.43
Age (square)	0.000	-14.43	0.000	-4.64	0.000	-16.31
Number of children	0.017	5.33	0.019	3.44	0.016	4.93
North x Second. Educ.	-0.011	-0.37	-0.144	-2.32	-0.025	-0.88
x Univers. Educ.	-0.001	-0.03	-0.201	-3.44	0.035	1.22
x Managers	-0.269	-3.68	-0.194	-1.25	-0.301	-4.26
x Professionals	-0.053	-1.38	0.167	1.92	-0.265	-7.03
x Clerks	-0.020	-0.46	0.105	1.11	-0.023	-0.52
x Semi-skilled	-0.066	-1.81	0.019	0.20	-0.089	-2.64
East x Second. Educ.	-0.032	-1.34	-0.135	-2.46	-0.023	-1.04
x Univers. Educ.	-0.040	-1.66	-0.208	-4.09	-0.002	-0.08
x Managers	-0.176	-3.16	-0.131	-0.94	-0.251	-4.88
x Professionals	-0.104	-3.20	0.129	1.64	-0.190	-6.15
x Clerks	-0.037	-1.00	0.068	0.81	-0.036	-1.05
x Semi-skilled	-0.063	-2.02	-0.050	-0.57	-0.088	-3.09
South x Second. Educ.	-0.019	-0.78	-0.084	-1.60	-0.012	-0.54
x Univers. Educ.	0.055	2.23	-0.058	-1.17	0.060	2.43
x Managers	-0.286	-4.77	-0.467	-3.46	-0.249	-4.38
x Professionals	-0.120	-3.70	0.039	0.52	-0.236	-7.56
x Clerks	-0.051	-1.38	0.100	1.23	-0.053	-1.50
x Semi-skilled	-0.060	-1.94	-0.140	-1.67	-0.062	-2.19
Constant term	5.741	137.54	5.889	57.02	5.731	145.15
Num. Obs	28,238		6,925		21,313	
Pseudo R2	0.336		0.349		0.270	

Notes: Time and regional dummies (see Table B3.b) included. The constant term represents a worker with primary education, single, working in Madrid in a firm with less than 500 employees and in an unskilled position.

Table B3.b. Quartile regressions (50th quartile).
Regional dummies

	FULL SAMPLE		PUBLIC SECTOR		PRIVATE SECTOR	
	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	t-Stat
Andalusia	-0.089	-3.25	-0.056	-0.83	-0.099	-3.88
Aragon	-0.022	-0.74	-0.060	-0.83	-0.005	-0.19
Asturias	-0.055	-1.6	0.002	0.03	-0.034	-1.03
Ballearic Islands	-0.020	-0.65	-0.016	-0.21	-0.012	-0.4
Canary Islands	-0.127	-4.49	-0.030	-0.43	-0.142	-5.38
Cantabria	-0.139	-4.09	-0.011	-0.14	-0.128	-4.02
Castilla y León	-0.066	-2.31	-0.013	-0.19	-0.061	-2.26
Castilla-La Mancha	-0.103	-3.53	-0.023	-0.32	-0.122	-4.42
Catalonia	0.066	2.36	-0.005	-0.07	0.097	3.72
Comunidad Valenciana	-0.061	-2.18	-0.053	-0.73	-0.056	-2.17
Extremadura	-0.151	-5.07	-0.185	-2.67	-0.130	-4.55
Galicia	-0.209	-6.29	-0.113	-1.42	-0.208	-6.7
Murcia	-0.174	-6.07	-0.135	-1.94	-0.179	-6.64
Navarra	0.117	3.88	0.038	0.52	0.160	5.68
Basque Country	0.141	4.77	0.148	1.98	0.161	5.88
La Rioja	-0.031	-0.98	-0.130	-1.67	0.013	0.43
Constant term	5.741	137.54	5.889	57.02	5.731	145.15

