

# Flying High and Laying Low in the Public and Private Sectors: A Comparison of Pay Differentials for Male, Full-Time Employees

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## Abstract

*Using linked employee-employer data, this paper shows that, on average, male full-time public sector employees in Britain earn 8.9 per cent more than their private sector counterparts. Analysis reveals that the majority of this pay premium is associated with public sector employees having individual characteristics typically associated with higher pay, especially working in higher paid occupations. Further focussing on the highly skilled and unskilled occupations in both sectors reveals evidence of workplace segregation positively impacting on earnings in the private sector for the highly skilled, and in the public sector for the unskilled. Substantial earnings gaps between the highly skilled and unskilled are found in both sectors; and the unexplained components in these gaps are shown to be very similar regardless of sector.*

JEL Classification: J300; J700

## 1. Introduction

There are surprisingly few studies that explicitly compare earnings in the public and private sector; after controlling for the substantial differences in employee and workplace characteristics in the two sectors. Many of the extant studies in the literature use British data. For example, Bender and Elliot (1999) use the New Earnings Survey (NES) and the British Household Panel Survey (BHPS) to investigate pay convergence across the public and private sectors. Their main conclusion (using the usual decomposition analysis) is of divergence between returns to sector-specific

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occupational characteristics. Elliot *et al.* (1999) investigate public-private sector wages in the five largest EU states and Sweden. They also conclude that it is vital to allow fully for different returns to occupation, however, they note that a major difficulty occurs in identifying occupations where both private and public sector employees are present in large numbers. Analogously, Borland *et al.* (1998) found Australian full-time male public sector employees earned significantly more than did their private sector counterparts in the late 1990s and that this gap was almost wholly explained by differences in the productivity-related characteristics of employees and job characteristics in each sector.

Yu *et al.* (2005) using data from the BHPS throughout the 1990s find the chances of earning a higher salary are greater for well paid employees in the private sector and vice versa for the lowly paid in the public sector. They only include years of schooling, work experience and an indicator variable for public sector employment as explanatory variables. Lucifora and Meurs (2006) compare the public sector pay gap across, Britain, France and Italy (for Britain they use data from the Labour Force Survey, LFS, in 1998). They also conclude that the pay gap is highest for low salary earners in the public sector and argue that differences in unobserved characteristics may be more important for these employees. Similarly, Blackaby *et al.* (1999) find that in common with North American findings, the highest wage premiums for UK public-sector workers are found amongst low earners. These findings suggest that studies which divide the sample (in some way) between high and low salaried employees could expect to find a positive pay premium for low earners in the public sector, especially so if males and females are considered together and if occupations are not fully allowed for. Nickel and Quintini (2002) show that a decline in public relative to private sector pay in Britain adversely affects the quality of males in the public sector, but not females. Their paper further emphasises the need to control fully for the individual characteristics of public sector employees, but also raises the question of why the genders may respond differently to the characteristics of public sector workplaces.<sup>1</sup>

Another major difference between the public and private sectors is typically the nature of the wage setting process and workplace specific employment conditions. For example, in Britain there are considerable disparities in the extent of trade union representation in wage negotiations, the presence of wage setting boards in the public sector<sup>2</sup>, and the presence of incentive pay schemes across the sectors. Makepeace and Marcenaro-Gutierrez (2006) use data from the Labour Force Survey (LFS) to study public sector pay relativities, distinguishing between public servants covered by Pay Review Boards and those uncovered groups in Britain. They find that covered public sector workers do better than uncovered (and that the extent of this wage premium varies substantially by occupation). The authors have no other information on the nature of the covered and uncovered workplaces, however, and so can provide limited alternative possible explanations.

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<sup>1</sup> This paper will concentrate on males working full-time.

<sup>2</sup> There are six Pay Review Bodies for public sector employees in Britain, which have specific remit groups. In addition the Office of Manpower Economics (OME) services the Police Negotiating Board. They are all serviced independently by the OME. The current aggregate pay bill of these covered groups is over £50 billion (some 5 per cent of GNP).

Burgess and Metcalfe (1999) use the 1990 Workplace Industrial Relations Survey (WIRS90) to explore incentive schemes across public and private sector workplaces. Controlling for occupational type they find that incentive schemes are much rarer in the public sector for higher skilled occupations. Burgess and Ratto (2003) survey international evidence to further explore the impact of explicit incentives (and especially Performance Review Pay, PRP) in the public sector. They conclude that these practices are typically underutilised in the public sector. A strength of these studies is the recognition that workplace characteristics are not uniform across the sectors. To be able to fully consider the association between payment schemes such as these and the resultant public sector pay gap for individual employees, however, it is necessary to use linked employee and workplace data.

The data used in this study are drawn from the British Workplace Employee Relations Survey 2004 (WERS04)<sup>3</sup> which is a nationally representative survey of both workplaces and their employees. The linked nature (and extensive questionnaires) of the WERS04 data allows us to control far more extensively for individual employee characteristics, job characteristics and workplace characteristics than has been possible in previous earnings studies. A further attractive feature of the WERS04 data, of particular relevance to our study, is the extensive information it provides on both public and private sector workplaces (Kersley *et al.* 2006, page 5).

Most studies concentrating on the public-private wage differential rely on the human capital model as the theoretical basis for the study of earnings (Becker, 1962 and 1964). This approach is also used as the starting point in this paper. At the employee level, it is assumed that wages increase with (marginal) productivity which in turn increases with measures of accumulated skills such as education, work experience, and training. The Human Capital approach is necessarily partial. Relying on experience and education outcomes as measures of potential productivity have many well-known limitations, particularly so for those with intermittent periods of labour supply and/or a history of part-time employment (Heckman, 1979; Nickel and Quintini, 2002). We choose to focus our analysis on male full-time employees, leaving the study of women and part-time workers for future work.

