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Abstract

We investigate public-private pay determination using French, British and Italian microdata. While traditional methods focus on parametric methods to estimate the public sector pay gap, in this paper, we use both non-parametric (kernel) and quantile regression methods to analyse the distribution of wages across sectors. We show that the public-private (hourly) wage differential is sensitive to the choice of quantile and that the pattern of premia varies with both gender and skill. In all countries the public sector is found to pay more low skilled workers with respect to the private sector, whilst the reverse is true for high skilled workers. The effects are more pronounced for females.

JEL classification: J31, J45, C14

Keywords: Wage differentials, Public sector, Quantile regression

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1 Introduction

In many OECD countries public sector employment accounts for a significant share of total employment and public sector expenditures, as well as playing an important role in economic performance. The institutional setting governing human resources management and pay determination, as well as the goods and services (respectively) offered, however, can differ significantly between the public and private sector. In this context, relative pay also shows substantial heterogeneity by gender and skill levels between the two sectors, whilst both sectors compete on the labour market. Among other things, these features have important implications for the functioning of the labour market in terms of workers-job queues, 'wait' unemployment, as well as adverse effects in recruitment, retention and incentive policies. Empirical evidence on the public sector pay gap suggests, even after controlling for observable characteristics, a positive wage differential for public sector workers and a higher premia for women as compared to men; also, pay dispersion is usually found to be lower in the public sector with respect to the private sector. Given existing differences in the distribution of wages across public and private sectors, public sector pay gap estimates proved, in general, rather sensitive to sample choice, empirical specification and the group of worker selected (Gregory and Borland, 1999).

In this paper, we investigate public-private pay determination comparing different institutional settings and public sector pay formation, using French, British and Italian microdata. Our findings contribute to the existing literature in several ways. First, by focussing on different countries we exploit institutional differences to gain insights on the process of pay formation. Second, while traditional methods focus on a parametric approach to estimate the public sector pay gap, we use both non-parametric and quantile regression methods to analyse the distribution of wages across sectors. We show that the public-private (hourly) wage differential is sensitive to the choice of quantile and that the pattern of premia varies with both gender and skill. We argue that the decomposition of predicted wage gaps at diverse quantiles provides a more accurate set of measures for the size of the part of the wage gap that is attributed to different returns to skills between the public and private sector. In all countries the public (private) sector is found to pay more (less) low skill workers with respect to the private (public) sector, whilst the reverse is true for high skill workers. The effects are more pronounced for females. Finally, when the wage differential is decomposed by quantile, using an Oaxaca-Ransom type decomposition, we show that a significant portion is explained by observed characteristics (over 60 percent on average) and is increasing over the wage

distribution. Symmetrically, the unexplained part due to the wage differential between public and private sector decreases and becomes close to zero at the highest quantiles, suggesting that differences in unobserved characteristics are more important at lower quantiles.

The paper is organised as follows. We start by comparing the institutional system and pay setting in each country. Next, in section 3, we describe the data and present some descriptive statistics. Section 4 discusses the empirical strategy and compares results from the standard OLS approach to quantile regression methods. In section 5 we investigate further the differences in the public sector pay gap across countries. Conclusions follow.

2. Institutional Differences in Public Sector Pay

The set of rules governing terms and conditions of employment and pay are quite different across the public and private sectors, in all countries. Despite the substantial changes introduced in recent decades to increase both competition and efficiency of the public sector, still significant differences exist between the two sectors. The latter range from the criteria adopted, in each sector, to select, recruit and promote workers, to adjust wage levels, as well as in terms of wage profiles, career advancement and the role played by collective bargaining and trade unions. In Italy and France public servants are still generally recruited through open, competitive examinations - for which a given level of education is required – and, once hired, enjoy life-time contracts in which seniority plays a major role. In general, public servants in the above countries cannot be discharged, except for misconduct, and the statutory terms apply regardless of whether the individual is employed at the national, regional of local authority level. Conversely, in Great Britain the process of decentralisation has determined, on the one hand, a significant variation both in recruitment criteria and pay levels of civil servants across different Departments within the public sector, whilst, on the other, a number of services have been progressively contracted out.

In the private sector, as opposed to the public, the degree of regulation is generally much lower in all countries. Italy and France, however, are still characterised by quite strict job protection measures, extensive coverage of collective agreements and a rather centralised system of pay determination, whilst in Great Britain pay determination is highly decentralised, unions are weaker and job protection is fairly low (Oecd, 2000). As it might be expected, pay inequality is greater and low pay employment is larger in Great Britain as compared to both France and Italy (Oecd, 1996; Lucifora, 2000).