## Table B4.a. Quartile regressions (75th quartile)

Variables	FULL SAMPLE		PUBLIC SECTOR		PRIVATE SECTOR	
	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	t-Stat
Public Sector	0.116	16.14				
Male	0.181	30.21	0.058	5.52	0.230	29.51
Secondary Education	0.133	6.18	0.193	4.02	0.110	4.24
University Education	0.338	15.73	0.453	10.03	0.305	11.29
Permanent Contract	0.118	15.97	0.143	8.42	0.108	12.19
Tenure	0.020	11.01	0.019	5.25	0.019	8.68
Tenure (square)	0.000	-4.31	-0.001	-3.69	0.000	-2.51
Managers	0.787	15.45	0.613	5.26	0.830	13.79
Professionals	0.383	12.90	0.272	3.94	0.439	12.17
Clerks	0.204	6.06	0.048	0.63	0.275	6.76
Semi-skilled workers	0.094	3.16	0.110	1.42	0.078	2.24
Married	0.046	5.65	0.046	2.98	0.047	4.63
Age	0.027	14.22	0.022	5.46	0.027	11.58
Age (square)	0.000	-11.69	0.000	-3.54	0.000	-9.83
Number of children	0.020	6.00	0.007	1.30	0.026	6.14
North x Second. Educ.	-0.009	-0.30	-0.125	-1.98	0.001	0.02
x Univers. Educ.	0.002	0.06	-0.200	-3.49	-0.006	-0.16
x Managers	-0.144	-1.89	0.014	0.09	-0.133	-1.42
x Professionals	-0.029	-0.75	0.262	3.05	-0.232	-4.74
x Clerks	-0.080	-1.71	0.093	0.97	-0.108	-1.82
x Semi-skilled	-0.027	-0.72	0.183	1.91	-0.042	-0.93
East x Second. Educ.	-0.051	-2.08	-0.136	-2.41	-0.034	-1.15
x Univers. Educ.	-0.040	-1.64	-0.179	-3.48	-0.033	-1.10
x Managers	-0.082	-1.41	0.044	0.31	-0.160	-2.35
x Professionals	-0.114	-3.45	0.185	2.38	-0.211	-5.25
x Clerks	-0.042	-1.11	0.094	1.09	-0.084	-1.80
x Semi-skilled	-0.016	-0.48	0.085	0.96	-0.028	-0.74
South x Second. Educ.	-0.028	-1.14	-0.060	-1.11	-0.023	-0.76
x Univers. Educ.	0.080	3.27	0.025	0.50	0.046	1.46
x Managers	-0.223	-3.56	-0.353	-2.63	-0.206	-2.73
x Professionals	-0.146	-4.48	0.012	0.16	-0.276	-6.84
x Clerks	-0.104	-2.71	0.017	0.20	-0.101	-2.13
x Semi-skilled	-0.027	-0.83	-0.020	-0.24	-0.020	-0.52
Constant term	6.013	139.07	6.190	60.01	6.022	116.05
Num. Obs	28,238		6,925		21,313	
Pseudo R2	0.377		0.339		0.333	

Notes: Time and regional dummies (see Table B4.b) included. The constant term represents a worker with primary education, single, working in Madrid in a firm with less than 500 employees and in an unskilled position.

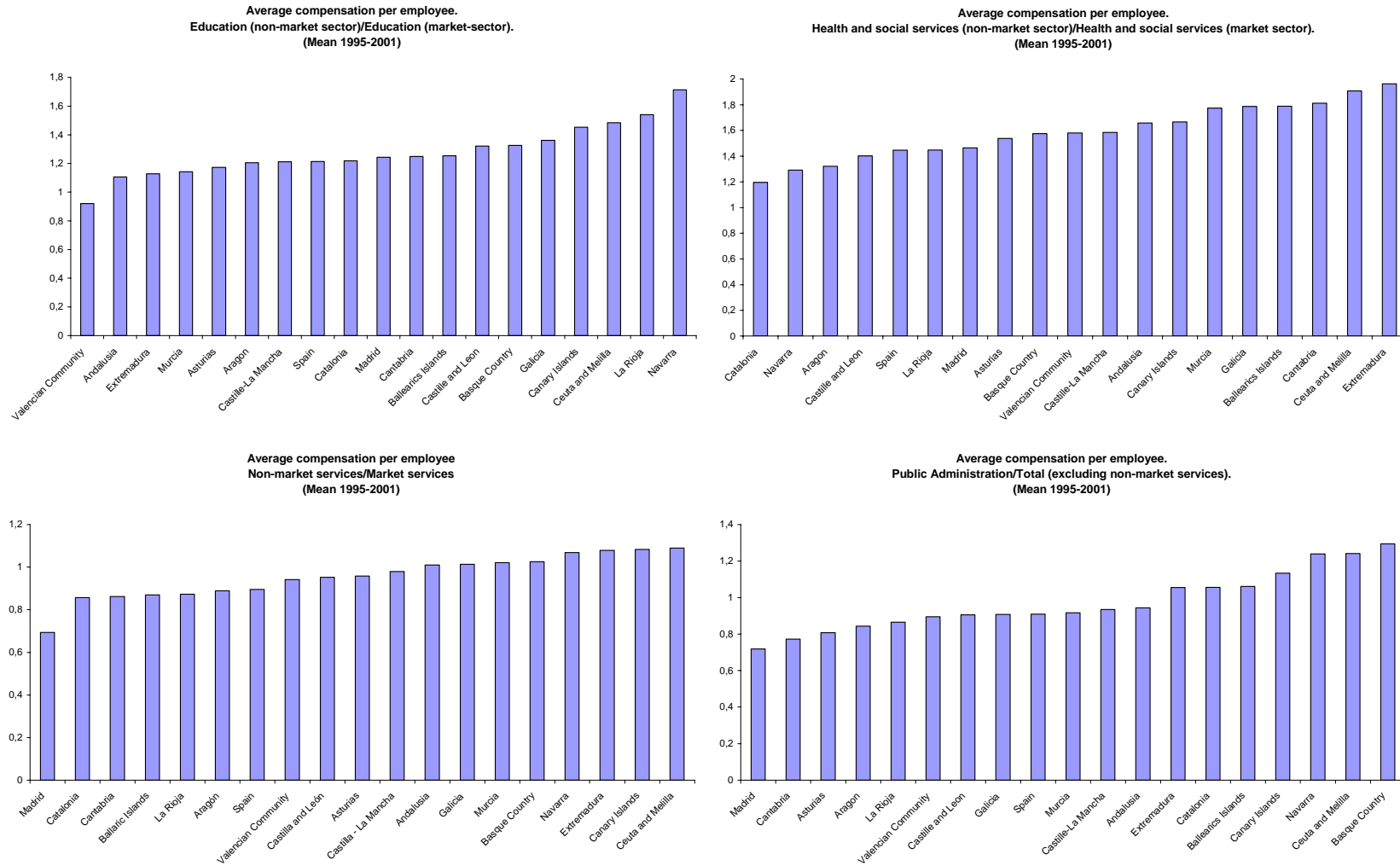**Table B4.b. Quartile regressions (75th quartile)**
Regional dummies