Other factors also affect the marginal productivity of workers. Principally these other factors derive from the nature of the job that an individual does and from the workplace that they work in. By using linked workplace-worker data, we are able to fully control for the additional role the workplace may have in the wage determination process and on the public-private wage differential in Britain. In doing so, we investigate the relative earnings of (1) public sector and private sector full-time male employees, and (2) male full-time employees in the highly skilled (managerial, professional and technical) and unskilled occupations in each of these sectors. WERS04 and its predecessors have been used to analyse diverse research questions (Millward *et al.* 2004), but we are not aware of any research using these data to explicitly examine the earnings gap between highly skilled and unskilled, public sector and private sector, male full-time employees in Britain.

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<sup>3</sup> Department of Trade and Industry (2006), Workplace Employee Relations Survey: Cross-Section, 2004 (computer file). 5th ed. Colchester: The Data Archive (distributor). SN: 5294.

## 2. Wage and Marginal Productivity in the Private and Public Sectors

The process of wage determination in any organisation is complex. There are many and sometimes conflicting effects to consider. The most general statement that economists can make is that in the private sector populated by profit maximising firms, there is a close relationship between the wage and the marginal product of labour. The exact nature of this relationship depends on market conditions. Under full blown labour market competition, the wage will equal the value of the marginal product of labour as in the classical textbook account. In the public sector (and in the not-for-profit sector) there is no obvious reason why the link between marginal product and wage should be so strong. Nonetheless, so long as public sector organisations do have well defined objectives, then cost minimising considerations will also require them to take account of the productivity of workers in setting wage rates.

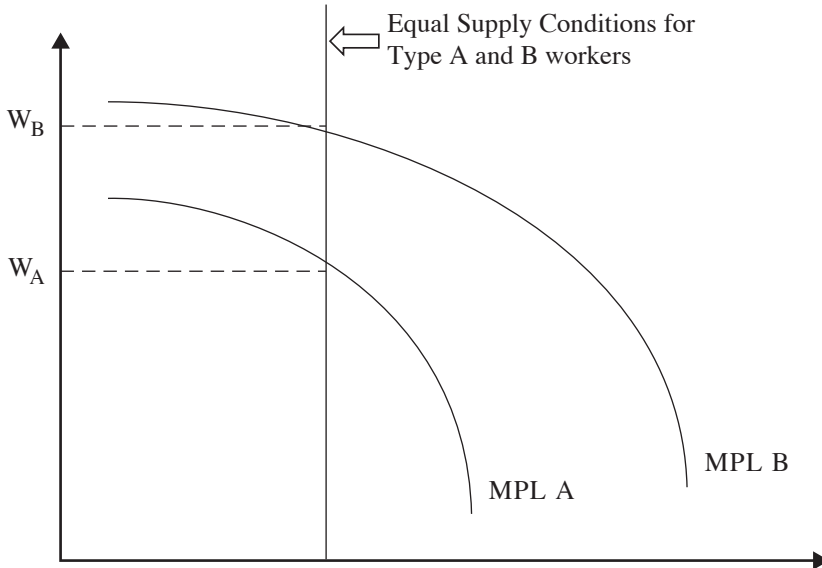
The factors which determine the marginal productivity function can be broadly divided into two types. First, there are those which are wrapped up in the individual worker: accumulated human capital, motivation, and so on. Secondly, there are those which are due to the workplace environment that the worker finds him/herself in: the level and quality of capital and other complementary inputs and the industrial relations environment for example. A favourable change in any of these will cause the marginal product function to be higher than it would have been without the favourable change.

The wage rate also depends on the labour market conditions facing the firm. Other things being equal, wages set under monopsony conditions will be lower (for the same MPL function) than under competition. From the point of view of a cross section econometric analysis, the comparative static proposition that can most usefully guide the estimation will be of the type: If worker B has a higher level of human capital than worker A, and if the supply conditions of type A workers and type B workers is the same and if both workers are in the same working environment (including the degree of market power enjoyed by their employers), then the wage of B should be higher than that of A.

Similarly, if the focus was on firm specific characteristics rather than worker characteristics, then the equivalent proposition would be: If worker B is employed in a firm with a higher level of capital than worker A's firm, but both firms enjoy equal market power, and if the supply conditions of type A workers and type B workers is the same and if both workers have the same level of human capital, then the wage of B should be higher than that of A. The diagram below illustrates in the case of perfect competition.

Under perfect competition and equal supply conditions, the only source of wage variation between A and B is to do with higher marginal product functions whether these are due to B's extra human capital or B's employers extra capital stock as illustrated in Figure 1.

Figure 1 - Wage Determination under Perfect Competition



Typically, the econometric study of wage determination (the earnings function approach) has been based on data in which only workers have been sampled, e.g. the LFS. The typical variables thought to capture human capital and skill (i.e. education, experience, etc.) have been used as explanatory variables in regressions in which the endogenous variable is a suitable measure of earnings. Essentially, in terms of our diagram above, all variations in marginal product of labour functions are attributed to worker characteristics. Though these studies have provided valuable insights into the factors determining wages, they are necessarily limited because they are unable to take into account the potential sources of variation in MPL functions due to variations in the working environments of different workers. In other words, the role of workplace specific variables (which impinge on the MPL functions of all workers employed in the workplace) cannot be estimated, unlike in our analysis.

### 3. The Data

The British Workplace Employee Relations Survey 2004 (WERS04)<sup>4</sup> is a nationally representative survey of workplaces with five or more employees<sup>5</sup>. (A workplace comprises the activities of a single employer at a single set of premises.) Face-to-face interviews for WERS2004 were conducted with a senior manager (with day-to-day responsibility for employee relations). At those workplaces responding to the manager

<sup>4</sup> The UK economy has entered into severe recession since the 2004 data was collected, this would be expected to have major impacts on both sectors.

<sup>5</sup> The industries excluded from the survey were agriculture, hunting and forestry; fishing; mining and quarrying; private households with employed persons; and extra-territorial organisations and bodies.