In this context, differences in the rules governing public and private sector employment may well have a role in determining relative pay differentials within each

country. However, also differences across countries in the institutional setting – i.e. pay regulation, collective bargaining coverage and extension, private sector comparability provisions, etc. -- are likely to affect the structure and magnitude of the public sector pay gap. In France collective bargaining, in the private sector, establishes industry minima for wages and employment conditions, whilst, in the public sector, unions also take part in national wage negotiations but the outcome is not legally binding for the government[1]. In practice civil servants are not allowed to engage in collective bargaining and their pay is set by statute with the same pay scales applying to all public sector workers (Guillotin and Meurs, 1999). In Italy, collective bargaining in the private sector takes place at the industry level, while in the public sector wage levels and wage adjustments are all decided at the central level (Dell'Aringa and Della Rocca, 1996)[2]. Conversely, in Great Britain, civil servants are covered by a variety of different arrangements, which include: Review Bodies, index linking, decentralised as well as centralised collective bargaining. In recent years, policies such as contracting-out and competitive tendering have also contributed to a progressive 'privatisation' of pay setting procedures (Bender and Elliott, 1999). Thus, whilst in Great Britain private sector pay is used as a reference point for pay determination in the public service (at least in some part of it), France and Italy lack any application of this comparability principle and the reference is, in general, given by cost of living and public budget conditions. Minimum wage legislation also has different applications in these countries, being relevant in Great Britain and France but absent in Italy. The different set of institutional rules that govern pay determination in the public sector, in the three countries considered, provides an interesting source of variation for assessing whether collective bargaining practices, private sector pay comparability standards, as well as other factors, have an impact on the public-private wage differential.

2.1. Public-Private Pay: some stylised facts

Comparing (gross) pay levels across public and private sectors is not without problems. The more the public sector undertakes activities that are not found in the private sector and the lower is substitutability in the goods and services provided by each sector, the more difficult comparability is and the higher is the scope for pay differences existing across

[1] Collective bargaining was extended as a result of the "Auroux law" in 1982.

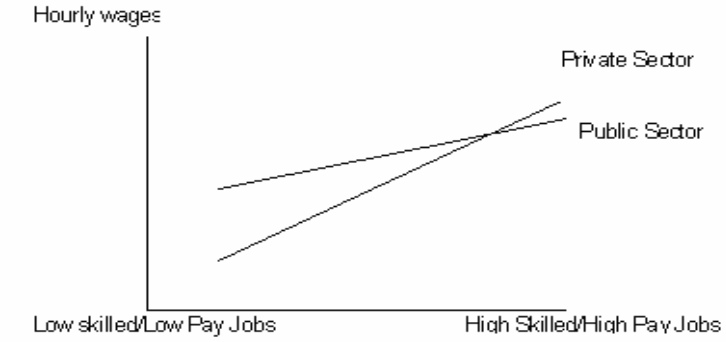
[2] Public sector pay negotiations cover each of the eight functional sub-sectors defined as a result of the 1993 civil service reform in which an independent agency (Agenzia per la reppresentanza sindacale nel pubblico impiego - ARAN) has been invested of negotiating for public sector employees. The police and armed forces, university professors and other academic staff, judges and prosecutors, as well as senior civil servants are

sector. Moreover, since the vast majority of doctors, nurses, teachers, policemen and judges are employed in the public sector, while insurance salesmen, assembly workers, stock and bond dealers are exclusive of private sector, average qualification and job contents are likely to differ and hence comparison of (unconditional) pay levels across sector can prove misleading. With these caveats in mind, if we look the raw average difference in pay between public and private sector, we find that these are quite different and equal to 11.5, 28.5 and 16.1 percent, respectively for France, Italy and Great Britain. However, if we account for the existing heterogeneity in the characteristics of the workforce in the two sectors by conditioning on a set of personal and job characteristics pay differential are much lower than what suggested from raw data: namely between 5 and 6 percent in all countries. Apart from average differences, one common feature shared by most countries is that minimum rates of pay for least skilled workers are higher in the public as opposed to the private sector. This is the result of a number of features that impact differently on the private and the public sector. A wider union presence and a more effective use of union power -- which protect low paid workers --; as well as 'fair' rates of pay offered by the State (as "good employer") to the least skilled, all tend to reduce wage dispersion in the lower part of the distribution in the public sector as compared to the private (Bender and Elliott 1999). Conversely, the rates paid to the most senior public servants have often reported to be substantially lower than those paid to individuals with comparable skills and responsibility in the private sector: public opposition to high rates of pay for public servants seems to account for this feature (Katz and Kreuger, 1991; Lucifora, 1999). Whilst, the combined effects of these features is conducive to a much flatter public sector wage structure than the private sector (as shown in figure 1); an additional effect works through the larger proportion of low paid individuals in the private sector of the economy, where both monopsony and discrimination effects have been documented to be larger (Bazen, Gregory and Salverda, 1998). The economic consequences of such an imbalance, assuming the private sector as the reference sector, are that the public sector pays more than the opportunity wage for unskilled and low skilled labour. On the contrary, under the hypothesis that labour market failures are less relevant for skilled individuals in the private sector, the rates paid to high skilled workers in the public sector appear to be less than what would be needed to attract, retain and motivate such workers. Clearly, the underlying distortions in relative pay, in both sides of the distribution, makes human resource management and recruitments decisions particularly difficult.