	FULL SAMPLE		PUBLIC SECTOR		PRIVATE SECTOR	
	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	t-Stat
Andalusia	-0.093	-3.25	-0.115	-1.7	-0.096	-2.84
Aragon	-0.052	-1.68	-0.173	-2.39	-0.034	-0.92
Asturias	-0.030	-0.84	-0.114	-1.41	-0.031	-0.71
Ballearic Islands	-0.080	-2.43	-0.156	-2.05	-0.075	-1.94
Canary Islands	-0.103	-3.49	-0.045	-0.65	-0.134	-3.81
Cantabria	-0.114	-3.19	-0.130	-1.61	-0.118	-2.77
Castilla and León	-0.059	-1.96	-0.095	-1.37	-0.056	-1.56
Castilla-La Mancha	-0.115	-3.75	-0.104	-1.49	-0.124	-3.37
Catalonia	0.063	2.13	-0.095	-1.33	0.086	2.5
Comunidad Valenciana	-0.095	-3.26	-0.186	-2.59	-0.086	-2.5
Extremadura	-0.165	-5.33	-0.225	-3.26	-0.135	-3.57
Galicia	-0.208	-5.96	-0.143	-1.81	-0.215	-5.15
Murcia	-0.169	-5.64	-0.146	-2.09	-0.177	-4.96
Navarra	0.074	2.36	-0.044	-0.6	0.088	2.34
Basque Country	0.124	4.04	0.026	0.35	0.135	3.72
La Rioja	-0.050	-1.54	-0.236	-3.06	-0.016	-0.42
Constant term	6.013	139.07	6.190	60.01	6.022	116.05

Figure 1. Distribution of Public Employment
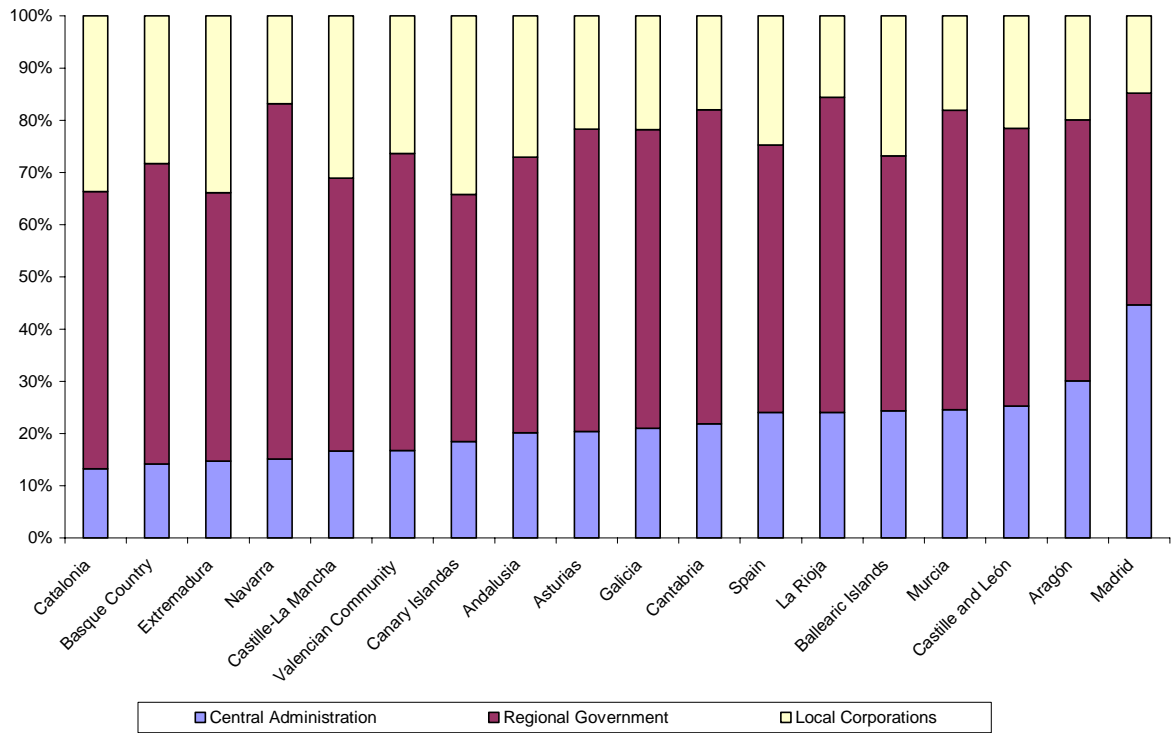
Notes: It excludes *personal laboral.* Source: Register of Public Employment

Figure 2. Unadjusted public sector wage gaps in Spanish regions

**Average compensation per employee.
Education (non-market sector)/Education (market-sector).
(Mean 1995-2001)**

**Average compensation per employee.
Health and social services (non-market sector)/Health and social services (market sector).
(Mean 1995-2001)**

**Average compensation per employee
Non-market services/Market services
(Mean 1995-2001)**

**Average compensation per employee.
Public Administration/Total (excluding non-market services).
(Mean 1995-2001)**

Source: National Accounts.