Table 1 - Sample Means

|                        | Full Sample |      | Public Sector |      | Private Sector |      | Highly Skilled |       | Unskilled |      |
|------------------------|-------------|------|---------------|------|----------------|------|----------------|-------|-----------|------|
|                        | Mean        | s.e. | Mean          | s.e. | Mean           | s.e. | Mean           | s.e.  | Mean      | s.e. |
| In(average hourly pay) | 2.219       | 0.01 | 2.315         | 0.02 | 2.198          | 0.02 | 2.524          | 0.01  | 1.807     | 0.02 |
| Potential experience   | 24.321      | 0.24 | 26.223        | 0.41 | 23.907         | 0.27 | 23.153         | 0.30  | 25.603    | 0.74 |
| training               | 2.554       | 0.07 | 3.564         | 0.16 | 2.334          | 0.07 | 3.258          | 0.10  | 1.638     | 0.14 |
| Education measures;    |             |      |               |      |                |      |                |       |           |      |
| minimal                | 0.274       | 0.01 | 0.206         | 0.01 | 0.290          | 0.01 | 0.108          | 0.01  | 0.396     | 0.02 |
| cse25                  | 0.113       | 0.01 | 0.088         | 0.01 | 0.119          | 0.01 | 0.067          | 0.01  | 0.156     | 0.01 |
| cse1                   | 0.218       | 0.01 | 0.215         | 0.01 | 0.219          | 0.01 | 0.200          | 0.01  | 0.182     | 0.02 |
| gceae                  | 0.042       | 0.00 | 0.046         | 0.01 | 0.042          | 0.00 | 0.041          | 0.05  | 0.034     | 0.01 |
| gce2ae                 | 0.071       | 0.00 | 0.079         | 0.01 | 0.069          | 0.00 | 0.089          | 0.01  | 0.056     | 0.01 |
| degree                 | 0.197       | 0.01 | 0.241         | 0.02 | 0.188          | 0.01 | 0.343          | 0.01  | 0.064     | 0.01 |
| postgraduate           | 0.069       | 0.01 | 0.114         | 0.01 | 0.059          | 0.01 | 0.142          | 0.01  | 0.013     | 0.01 |
| Vocational qual.       | 0.598       | 0.01 | 0.670         | 0.02 | 0.582          | 0.01 | 0.653          | 0.01  | 0.426     | 0.02 |
| Child                  | 0.419       | 0.01 | 0.452         | 0.02 | 0.412          | 0.01 | 0.451          | 0.01  | 0.375     | 0.02 |
| Married                | 0.705       | 0.01 | 0.754         | 0.01 | 0.695          | 0.01 | 0.755          | 0.01  | 0.619     | 0.02 |
| Disabled               | 0.123       | 0.00 | 0.137         | 0.01 | 0.120          | 0.01 | 0.112          | 0.01  | 0.127     | 0.01 |
| Ethnic                 | 0.055       | 0.01 | 0.043         | 0.01 | 0.058          | 0.01 | 0.042          | 0.01  | 0.083     | 0.02 |
| Fixed term             | 0.024       | 0.00 | 0.034         | 0.01 | 0.022          | 0.00 | 0.029          | 0.004 | 0.025     | 0.01 |
| Tenure                 | 5.512       | 0.08 | 6.340         | 0.16 | 5.331          | 0.09 | 5.560          | 0.11  | 5.095     | 0.22 |
| Union                  | 0.320       | 0.01 | 0.736         | 0.02 | 0.229          | 0.01 | 0.273          | 0.01  | 0.362     | 0.03 |
| Occupation categories; |             |      |               |      |                |      |                |       |           |      |
| managerial             | 0.160       | 0.01 | 0.115         | 0.01 | 0.169          | 0.01 | x              |       |           |      |
| professional           | 0.115       | 0.01 | 0.161         | 0.02 | 0.105          | 0.01 | x              |       |           |      |
| Technical              | 0.133       | 0.01 | 0.241         | 0.02 | 0.110          | 0.01 | x              |       |           |      |
| Clerical               | 0.074       | 0.00 | 0.123         | 0.02 | 0.064          | 0.00 |                |       |           |      |
| Craft                  | 0.160       | 0.01 | 0.095         | 0.02 | 0.174          | 0.01 |                |       |           |      |
| Personal               | 0.027       | 0.00 | 0.061         | 0.01 | 0.014          | 0.00 |                |       |           |      |
| Sales                  | 0.037       | 0.00 | 0.006         | 0.00 | 0.044          | 0.01 |                |       |           |      |
| Operative              | 0.165       | 0.01 | 0.055         | 0.01 | 0.189          | 0.01 |                |       |           |      |
| Unskilled              | 0.134       | 0.01 | 0.143         | 0.02 | 0.132          | 0.01 | x              |       |           |      |
| No. observations       | 6695        |      | 1489          |      | 5206           |      | 2900           |       | 862       |      |

Source: WERS 2004.

survey, a questionnaire was presented to up to 25 randomly selected employees (in workplaces with more than five employees) or to all the employees (in workplaces with fewer than 26 employees). The entire surveying process resulted in 2,295 completed workplace surveys, with 22,451 completed employee questionnaires from 1,733 of these workplaces. Retaining only those individuals who have complete information for the variables used in the analyses below leaves us 6,695 male full-time employees (1,489 from the public sector and 5,206 from the private sector).

WERS04 is a stratified random sample, and larger workplaces and some industries are over-represented. Thus, all of the empirical results that follow use workplace and employee sampling weights where possible (Deaton, 1998).

#### 4. Measuring the Earnings Gap

Full definitions of the variables to be used in the study are presented in appendix table A1. Brief sample based summary statistics are presented in table 1 for the full data sample (columns one and two), the public sector (columns three and four), and the private sector employees (columns five and six). We concentrate on male full-time employees only. A full-time employee is defined to be working 37 or more hours per week, which is a standard full-time working week in the public sector and a reasonable assumption for the more variable definition of full-time in the private sector. The need to allow for endogenous sample selection (such as the non-random probability of working full-time) when estimating an earnings function is well documented by Heckman (1979). Unfortunately, suitable instruments for the identification of a possible three way sample selection effect from comparing (i) full-time (ii) male employees working in the (iii) public or private sector are not available in the WERS data (unsurprisingly given its cross sectional nature). This interpretation of the estimated coefficients in the earnings functions (and especially the extrapolation of those results outside of the achieved sample being analysed) should bear this caveat in mind.