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excluded from these negotiations.

Figure 1 – Pay profiles by skill: Public and private sectors



There are of course several features that are missing from a simple wage comparison which might be relevant. For example, other dimensions of the work package and the work environment such as job security, risk and injury at work, may play a role (Hamermesh and Wolfe, 1990; Sandy and Elliott, 1996). Also, workers might be heterogeneous across sectors with respect to some unmeasured characteristics in a non random way, such as preference for public sector work, desire to be a civil servant, or work in the non-profit sector, and self-select themselves according those features. In this paper, while acknowledging the caveats that the features discussed above may imply, we restrict attention to the public sector pay gap as measured by hourly wages and focus on pay differentials between the public and the private sector that emerge along the entire wage distribution. The next section briefly reviews the empirical evidence and discusses the main results from previous studies.

2.2. Previous Studies

The analysis of public sector labour market has not attracted much attention among economists in European countries, and the number of studies which have attempted to compare job and pay conditions across sectors is rather limited. In general, most studies that have investigated relative wages across sectors used a standard wage equation approach where the public-private differential is estimated by means of a dummy variable identifying the public sector or by estimating separate equations and computing the implied wage differentials using the Oaxaca-Ransom methodology. Some studies have also attempted to model the choice of the sector jointly with wage determination and then correct the estimation of the public-private differential[3]. In general, results from the above studies show a great deal

[3] A number of studies estimated a sectoral choice equation which is then used to correct the coefficients in the

of variation in the estimated differentials depending on the sample selected, the definition of the public sector, the specification chosen and the identification strategy used. These features, however, complicate considerably comparisons across countries.

Here, we focus attention on the main results of the empirical studies which have investigated public and private sectors wage differentials in Great Britain, Italy and France. The general finding in Great Britain is that, on average, civil servants earn more than comparable workers in the private sector (Rees and Shah, 1995; Disney and Gosling, 1998, 2003; Blackaby, Murphy and O'Leary, 1999; Bender and Elliott, 1999). The average differential controlling for standard human capital variables is close to 5 percent, although it is much higher for females (15-18 percent) as compared to men (2-5 percent); while approximately half of the raw differential is explained by differences in observed characteristics. Evidence for Italy also suggests a relatively large raw (positive) differential between the public and the private sector (Cannari *et al.*, 1989; Brunello and Dustmann, 1997; Bardasi, 1996; Lucifora, 1999; Comi, Ghinetti and Lucifora, 2002). After conditioning on a set of variables, the differential results moderate for men (10 percent) and higher for females (18-20 percent). The largest portion of the wage gap, however, can be attributed to differences in the observed characteristics of workers (90 percent), whilst only small differences in returns exist between the sectors. Finally, quite surprisingly, only a few studies have investigated the issue of public sector pay differentials in France (Insee, 1996; Fournier, 2001). These studies suggest that in the public sector there is a positive (negative) premium for low (high) skilled and that being a female also grants a positive premium.

Results from standard decomposition methods, in all the countries considered, point to similar results: namely a rather small wage differential - once differences in characteristics are controlled for - for adult males, while a more significant positive differential is detected when female are considered.

Given the differences in the distribution and dispersion of pay between the sectors, the standard approach based on the analysis of the conditional mean of the distribution has been criticized in a number of studies. For the US, Poterba and Rueben (1994) report evidence suggesting that the wage distribution for the public sector is much less dispersed and propose alternative methods to analyse pay differentials based on quantile regression. Mueller (1998) provides a decomposition of wage differentials at several quantiles of the densities, applied to workers in the public and private sectors in Canada. In the UK, Blackaby, Murphy and

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wage equations. Notable examples of such an approach are: Godderis, (1988) and Hartog and Osterbeek, (1993). Few studies also use fixed effect estimators to analyse public sector pay differentials, exemples are Disney and Gosling (1998 and 2003). However, both approaches are not without problems (Nawata, 1996; and Manski, 1993 and 1995).

O'Leary (1999) and Disney and Gosling (1998) show that the public sector pay gap vary along the distribution, being higher for the lowest deciles with respect to the top deciles. Melly (2002), in Germany, also finds that the differential decreases monotonically as one moves up the wage distribution.