Figure 3. Public sector wage gaps from quartile regressions
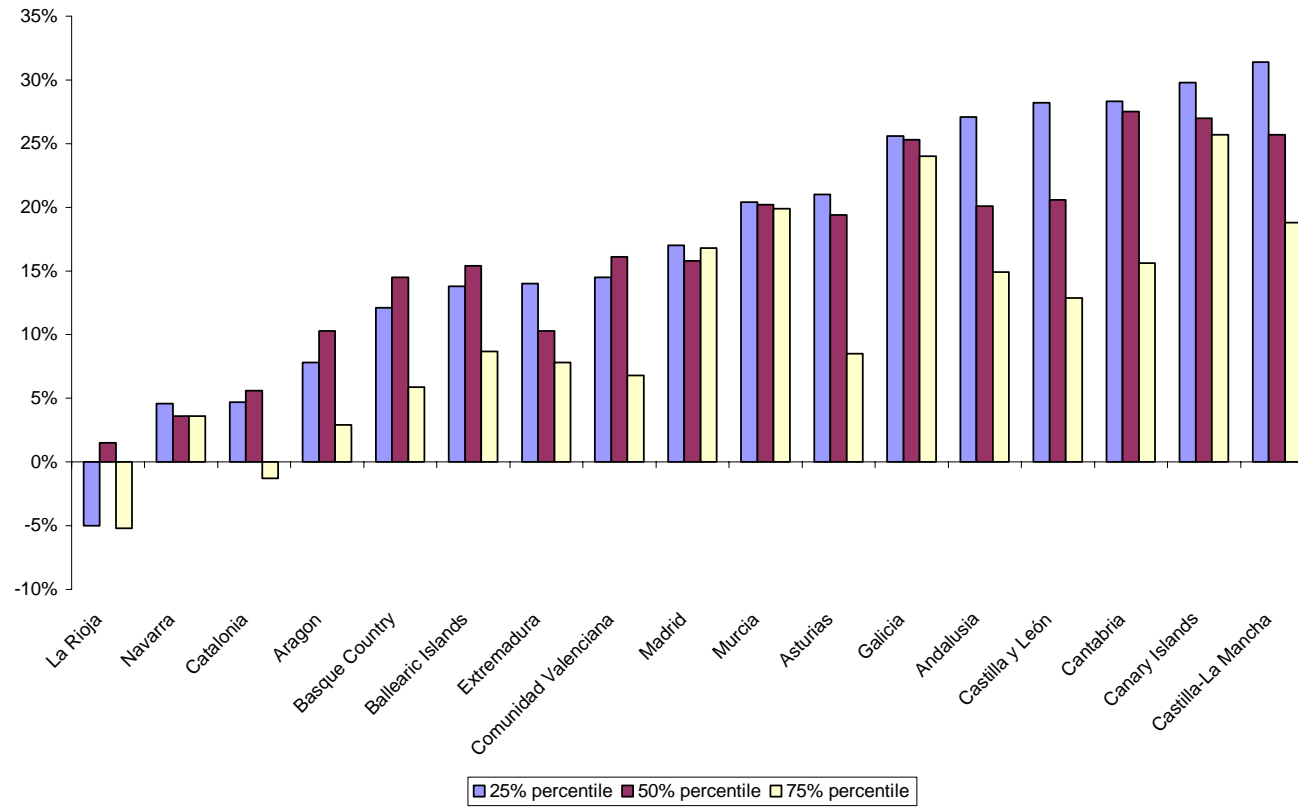