In the latter sections of this paper, we aggregate the three upper occupational categories by skill, namely managerial, professional and technical, into one highly skilled (high flying) category which we call 'Highly Skilled'. For contrast, we also focus on the occupational group of 'Unskilled' workers. Table 1 also presents summary statistics for the Highly Skilled (columns seven and eight) and for the Unskilled employees (columns nine and ten), respectively. The Highly skilled occupations constitute 43 per cent of the total workforce sample, the Unskilled make up 13 per cent. The public sector (as defined by the suppliers of the data set<sup>6</sup>) employs 22 per cent of male full-time employees in Britain (table 1): 28 per cent of the Highly Skilled group

<sup>6</sup> A public sector workplace is one where the best description of the formal status of the establishment (or the organisation of which it is a part) is that it is a: government owned limited company; nationalised industry; public service agency; other non-trading public corporation; quasi autonomous national government organisation (QUANGO); or local/central government (including the National Health Service and Local Education Authorities).

A private sector workplace is one where the best description of the formal status of the establishment (or the organisation of which it is a part) is that it is a: public limited company (PLC); private limited company; company limited by guarantee; partnership (including limited liability partnership/ self-proprietorship.); trust/charity; body established by Royal Charter; or co-operative/mutual/friendly society.

and 26 per cent of the Unskilled. In other words, there is some over representation, in the public sector, at both ends of the occupational spectrum.

The variable of major interest is the hourly wage variable  $W$  for employee  $i$  in workplace  $j$ . Hourly earnings are calculated for each employee by dividing their gross (before tax and other deductions) weekly wages by the hours they usually work each week (including any overtime and extra hours). The data do not give the actual value of gross weekly wages but rather the interval to which the wage belongs for each sampled worker, there are 14 bands. In our regression analysis, the mid-point of the interval is used as the measure of weekly wages.<sup>7</sup> Usual hours worked is a continuous measure. The subsequent hourly wage measure,  $W_{ij}$ , is the ratio of weekly wages to usual hours and is therefore continuous.

We find that public sector full-time males earn some 8.9 per cent more than do their private sector employees and that there is considerably more variance in public than in private sector pay. In other words, comparing log wages, as is more common in the literature, public sector employees earn 11.73 log wage points (lwp) or 8.9 per cent more than private sector employees (table 1, row one). This is the raw earnings gap that will be explored further.

### ***The Determinants of Earnings***

As discussed above, the majority of authors have adopted the human capital model as the theoretical basis for the earnings function in both the private and the public sector (Becker, 1962 and 1964). This approach is also used in this paper. At the employee level, it is assumed that wages increase with measures of accumulated skills such as education, work experience, and training.

WERS04 provides information as to the highest level of education the individual has received across a range of educational categories. Just over a quarter of full-time male employees have a degree or postgraduate qualification whilst 60.5 per cent have no post-age 16 qualifications (table 1). Measures of work experience are usually assumed to be positively related to wages via the ability to become more productive over the time period the employee has spent working. WERS04 does not have information on actual experience over working life; potential experience (age minus (years spent in education and infancy)) is used instead. This may lead to an underestimate of the relationship between work experience and earnings if the individual was not employed consistently throughout their working life; the results should be interpreted accordingly. The length of the time the employee spent in employer-provided training in the previous year (sometimes thought of as Continuous Professional Development, CPD) is also included in the dataset; this measure of training is expected to be positively related to wages (Almeida-Santos *et al.* 2010).

The public sector sample displays higher levels for all of these categories (35.5 per cent have a degree or postgraduate qualification compared to 24.7 per cent of the private sector employees; they have on average 2.3 more years of experience and 1.2

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<sup>7</sup> In unreported results, we address the possibility that this banding may affect our results (Stewart, 1983). Using interval regression techniques, we find, however, no significant difference from the more general regression results analogous to those reported in the text and those estimated in the restricted manner.



days more training in the previous year; they are also almost 9 per cent more likely to have a vocational qualification, see table 1). Public sector employees are much more likely to be in the professional, technical, clerical and personal services occupations whilst the private sector has more managers, craftsmen, salesmen, and operative-assembly workers.

The earnings function is augmented with the inclusion of further categories of explanatory variables capturing individual employee characteristics such as demographic variables (which may constrain an individual's choice of jobs these are the presence of dependent children, marital status, race and physical disability); job characteristics (being on a fixed term contract, current job tenure, and trade union membership); and workplace-specific characteristics (we allow the workplace to have a fixed-effect impact on the productivity of individual employees and thus on the earnings function). The workplace-specific effect captures unobservable effects that are common to all employees in a workplace such as management style, wage setting practices, industry and region.

## 5. Estimating the Earnings Function

We start by estimating an earnings function which uses individual worker and job characteristics only. For clarity we focus on earnings outcomes for full-time males, not least because the impact of gender may well be conflated with the issue of workplace-specific effects. Using semi-logarithmic wage equations, we estimate:

$$W_{ij} = \alpha + \beta_1 X(1)_{ij} + \dots + \beta_k X(k)_{ij} + \varepsilon_{ij} \quad (1)$$

where  $W_{ij}$  is the natural log of the wage for individual  $i$  in workplace  $j$ ;  $\alpha$  is an intercept term;  $X_{ij}$  is a vector of  $k$  regressors capturing the individual characteristics expected to have an impact on wages; and  $\varepsilon_{ij}$  is a residual term. We estimate this earnings function using ordinary least squares.

We then allow for workplace-specific fixed effects by re-estimating (1) using a fixed effects model:

$$W_{ij} = \alpha + \delta_j + \beta_1 X(1)_{ij} + \dots + \beta_k X(k)_{ij} + \varepsilon_{ij} \quad (2)$$

where  $j$  again represents the workplace and  $\delta_j$  the workplace-specific effect<sup>8</sup>.