3. Data and descriptive statistics

This study uses microdata for Great Britain, France and Italy, for 1998. Data used is drawn from National Surveys, respectively: British data from the Labour Force Survey (GBLS), Italian data from the Bank of Italy's Survey of Household Income and Wealth (SHIW) and French data from Enquéte Emploi (FREE). Each National Survey provides information on standard human capital variables (i.e. education, gender, marital status, age, work experience), occupation, region of residence, gross earnings, hours worked, and a public sector identifier[4]. We restrict our samples to non-agricultural employees aged from 15 to 70. In table 1, we report the main features of the National data sets, and compare public and private sector workers. Descriptive statistics show that, on average, civil servants are older, more educated and work shorter hours in all countries. The public sector employs more females, more part timers and a larger share of white collar workers. Furthermore, when comparing hourly wages, public sector employees – both males and females --are shown to earn higher wages[5].

[4] The definition retained for the public sector is the same in all countries. It includes Central and Local Administrations, Health and Education and excludes firms, financed by the State, but operating on the market.

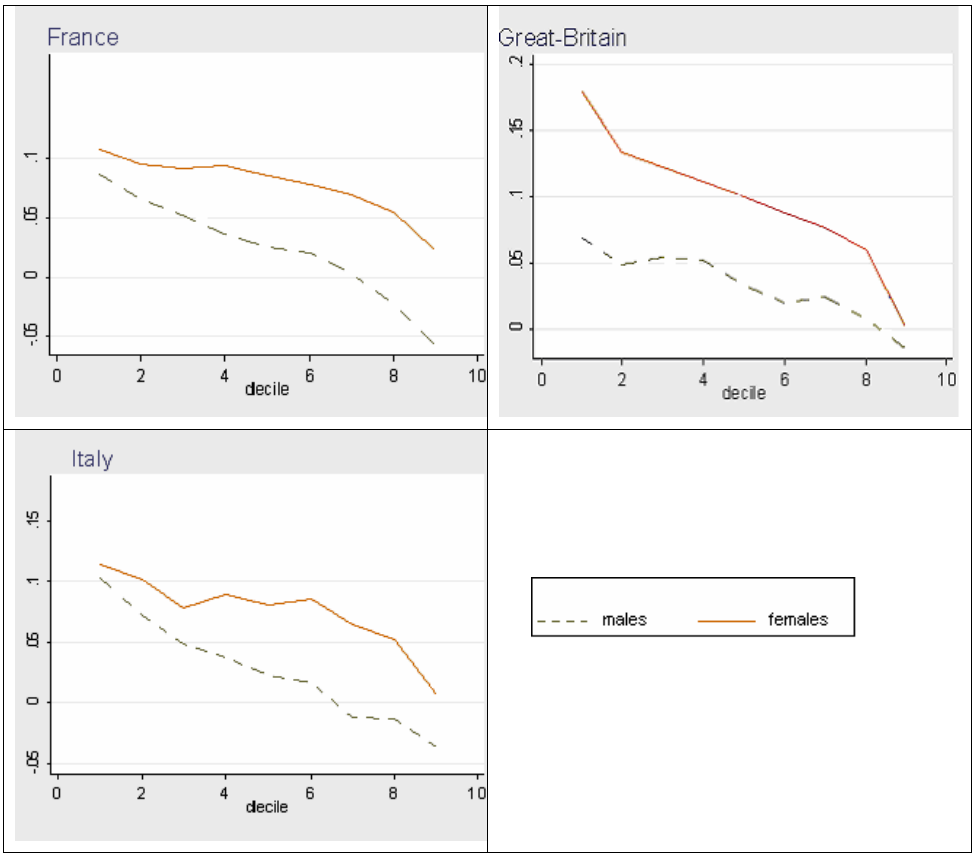
[5] In 1998 parities for the Euro were fixed within the European Monetary Union (EMU), hence this is what we used for France and Italy. As far as Great Britain is concerned, we used the average exchange rate for 1998 (European Parliament, 1998).