25% percentile 50% percentile 75% percentile

Figure 4. Breakdown of public sector wage gaps in Spanish regions
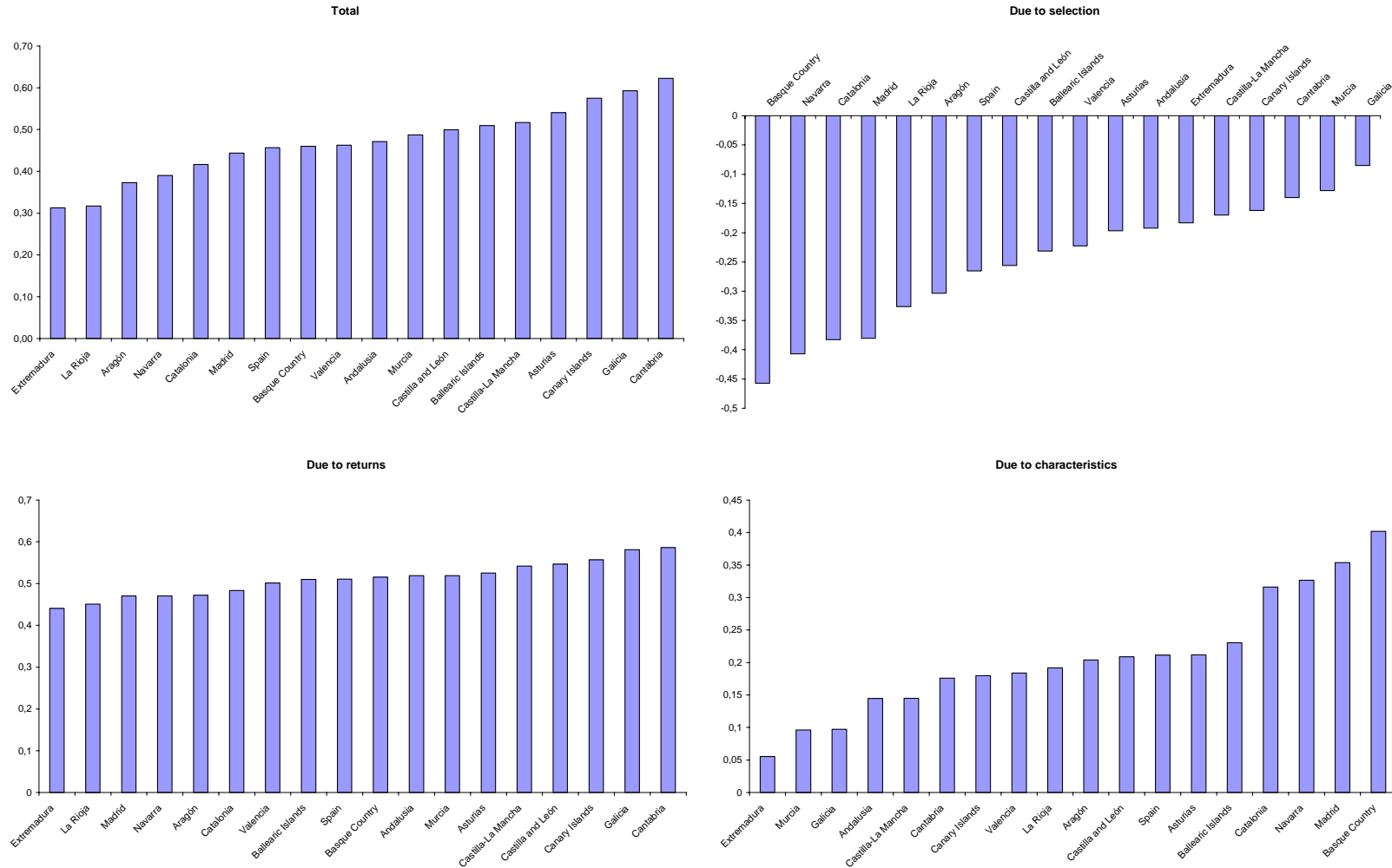
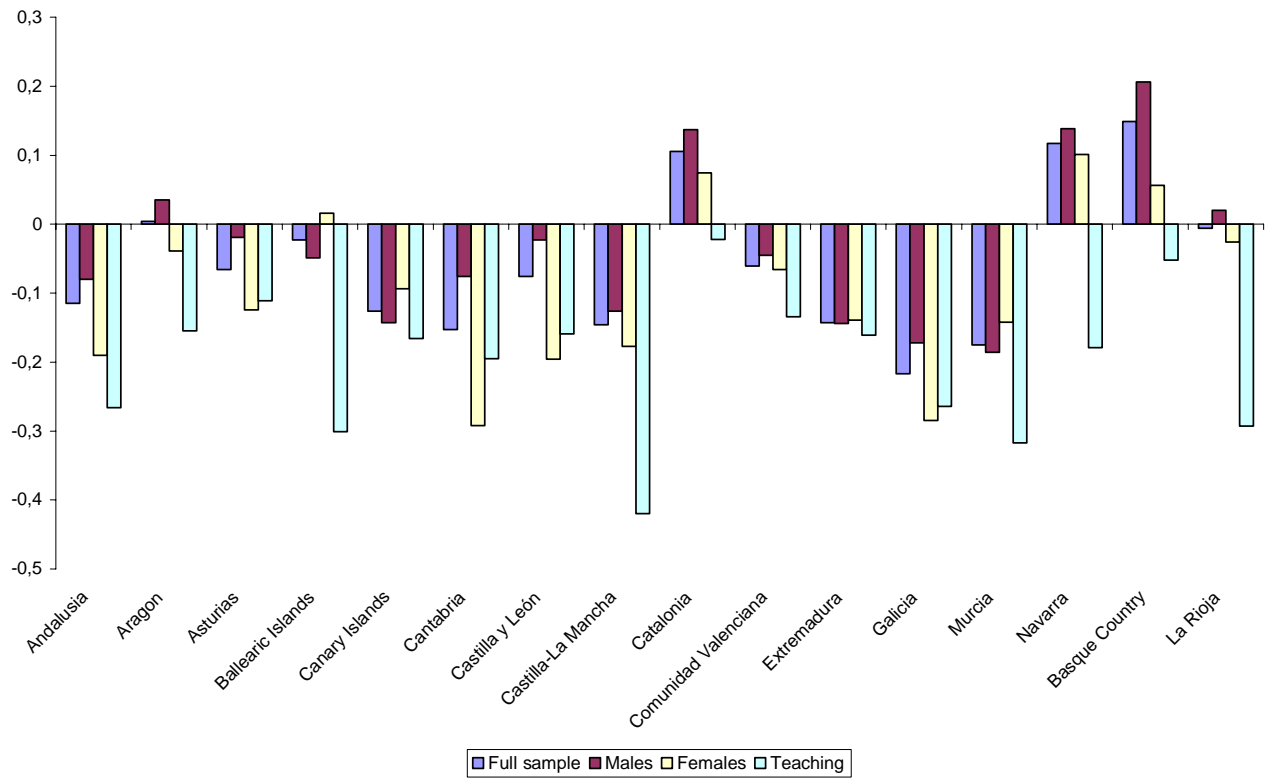# Figure 5. Regional wage differences (relative to Madrid)