We begin with an analysis of male public sector and private sector full-time employees. This is followed with an investigation of the relative earnings of male full-time employees in the highly skilled (managerial, professional and technical) and unskilled occupations in each of these sectors (see section 6 below). We present results separately for each of the groups of employees, rather than for the pooled models across employees (see Bayard *et al.* 2003, for example). We take the view that models for public sector and private sector employees may be more likely to produce different parameters than those for all employees. This is borne out in the results shown below.

<sup>8</sup> The workplace-specific effect  $\delta_j$  also captures unobservable individual effects common to all employees in a workplace. It is not possible to identify the remaining idiosyncratic effects and we relegate them to the residual. This will have no consequence for the estimate of  $\delta_j$  if the remaining individual effects are uncorrelated with these included workplace-specific effects.

## 6. Estimation Results

Table 2 reports the OLS estimates of our earnings function in columns two to five and the estimates including workplace specific fixed effects in columns six to nine. The test of the explanatory power of the regressors is clearly significant for all the regressions. Overall, the parameter estimates are generally well defined and have the expected sign.

Beginning with the OLS regressions, the returns from higher qualifications are positive for all employees and they are higher in the private sector than in the public sector. It should be remembered that these statements are relative in nature. For example, the returns to education in each sector are measured relative to the omitted education category; in this case, education minimal or other (which we treat as our base). The average log hourly pay for this education level is 1.99 lwp in the private sector and 2.08 lwp in the public. As the comparison group is lower paid in the private sector we might expect to see larger rates of return for higher education levels in this sector. The returns from extra days of training and vocational qualifications are also positive for all employees but are only significantly related to wage increase in the private sector.

The returns from potential work experience are a little more complex to interpret as there is evidence that the relationship is not a simple linear one. The returns are increasing (as indicated by the positive coefficients in row one of table 2) but at a decreasing rate (the negative coefficients for potential experience squared in row two of table 2). Thus, the total returns associated with potential work experience are not constant for difference lengths of experience. Returns in the private sector are higher for all but the very longest periods of work experience. (At experience levels less than 44 years, the total returns from experience are higher in the private sector and at experience levels more than 44 years they are higher in the public sector.) Total returns from experience in the private sector are increasing up to 33 years of experience, after which the marginal returns associated with an extra year of experience becomes negative. The relationship between experience and returns in the public sector is relatively smoother; the marginal returns associated with an extra year of experience only becomes negative at 42 years of experience. The difference in the returns from experience across the sectors is highest at 22 years of experience, the gap then closes until the curves cross at 44 years. The average experience in these two sectors is 26 years in the public sector and 24 in the private (see table 1); where the gap in returns is close to the widest.

The returns from being in the more skilled occupations (managerial, professional and technical) rather than clerical are all higher in the public sector. The average log hourly pay for clerks is 2.17 lwp in the public sector and 2.26 lwp in the private and so we might expect to see higher returns for better paid occupations in the public sector. In the private sector there is a clear break in the return to occupation with craft, personal services, salesmen, operative and assembly workers and the unskilled earning less than clerks. The (almost) monotonic decline in the rates of return to the occupational categories used suggests a clear occupational hierarchy. In analysis below, we exploit this hierarchy by looking at both extremes separately.

The introduction of workplace specific fixed effects (columns six to nine of table 2), though statistically significant, has little impact on the public sector results

Table 2 - OLS and FE Regressions: Public and Private Sector Full-time Males

| <i>ln(hourly pay)</i>             | OLS           |                |                |                |                |                |
|-----------------------------------|---------------|----------------|----------------|----------------|----------------|----------------|
|                                   | Public Sector |                |                | Private Sector |                |                |
|                                   | <i>coeff</i>  | <i>t-value</i> | <i>t-value</i> | <i>coeff</i>   | <i>t-value</i> | <i>t-value</i> |
| Potential experience (years)      | 0.018         | 5.14 ***       | 12.03 ***      | 0.013          | 3.78 ***       | 10.29 ***      |
| Potential experience sqd. (x1000) | -0.217        | -3.11 ***      | -9.56 ***      | -0.167         | -2.45 ***      | -8.55 ***      |
| Training (days previous year)     | 0.002         | 0.58           | 2.64 ***       | 0.004          | 1.12           | -0.08          |
| Education minimal is omitted      |               |                |                |                |                |                |
| <i>cse25</i>                      | 0.114         | 3.33 ***       | 4.02 ***       | 0.062          | 1.80 *         | 3.44 ***       |
| <i>cse1</i>                       | 0.139         | 5.99 ***       | 5.88 ***       | 0.109          | 4.01 ***       | 4.41 ***       |
| <i>gceae</i>                      | 0.094         | 1.19           | 3.89 ***       | 0.059          | 1.12           | 4.74 ***       |
| <i>gce2ae</i>                     | 0.229         | 6.91 ***       | 9.71 ***       | 0.148          | 4.49 ***       | 8.50 ***       |
| <i>degree</i>                     | 0.288         | 9.61 ***       | 14.75 ***      | 0.233          | 8.03 ***       | 11.76 ***      |
| <i>postgraduate</i>               | 0.491         | 9.37 ***       | 14.46 ***      | 0.429          | 7.00 ***       | 11.19 ***      |
| Vocational qualification          | 0.031         | 1.57           | 2.19 **        | 0.048          | 2.54 ***       | 3.17 ***       |
| <i>Child</i>                      | 0.053         | 2.63 ***       | 1.99 *         | 0.058          | 2.60 ***       | 1.51           |
| <i>Married</i>                    | 0.061         | 2.80 ***       | 5.28 ***       | 0.058          | 2.54 ***       | 5.56 ***       |
| <i>Disabled</i>                   | -0.032        | -1.56          | -1.48          | -0.012         | -0.54          | -0.83          |
| <i>Ethnic</i>                     | 0.093         | 1.76 *         | -2.37 ***      | -0.010         | -0.25          | -2.12 **       |
| <i>Fixed term</i>                 | 0.058         | 1.29           | -1.60          | 0.024          | 0.57           | -1.99 **       |
| <i>Tenure</i>                     | 0.014         | 4.71 ***       | 5.69 ***       | 0.014          | 4.45 ***       | 6.73 ***       |
| <i>Union</i>                      | -0.013        | -0.58          | 2.86 ***       | 0.008          | 0.32           | -2.87 ***      |
| Clerical is omitted               |               |                |                |                |                |                |
| <i>managerial</i>                 | 0.303         | 6.01 ***       | 6.74 ***       | 0.295          | 4.94 ***       | 10.06 ***      |
| <i>professional</i>               | 0.227         | 3.58 ***       | 5.58 ***       | 0.202          | 2.20 ***       | 5.12 ***       |
| <i>technical</i>                  | 0.230         | 4.50 ***       | 2.72 ***       | 0.206          | 3.73 ***       | 2.31 ***       |
| <i>craft</i>                      | 0.083         | 1.71 *         | -2.68 ***      | 0.076          | 1.30           | -0.528         |
| <i>personal</i>                   | -0.083        | -1.51          | -5.38 ***      | -0.006         | -0.08          | -2.75 ***      |
| <i>sales</i>                      | 0.041         | 0.49           | -6.27 ***      | -0.060         | -0.68          | -2.47 ***      |
| <i>operative</i>                  | -0.090        | -1.29          | -6.74 ***      | -0.209         | -2.25 ***      | -6.42 ***      |
| <i>unskilled</i>                  | -0.205        | -4.23 ***      | -9.59 ***      | -0.175         | -2.27 ***      | -8.73 ***      |
| Constant                          | 1.564         | 29.34 ***      | 37.15 ***      | 1.654          | 24.06 ***      | 47.40 ***      |
| No. observations                  |               | 1489           | 5206           |                | 1489           | 5206           |
| R-squared                         |               | 0.5147         | 0.5149         |                | 0.7427         | 0.7647         |