Table 1. Sample Descriptive Statistics

	France		**Italy**		**Great-Britain**	
	Private	Public	Private	Public	Private	Public
Personal Characteristics						
age	38,8	41,4	37 ,2	42 ,9	38 ,2	41 ,7
Education (years)	13,0	14,1	10 ,1	12 ,5	12 ,0	13 ,0
Females	0,432	0,601	0,360	0,549	0,452	0,644
Marry	0,750	0,761	0,607	0,767	0,586	0,661
Job attributes						
workers	0,395	0,113	0,611	0,144	0,505	0,342
clerks	0,304	0,439	0,315	0,475	0,183	0,169
intermediate	0,251	0,394	0,054	0,344	0,142	0,393
managers	0,050	0,054	0,020	0,035	0,170	0,096
part time	0,162	0,212	0,080	0,055	0,217	0,312
Wages						
Males						
Hours	39 ,77	38,83	41 ,64	37 ,22	39 ,77	37 ,76
Log hourly wage (€)	2 ,123	2 ,238	2 ,072	2 ,357	2 ,454	2 ,615
(st dev of log hourly wage)	0 ,381	0 ,365	0 ,465	0 ,422	0 ,604	0 ,533
Females						
Hours	34,61	34,59	36 ,13	32 ,31	29 ,59	28 ,32
Log hourly wage (€)	1 ,974	2 ,165	1 ,918	2 ,303	2 ,114	2 ,393
(st dev of log hourly wage)	0 ,357	0 ,362	0 ,490	0 ,445	0 ,553	0 ,514

Public and private sector wages also differ in term of (both unconditional and conditional) dispersion. In particular, the standard deviation of (log) hourly wages in the public sector (private sector) is 0.533 (0.604), 0.422 (0.465) and 0.365 (0.381) respectively in Great Britain, Italy and France. Wage dispersion appears to be wider in Great Britain, as opposed to Italy and France, especially in the private sector. To inspect the distribution of wages across sectors, we used non-parametric methods (kernel density estimator) to fit the density of hourly wages, which we then plot in Figure 2 (a-c) for each country. Estimated densities confirm that (hourly) wages in public sector, in all countries, have both a higher mean and a lower dispersion with respect to the private sector.

Figure 2 – Distribution of hourly wages in the public and private sector



4. Public private wage differentials: a Cross-country Comparison

When we estimate the public-private sector pay gap using OLS techniques, pooling data for both sectors and introducing a dummy variable for the public sector, we find a positive, statistically significant, coefficient in all countries. In general, as shown in table 2 (column 1), conditioning on a larger set of variables reduces the estimated gap as well as differences across countries. When the sample is split by gender, females show a much larger public sector wage gap as opposed to males. The above evidence based on a naïve estimation technique, however, suffers from several limitations[6]. In particular, given the differences in the distribution of pay between the sectors (i.e. public sector low-skilled workers, located in

[6] The whole set of estimations is contained in an Appendix which is not reported but can be obtained upon request from the authors.

the lower part of the distribution, enjoy higher pay as compared to private sector workers), OLS methods based on conditional mean wage may result overly restrictive. In this context, the use of quantile regression methods (QRM), which allow the analysis of the entire wage distribution, may be preferable: for the (marginal) effect of the covariates on the dependent variable can differ at different points of the wage distribution. These outcomes may also be interpreted as the effect of a different distribution of unobserved determinants of wages, for a given set of workers characteristics, at various points of the wage distribution. The analytical framework we adopt for the estimation is based on the quantilic regression methodology developed by Koenker and Basset (1978) and applied, in the context of wage equations, by Chamberlain (1994), Poterba and Rueben (1994), Buchinsky (1994, 1996, 1997) and Machado and Mata (1999).

Assume that the quantile q^{th} of the conditional distribution of wages is a linear function of worker's characteristics (X_k).

$$Q^q (y_k / X_k) = X_k b^q_k + PUB_k * d^q \qquad [2]$$

Koeker e Basset (1978) have shown that quantiles can be estimates by minimising (b^q, d^q) in [2]

$$\min_{b^q} \sum_{s_k<0} q^* \left| y_k - X_k b^q - PUB_k * d^q \right| + \sum_{s_k>0} (1-q)^* \left| y_k - X_k b^q - PUB_k * d^q \right| \qquad [3]$$

In the empirical analysis that follows, we first estimates the impact of workers' characteristics and job attributes on public and private sectors wages, respectively for males and females, and next we proceed decomposing the wage differential into a component that is due to differences in observed characteristics and a component that is due to differences in the rewards.

4.1. Main Results

To examine the effects of differences in characteristics on the public sector pay gap at different points in the distribution, we first carry out a series of quantile regressions on the pooled data set and compare the main set of results with OLS estimates. Pooled regressions impose the restriction that the returns to observed characteristics are the same for the two sectors and that public-private differences only depend on a shift factor (i.e. as shown in equation [2]). Hence, the estimated public sector dummy captures the extent to which the public sector pay gap remains unexplained -- at the various quantiles -- after controlling for individual characteristics, gender and job attributes. Table 2 presents estimates of the public-

private sector wage differential at every decile of the wage distribution, using two different specifications: first, controlling for standard human capital variables only and then adding job characteristics and regional controls (capital city).

Table 2. Estimates of Public Sector Pay Gap.