Public sector

Full sample ■ Males □ Females □ Teaching

Private sector

Full sample ■ Males □ Females □ Teaching
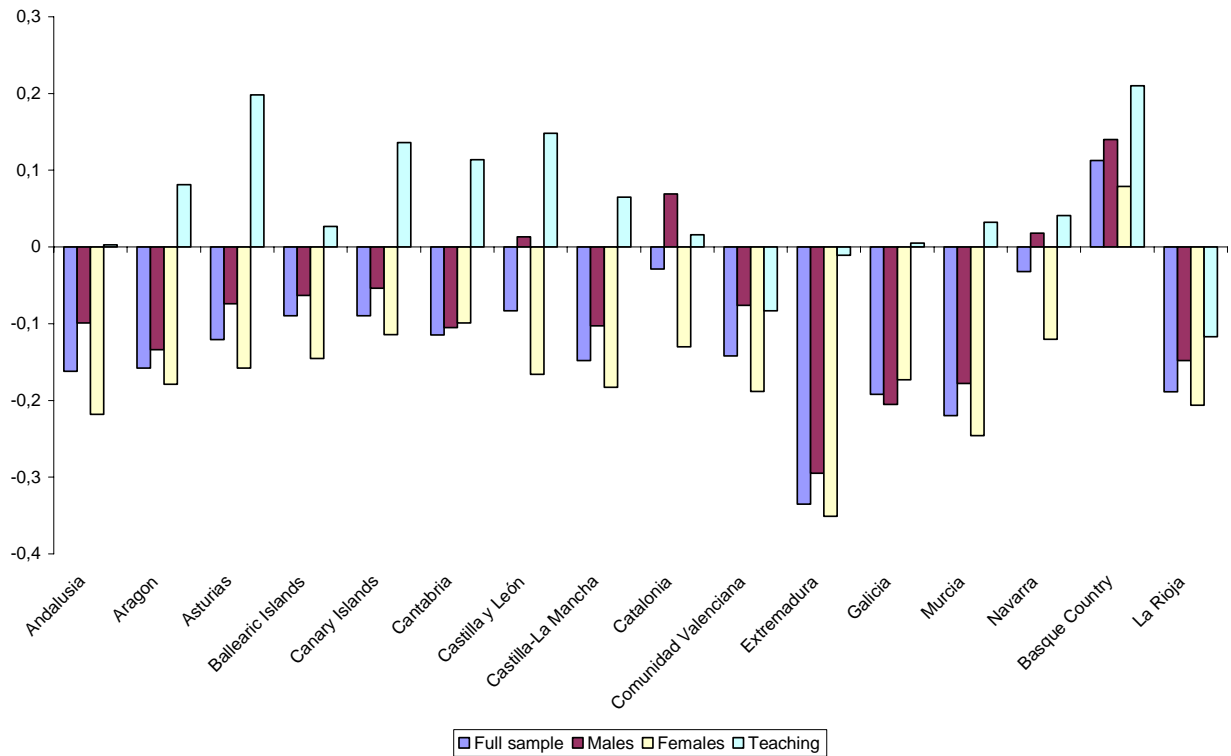
Figure 6. Proportion of public employment at regional governments and public sector wage gaps

Top chart:

0,65
0,6
0,55
0,5
0,45
0,4
0,35
0,3
0,25
0,2

0,400   0,450   0,500   0,550   0,600   0,650   0,700   0,750

Cantabria
Galicia
Canary Islands
y = -0,0428x + 0,4927
$R^2 = 0,0009$
Asturias
Castilla-La Mancha
Ballearic Islands
Castilla-Leon
Andalusia
Murcia
Spain
Valencian Community
Basque Country
Madrid
Catalonia
Navarra
Aragon
Extremadura
La Rioja

Bottom chart:

0,6
0,55
0,5
0,45
0,4

0,35   0,40   0,45   0,50   0,55   0,60   0,65   0,70   0,75

Public sector wage gap (returns)