With workplace specific fixed effects

pertaining to the relationship between earnings and the augmented human capital regressors. There is some reduction in the returns from low levels of education but the return for higher qualifications (degree and postgraduate) show relatively little change. There is some slight decline in the wage returns for the highest occupations in the public sector but again not significantly so. These results suggest that there is very little workplace segregation amongst public servants or, alternatively, that the introduction of workplace specific characteristics does not have an impact on the relationship between the individual characteristics of the workers and their wages in the public sector in aggregate. There is one major exception; the wage premium enjoyed by those considering themselves to be ethnic is no longer significant, suggesting that these employees are concentrated in high paying workplaces.

By contrast, introducing workplace-specific fixed effects into the private sector earnings function is associated with a removal of the positive relationship between training and wages; the positive returns from higher education levels are reduced; and the union wage gap becomes significantly negative. The earnings penalty associated with being unskilled has also fallen substantially. These results suggest that there is segregation of high paid workers into high paying workplaces; and segregation of low paid workers into low paying workplaces, in the private sector.

The change in the impact of union membership is particularly striking. Being a trade union member is not associated with significantly higher earnings in the public sector in our results (despite the high membership rates recorded in this sector) with or without workplace specific effects. In the private sector, without the inclusion of workplace specific effect trade union membership status is associated with 5.5 per cent higher earnings in the private sector. Once workplace specific fixed effects have been fully allowed for, trade union membership is found to be associated with 4.7 per cent lower earnings in the private sector. This would suggest that the wage premium associated with trade unionism in the private sector is linked to being in a 'unionised' workplace rather than the individual employee themselves being a member.

Another noteworthy finding is that the returns to the lower and higher levels of education (especially for postgraduates) are smaller in the private sector than the in public sector once workplace fixed effects are allowed for, as are the returns to a vocational qualification. We return to explore these findings more fully below where the role of occupation is addressed further.

### ***Focussing on the Highly Skilled and the Unskilled across the Sectors***

The implications of the findings above can be further explored by concentrating analysis on the extreme ends of the occupational categories; the higher skilled and lower skilled occupations in the two sectors discussed above. We aggregate the three upper occupational categories, namely managerial, professional and technical, into one highly skilled category which we call 'Highly Skilled'. For contrast, we also focus on the occupational group of 'Unskilled' workers. Relevant summary statistics for these subsamples are provided in Table 1 (and in appendix table A2). Within skill levels but across sectors, the public sector to private sector gap for the Highly Skilled is only 1 lwp; this is considerably smaller than the public sector to private sector gap for the Unskilled which is 14 lwp. Within sectors but across skill levels, the earnings

gaps are considerable: the Highly Skilled public sector to Unskilled public sector gap is 61.2 lwp, whilst the Highly Skilled private sector to Unskilled private sector gap is 74.2 lwp.<sup>9</sup>

Considering sector differences within skill group, the more general sector based relationships discussed above are still typically true. For example, public sector employees have more potential experience *ceteris paribus*, as do the Highly Skilled. They are more likely to have higher education levels, recent training, and vocational qualifications. Looking across the public-private divide, there is a greater uniformity amongst the Unskilled Group than in the Highly Skilled Group in terms of educational achievements. Trade union membership is consistently higher and substantial for public sector and for Unskilled employees. Only 14 per cent of Highly Skilled employees in the private sector have current trade union membership. In contrast, 82 per cent of Unskilled employees in the public sector are union members.

Highly Skilled employees in the public sector are twice as likely to be employed on a fixed term contract than are Highly Skilled employees in the private sector. This pattern is reversed for the Unskilled, where these employment contracts are more than three more likely to occur in the private sector. Analogously, in the public sector the Unskilled have the longest average current job tenure, in the private sector it is the Highly Skilled.

### ***Results for the Highly Skilled and the Unskilled across the Sectors***

The estimates of the earnings function for each of the four groups of employees are presented in tables 3 and 4. These are the OLS (baseline) estimates for public sector Highly Skilled, private sector Highly Skilled, public sector Unskilled, and private sector Unskilled male full-time employees. Results for the estimates of the semi-logarithmic wage equations (equation 1 above) are presented in table 3. Results for the estimates including for workplace-specific fixed effects (equation 2 above) are provided in table 4.