	OLS	**Deciles**								
		0 .1	**0 .2**	**0 .3**	**0 .4**	**0 .5**	**0 .6**	**0 .7**	**0 .8**	**0 .9**
France										
Model 1	0,070	0,094	0,110	0,106	0,096	0,082	0,069	0,053	0,033	0,003
(n=49286)	(20,03)	(19,23)	(26,95)	(22,98)	(25,92)	(20,83)	(16,05)	(12,00)	(6,55)	(0,41)
Model 2	0,055	0,095	0,084	0,072	0,070	0,064	0,054	0,041	0,026	-0,006
(n=49286)	(17,67)	(23,02)	(24,04)	(22,49)	(21,24)	(17,93)	(15,58)	(11,16)	(6,08)	(1,00)
Italy										
Model 1	0,113	0,172	0,150	0,130	0,122	0,117	0,109	0,111	0,107	0,059
(n=4820)	(8,50)	(7,64)	(8,49)	(9,44)	(9,42)	(9,22)	(7,26)	(7,12)	(6,34)	(2,22)
Model 2	0,049	0,114	0,084	0,069	0,060	0,061	0,053	0,038	0,027	-0,017
(n=4820)	(3,67)	(4,46)	(4,95)	(4,30)	(4,60)	(5,34)	(4,17)	(2,51)	(2,45)	(0,83)
Great Britain										
Model 1	0,079	0,154	0,134	0,130	0,114	0,099	0,075	0,052	0,034	-0,025
(n=16864)	(9,14)	(13,26)	(12,31)	(13,45)	(11,30)	(10,79)	(7,56)	(4,95)	(2,78)	(1,75)
Model 2	0,064	0,137	0,103	0,089	0,082	0,073	0,061	0,053	0,040	-0,005
(n=16864)	(8,07)	(10,55)	(10,54)	(10,47)	(10,37)	(8,61)	(7,33)	(5,84)	(3,48)	(0,37)

Note : Dependent variable : log of hourly wage. T-values in parentheses. Model 1 basic capital human characteristics : female, marital status, education in years, age, age squared. Model 2 same variables as Model 1 plus occupations (managers, intermediate, clerks, workers), part-time jobs and regions (region where capital city is placed).

The main set of results from quantile regressions show that the public sector pay gap declines along the wage distribution in all countries[7]. The other variables included (though not reported in the table) are in line with the standard findings in the literature: returns to education and age increase over the deciles in all countries[8]. These findings confirm our previous claim that focussing on the average public sector gap might be not appropriate. Since much of the empirical evidence we reviewed suggests the existence of a different gap across genders, in figures 3(a-c) we report coefficient estimates of the public sector dummy, by deciles, in separate wage regressions for males and females. As it can be seen from the

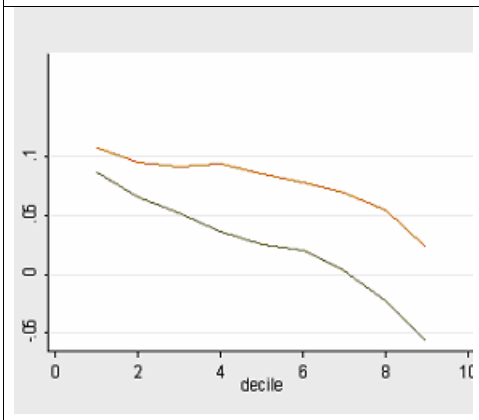
[7] We tested the equality of coefficients by carring out an F-test for equality of the public sector dummies. The hypothesis of equality is rejected at the 1 percent significance level.

figures, the public sector gap is decreasing along the wage distribution in all countries, and it is much higher for female workers as compared to their male conterpart. In the case of females the gap remains positive even at the top deciles, while for males in the upper part of the distribution it turns negative. It is worth noting that in the case of Britain, the difference in the public sector wage gap across gender is far higher at the lowest deciles and decreased thereafter, conversely in Italy and France differences in the gap, across genders, increases along the distribution and it is highest at the top deciles. In other words, if we had to interpret these patterns in terms of male to female wage differences, the evidence seems to suggest that female are relatively (much) better off being in the public sector – with respect to men -- at the lowest deciles in Great Britain, whilst the opposite is true (i.e. they are relatively better off at the highest deciles) in France and Italy. Whilst 'glass ceiling effect' can be the explanation in the case of France and Italy case, low pay for low skilled women in the private sector may account for the British evidence.

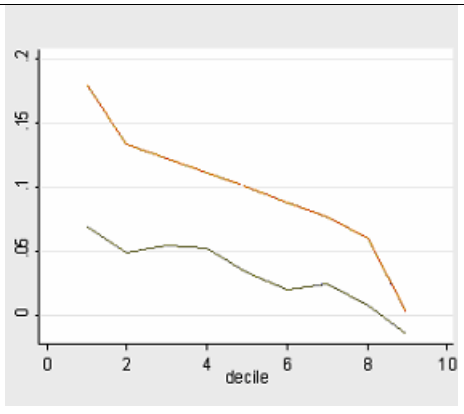
[8] The only exception is Italy where returns to age decrease monotonically over the distribution.