% public employment in regional governments

Cantabria
Galicia
y = 0,0716x + 0,4749
$R^2 = 0,0105$
Canary Islands
Castilla and Leon
Castilla-La Mancha
Valencian Community
Andalusia
Asturias
Murcia
Ballearic Islands
Spain
Basque Country
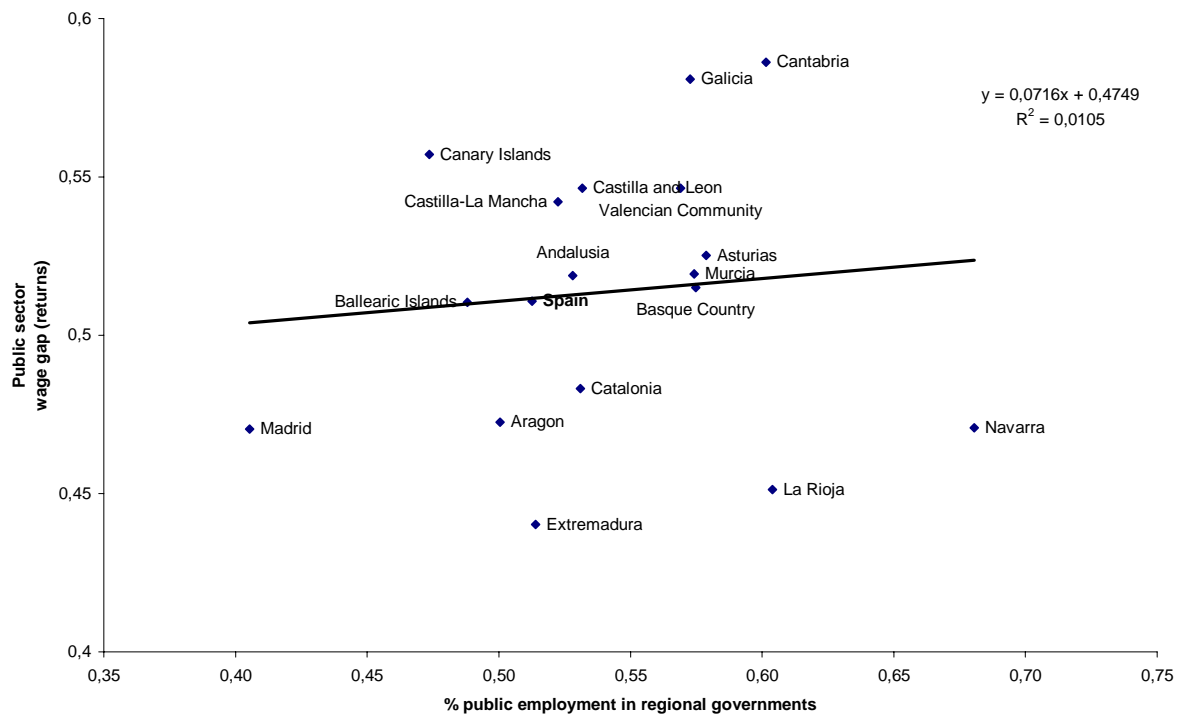Madrid
Catalonia
Aragon
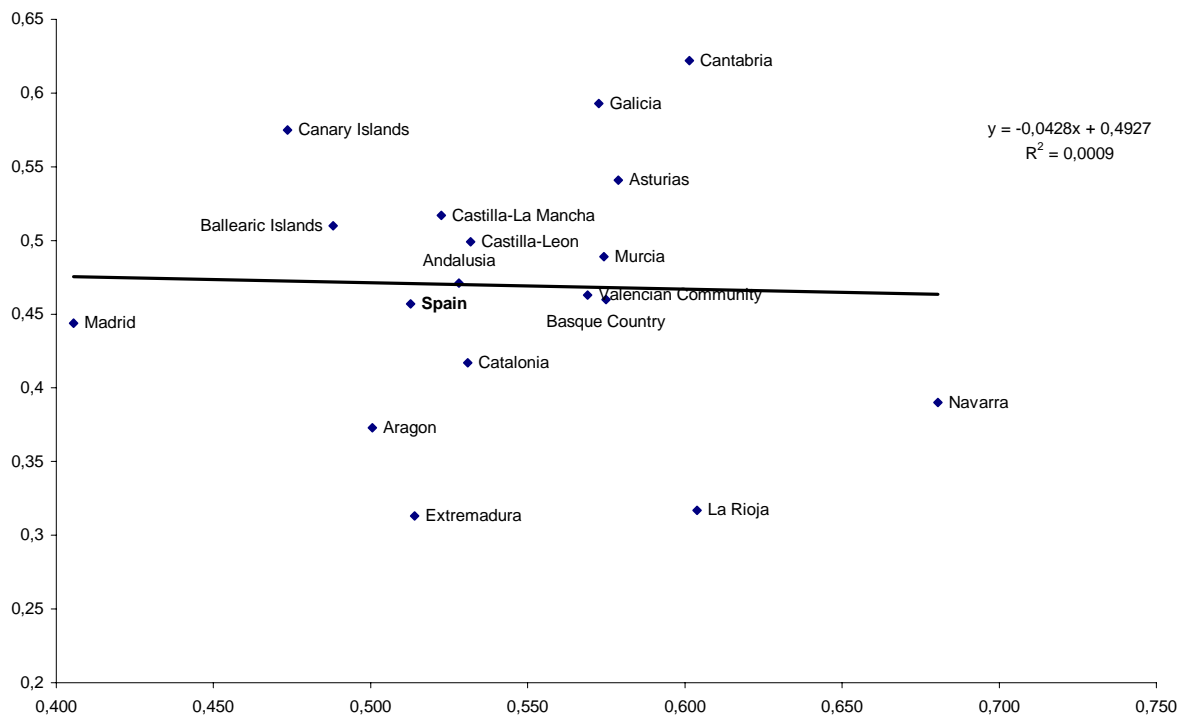Navarra