Reading across the columns in table 3, stronger relationships between the explanatory variables included in the earnings functions can generally be seen to occur for the Highly Skilled. For example, the returns from education are greater for the Highly Skilled across sectors, more so in the private sector than in the public. In contrast, there is no significant evidence of the more educated Unskilled employees earning more in either sector; instead, it would appear that those Unskilled employees who are in the middle of the education distribution do best (given the characteristics included in this analysis).

There is no significant evidence of higher earnings being associated with recent training in the public sector, unlike in the private sector where a relatively small impact is found for both Highly Skilled and Unskilled employees. Vocational qualifications are also only significantly related to earnings in the private sector but only for Unskilled employees.

Differences do occur, however, across the skill groups and/or sectors, a good

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<sup>9</sup> Two further bilateral gaps, not included in table 4, are those between Highly Skilled public sector and Unskilled private sector employees (which is 75.1 lwp); and that between the Highly Skilled private sector and the Unskilled public sector employees (which is 60.5 lwp).

Table 3 - OLS Earnings Regressions: By Skill Groups and Sector

|                              | Highly skilled |           |                |           | Unskilled     |           |                |           |
|------------------------------|----------------|-----------|----------------|-----------|---------------|-----------|----------------|-----------|
|                              | Public Sector  |           | Private Sector |           | Public Sector |           | Private Sector |           |
|                              | coeff          | t-value   | coeff          | t-value   | coeff         | t-value   | coeff          | t-value   |
| <i>log hourly pay</i>        |                |           |                |           |               |           |                |           |
| potential experience         | 0.021          | 3.46 ***  | 0.032          | 8.19 ***  | 0.021         | 2.92 ***  | 0.016          | 2.61 ***  |
| potential exp sqd (x1000)    | -0.261         | -2.03 **  | -0.475         | -5.79 *** | -0.304        | -2.01 **  | -0.268         | -2.49 *** |
| training                     | -0.004         | -1.22     | 0.007          | 2.27 **   | -0.003        | -0.20     | 0.010          | 1.81 *    |
| education minimal is omitted |                |           |                |           |               |           |                |           |
| cse25                        | 0.146          | 2.36 ***  | 0.017          | 0.35      | 0.070         | 1.43      | 0.065          | 1.36      |
| cse1                         | 0.142          | 3.22 ***  | 0.059          | 1.35      | 0.124         | 1.91 *    | 0.135          | 3.21 ***  |
| ceae                         | 0.035          | 0.22      | 0.048          | 0.84      | 0.037         | 0.47      | -0.052         | -0.78     |
| ce2ae                        | 0.228          | 3.98 ***  | 0.322          | 7.16 ***  | 0.228         | 3.62 ***  | 0.118          | 2.37 ***  |
| degree                       | 0.294          | 5.42 ***  | 0.387          | 9.19 ***  | 0.158         | 1.70 *    | 0.145          | 1.98 **   |
| postgraduate                 | 0.466          | 8.42 ***  | 0.557          | 11.77 *** | 0.125         | 0.89      | -0.231         | -0.84     |
| vocational qualification     | -0.009         | -0.36     | 0.011          | 0.49      | 0.058         | 1.43      | 0.053          | 1.66 *    |
| child 0-18                   | 0.056          | 1.96 **   | 0.012          | 0.55      | 0.003         | 0.05      | 0.010          | 0.31      |
| married                      | 0.045          | 1.69 *    | 0.099          | 3.74 ***  | 0.060         | 1.05      | 0.075          | 2.28 **   |
| disabled                     | -0.063         | -1.91 *   | -0.056         | -1.69 *   | 0.054         | 1.47      | -0.046         | -1.12     |
| ethnic                       | 0.083          | 1.23      | -0.049         | -0.93     | -0.019        | -0.27     | 0.015          | 0.23      |
| fixed contract               | 0.098          | 2.06 **   | -0.209         | -1.79 *   | -0.242        | -2.31 *** | -0.164         | -1.64     |
| tenure                       | 0.010          | 2.33 ***  | 0.009          | 2.97 ***  | 0.017         | 2.44 ***  | 0.023          | 4.60 ***  |
| union                        | 0.001          | 0.02      | -0.053         | -1.60     | -0.056        | -0.86     | 0.135          | 2.93 ***  |
| constant                     | 1.848          | 23.46 *** | 1.724          | 32.15 *   | 1.399         | 13.28 *** | 1.339          | 17.37 *** |
| No. observations             |                | 805       |                | 2095      |               | 222       |                | 640       |
| Pseudo R <sup>2</sup>        |                | 0.2601    |                | 0.2937    |               | 0.1411    |                | 0.2533    |

Source: WERS 2004. \*\*\* Significant at a confidence level of 99% and/or above, \*\* at 95% level, and \* at 90%.