Figure 3 : Estimates of Wage Gap

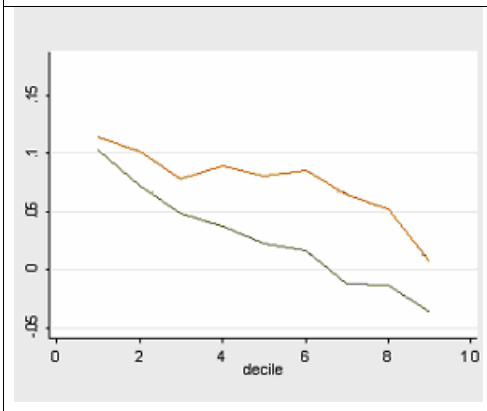
France (a)



Great Britain (b)



Italy (c)





As previously discussed, pooled regressions fail to capture differences in productivity related characteristics by sectors; hence we estimated more flexible specifications by fitting separate earnings equations for the public and the private sector and, within each sector, by gender. In general, results from separate public and private sector equations -- as well as by gender – confirm the findings that parameter estimates are not stable along the wage distribution. However, while returns to characteristics tend to decline over the wage distribution in Italy and France, in Great Britain the opposite pattern is observed. This is hardly surprising given the institutional differences discussed in the previous sections, with collective bargaining and union presence imposing lower returns to enforce a more egalitarian wage structure in Italy and France, and the prevalence of employer discretion in wage setting to attract and motivate workers in Great Britain. However, since we are primarily interested in the public sector pay gap, we do not report the detailed results and return the analysis of the differential to section 5, where we decompose the public sector wage gap into that part

explained by differences in observed characteristics and that part due to differences in rewards.

5. Decomposing the Gap and Explaining the Differences

In this section, we present a decomposition of the wage differentials applied to both OLS and QRM estimates. The standard methodology for analysing public-private sector wage differentials, with OLS, is to decompose the observed gap into two components: (i) a difference in average worker characteristics and job attributes between sectors; and (ii) a difference in the returns to worker characteristics and job attributes between sectors and an interaction effect treated as a residual component (Blinder, 1973; Oaxaca, 1973; Oaxaca and Ransom, 1994) all computed at the mean of the wage distribution[9]. The evidence presented in previous sections, however, suggests that the public-private wage gap may be higher in the lower part of the wage distribution. To explore further this hypothesis we decompose wage differences, quantile by quantile, using an Oaxaca-Ransom type decomposition[10]. However, one main difference between OLS and QRM is that, whilst OLS estimators ensure that the 'predicted wage' evaluated at the sample average vector of characteristics is equal to the sample average wage, QRM estimators do not share the same property. We follow a simple version of the approach developed by Machado and Mata (2000) which is based on quantile regression techniques and extend it to account for the "index" problem as suggested in Neumark (1988) and Oaxaca and Ransom (1988 and 1994) . The procedure is to generate counterfactual densities at each quantile of the distribution. In practice, as described in [4], we compare public and private workers characteristics (personal and job attributes) evaluated at the remuneration ($b^*(q)$) that an individual at random would get in the whole economy (first part of equation [4]); and the density that would be observed if private and public sector workers, respectively, maintained their own individual and job characteristics but were going to be paid like an individual chosen at random in the economy (second part of equation [4], in square brackets)[11]. In so doing, however, the difference between two quantiles of the marginal wage densities between the public and the private sector weighted by the

[9] In the literature the wage differential due to different returns is often referred to as the 'unexplained' part, and given a residual interpretation (i.e. with respect to what is explained by different characteristics), however, it is not clear if the decomposition will over or under estimate the residual. This should depend on whether omitted variables are positively or negatively correlated with productivity and on the distribution of the omitted variables across both sectors.

[10] Different techniques have been proposed in the literature for analysing differences in distributions, examples are: Dinardo, Fortin, and Lemieux (1996); Donald, Green, and Paarsch (2000); Fortin and Lemieux (1998) and Machado and Mata (2000).

[11] A similar approach has also been used by Mueller (1998) and Albrecht *et al*. (2003).

characteristics of workers does contain an additional component, which we consider of second order of magnitude and treat as a residual.

$$y^{PB}(q)-y^{PR}(q) = (X^{PB}-X^{PR})b^{*}(q)+[X^{PB}(b^{PB}(q)-b^{*}(q))+ X^{PR}((b^{*}(q)-b^{PR}(q))] \quad [4]$$

In table 3 we report the results of the decomposition and compare both standard methods and QRM type methods.