La Rioja
Extremadura
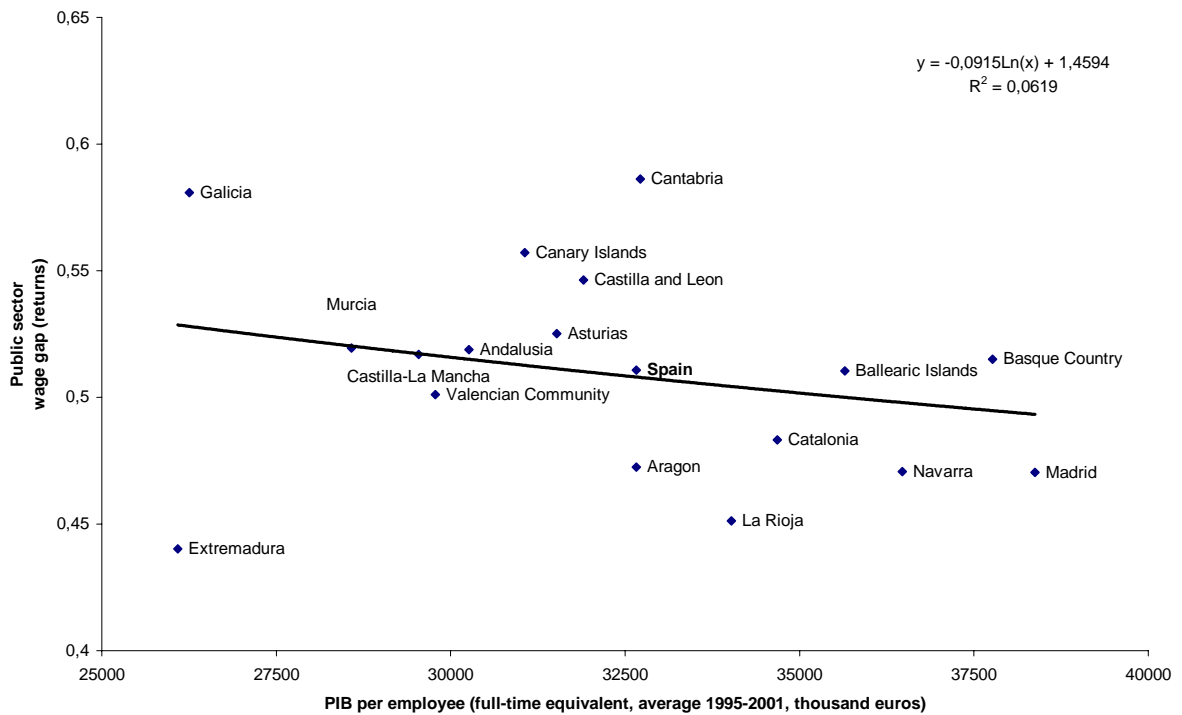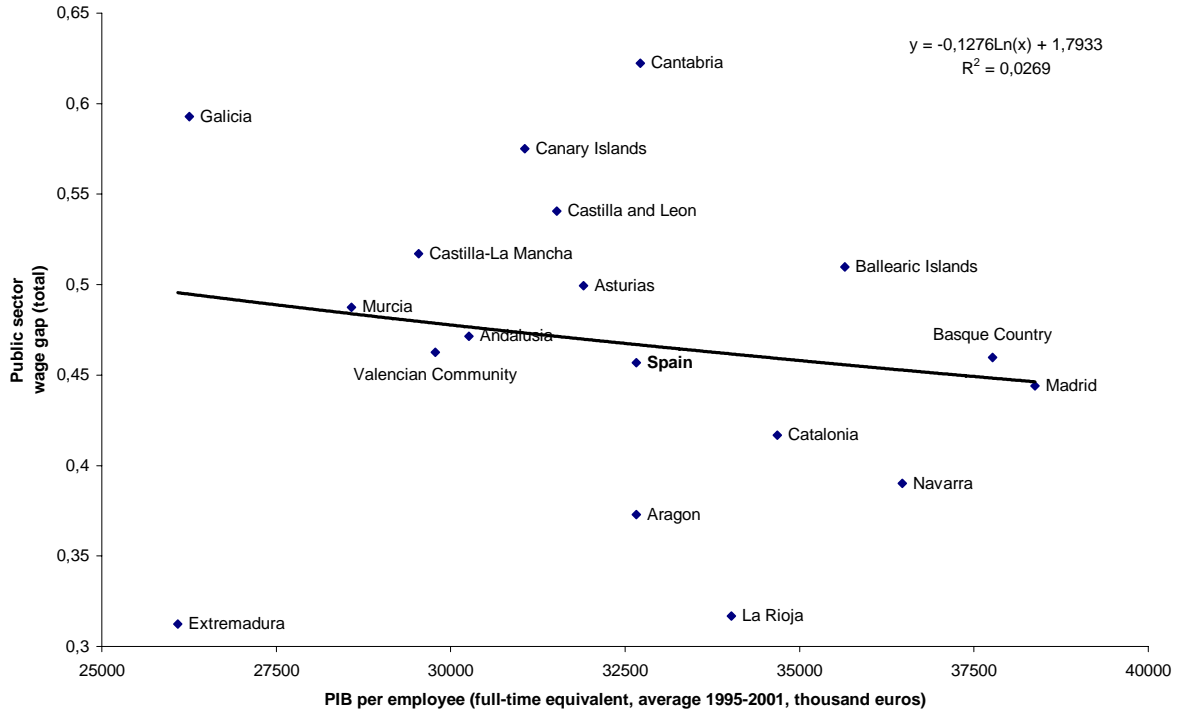
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Figure 7. PIB per employee and public sector wage gaps

Figure 8. Unemployment rates and public sector wage gaps

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