Table 3. Decomposition of public/private sector earnings differentials

France	**OLS**	**0 .1**	**0 .2**	**0 .3**	**0 .4**	**0 .5**	**0 .6**	**0 .7**	**0 .8**	**0 .9**
Males										
Raw differential (log)	0,116	0 ,148	0 ,141	0 ,132	0 ,126	0 ,124	0 ,120	0 ,115	0 ,099	0 ,072
Differences in return	0,016	0,086	0,063	0,045	0,032	0,024	0,015	0,005	-0,017	-0,055
Females										
Raw differential (log)	0,191	0,183	0,188	0,198	0,206	0,205	0,204	0,196	0,183	0,168
Differences in return	0,072	0,107	0,093	0,093	0,093	0,084	0,078	0,069	0,054	0,034
Italy	**OLS**	**0 ,1**	**0 ,2**	**0 ,3**	**0 ,4**	**0 ,5**	**0 ,6**	**0 ,7**	**0 ,8**	**0 ,9**
Males										
Raw differential (log)	0,285	0 ,346	0 ,283	0 ,261	0 ,261	0 ,265	0 ,267	0 ,265	0 ,280	0 ,281
Differences in return	0,009	0,081	0,050	0,034	0,033	0,021	0,017	-0,002	-0,005	-0,019
Females										
Raw differential (log)	0,385	0 ,480	0 ,413	0 ,380	0 ,378	0 ,377	0 ,394	0 ,396	0 ,398	0 ,363
Differences in return	0,042	0,080	0,066	0,047	0,054	0,052	0,046	0,040	0,038	0,013
Great – Britain	**OLS**	**0 ,1**	**0 ,2**	**0 ,3**	**0 ,4**	**0 ,5**	**0 ,6**	**0 ,7**	**0 ,8**	**0 ,9**
Males										
Raw differential (log)	0,161	0,190	0,178	0,182	0,189	0,169	0,174	0,153	0,147	0,110
Differences in return	0,023	0,058	0,046	0,046	0,051	0,034	0,042	0,020	0,006	-0,033
Females										
Raw differential (log)	0,278	0,338	0,304	0,297	0,286	0,285	0,272	0,272	0,259	0,203
Differences in return	0,083	0,163	0,120	0,105	0,089	0,083	0,070	0,067	0,056	0,002

Results of the decomposition analysis clearly show that, in all countries and for both genders, the portion of the public sector wage gap accounted by differences in returns to (observed) characteristics declines monotonically from lower to upper deciles. In other words, differences in returns can explain a significant portion of the differential in the lower part of the wage distribution, while this vanishes in the upper part (i.e. in some cases it is negative). For males the estimated wage gap due to differences in returns becomes negative at top deciles, implying that there are significant differences in individual (observed) characteristics and occupations across sectors. For females, differences in returns are particularly important

at the bottom of the wage distribution while they become insignificant (though still positive) at the top deciles.

However, when comparing the public sector wage gap by deciles across gender, substantial differences emerge in the countries considered. Italy, for example, shows the highest public sector raw differential at each quantile for both males and females but differences in the estimated wage gap due to returns are much smaller if compared to the other countries. Great Britain, in particular, exhibits a significantly higher estimated difference in returns for females at the lower deciles, while France is in between. In general males have much smaller public sector wage gap particularly in the upper part of the distribution where they turn negative.

6 Concluding Remarks

In this paper we have investigated public-private pay determination - using French, British and Italian micro data. Using quantile regression methods, we show that the public-private (hourly) wage differential is sensitive to the choice of quantile – thus rejecting the hypothesis of a constant wage differential (as implied in OLS methods) – and that the pattern of premia varies with both gender and skill. In France, Great-Britain and Italy low skilled public sector workers are paid higher wages with respect to their private sector counterparts, whilst the reverse is true for high skilled workers. These effects are more pronounced for females. In general wage gap estimates suggest that female are better off being in the public sector, particularly at the lowest deciles, whilst the opposite is true for men at the highest deciles. Institutional differences across countries seem to indicate that a 'glass ceiling effect' characterises private sector pay (at top deciles) for females in France and Italy, while a "low floor effects" is what distinguishes private sector pay of low skilled women in Britain.

Different economic implications are in order. On the one hand, empirical evidence confirms that the public sector is a "fair employer", both reducing pay differences by gender and compressing pay dispersion with respect to the private sector. On the other hand, the existence of a positive public-private pay differential, along most of the wage distribution, also means that the public sector pays more than the opportunity wage low skilled labour, while less than what is needed to attract, retain and motivate high skilled workers.

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