Table 4 - Fixed Effects Earnings Regressions: By Skill Groups and Sector

| <i>Log hourly pay</i>        | <i>Highly Skilled</i> |                |  |                       |                |  | <i>Unskilled</i>     |                |  |                       |                |  |
|------------------------------|-----------------------|----------------|--|-----------------------|----------------|--|----------------------|----------------|--|-----------------------|----------------|--|
|                              | <i>Public Sector</i>  |                |  | <i>Private Sector</i> |                |  | <i>Public Sector</i> |                |  | <i>Private Sector</i> |                |  |
|                              | <i>coeff</i>          | <i>t-value</i> |  | <i>coeff</i>          | <i>t-value</i> |  | <i>coeff</i>         | <i>t-value</i> |  | <i>coeff</i>          | <i>t-value</i> |  |
| Potential experience         | 0.019                 | 3.08 ***       |  | 0.031                 | 7.54 ***       |  | 0.016                | 2.34 ***       |  | 0.013                 | 1.64           |  |
| Potential exp sqd (x1000)    | -0.278                | -2.37 ***      |  | -0.467                | -5.64 ***      |  | -0.209               | -1.73 *        |  | -0.220                | -1.67 *        |  |
| Training                     | 0.001                 | 0.19           |  | 0.004                 | 1.15           |  | -0.0004              | -0.05          |  | 0.003                 | 0.59           |  |
| Education minimal is omitted |                       |                |  |                       |                |  |                      |                |  |                       |                |  |
| cse25                        | 0.045                 | 0.80           |  | -0.060                | -0.99          |  | -0.043               | -1.04          |  | -0.010                | -0.20          |  |
| cse1                         | 0.127                 | 3.06 ***       |  | -0.019                | -0.42          |  | 0.088                | 1.65 *         |  | 0.009                 | 0.19           |  |
| ceae                         | 0.023                 | 0.24           |  | 0.018                 | 0.34           |  | -0.053               | -0.69          |  | -0.022                | -0.28          |  |
| ce2ae                        | 0.129                 | 2.38 ***       |  | 0.158                 | 3.22 ***       |  | 0.144                | 2.64 ***       |  | 0.112                 | 2.14 **        |  |
| degree                       | 0.232                 | 5.19 ***       |  | 0.182                 | 3.98 ***       |  | 0.082                | 1.15           |  | 0.080                 | 1.58           |  |
| postgraduate                 | 0.356                 | 7.45 ***       |  | 0.312                 | 5.84 ***       |  | -0.028               | -0.15          |  | -0.078                | -0.74          |  |
| Vocational qualification     | 0.035                 | 1.42           |  | 0.020                 | 1.03           |  | 0.049                | 0.91           |  | 0.093                 | 2.45 ***       |  |
| Child 0-18                   | 0.034                 | 1.00           |  | 0.032                 | 1.67 *         |  | 0.066                | 1.08           |  | -0.046                | -1.43          |  |
| Married                      | 0.079                 | 2.46 ***       |  | 0.083                 | 3.12 ***       |  | 0.078                | 1.61           |  | 0.037                 | 1.01           |  |
| Disabled                     | -0.014                | -0.35          |  | 0.003                 | 0.13           |  | 0.019                | 0.54           |  | -0.070                | -1.99 **       |  |
| Ethnic                       | -0.022                | -0.36          |  | -0.103                | -2.62 ***      |  | -0.119               | -1.16          |  | -0.016                | -0.17          |  |
| Fixed contract               | 0.018                 | 0.39           |  | -0.099                | -0.89          |  | -0.263               | -3.18 ***      |  | 0.102                 | 1.52           |  |
| Tenure                       | 0.016                 | 3.38 ***       |  | 0.012                 | 3.53 ***       |  | 0.012                | 1.99 **        |  | 0.017                 | 3.41 ***       |  |
| Union                        | 0.079                 | 2.31 **        |  | -0.101                | -3.19 ***      |  | -0.005               | -0.20          |  | -0.087                | -1.16          |  |
| Constant                     | 1.809                 | 24.41 ***      |  | 1.882                 | 32.32 ***      |  | 1.457                | 10.45 ***      |  | 1.526                 | 16.03 ***      |  |
| No. observations             |                       | 805            |  |                       | 2095           |  |                      | 222            |  |                       | 640            |  |
| Pseudo R <sup>2</sup>        |                       | 0.7135         |  |                       | 0.7034         |  |                      | 0.6236         |  |                       | 0.7718         |  |

Source: WERS 2004. \*\*\* Significant at a confidence level of 99% and/or above, \*\* at 95% level, and \* at 90%.

example of this is the relationship between potential work experience and earnings. As discussed above when considering sector differences, the returns from potential work experience are non-linear. The returns are increasing (as indicated by the positive coefficients in row one of table 3) but at a decreasing rate (as indicated by the negative coefficients for potential experience squared in row two of table 3); this is true for each skill group and sector. The returns to experience are consistently found to be the lower for Unskilled employees in the private sector (peaking at 31 years)<sup>10</sup>. In contrast, the returns from experience are always higher for the High Skill employees in the private sector (peaking at 36 years).

The returns from experience for High Skill public sector employees also always sit above those of the Unskilled public sector employees; however, these profiles are much closer together and are much flatter than they are in the private sector. The latter is especially true for the High Skill employees. At the point of greatest difference, however, High Skill employees in the private sector have returns from work experience that are some 39 per cent greater than their High Skill counterparts in the public sector. When they have 40 years of work experience this difference has dropped to 23 per cent (it is 15 per cent at 45 years). This result is of some policy importance given the concerns about experience based pay scales which are prevalent in the public sector. Our results suggest that notwithstanding the absence of formal experience based pay progression, private sector High Skill employees are even more greatly rewarded for experience than their public sector counterparts.

Current job tenure is rewarded similarly for the Highly Skilled in both the public sector and private sectors. However, consistent with the findings for work experience, the return for current job tenure is much higher for the Unskilled, especially in the private sector.

Being on a fixed-term contract has a strong positive relationship with wages for Highly Skilled employees in the private sector, it has a strong negative relationship with wages for all of the remaining groups of employees (although this is only weakly significant for the Unskilled in the private sector). Current union membership is only related to higher earnings for the Unskilled in the private sector, where it has a comparatively strong impact.

Including workplace-specific fixed effects in the analysis of the Highly Skilled group of employees again has differential impacts. In the private sector the estimated rates of return for higher education levels fall (especially at the degree and postgraduate levels, where they are now lower than in the public sector, see table 4). The positive wage returns from training in the private sector also decline. These results are consistent with High Skilled employees tending to concentrate in high paying workplaces in the private sector. Analogously, the negative relationship between earnings and being on a fixed term contract are no longer significant, suggesting that these workers are concentrated in low paying workplaces. Finally, the negative relationship revealed between union membership and ethnicity and earnings

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<sup>10</sup> As discussed above, we might expect the returns from experience to be biased downwards as the measure of work experience used here is likely to overestimate the time actually spent in employment over the working life (for example, by ignoring spells of unemployment). This may be more relevant for private sector and/or Unskilled employees.



both strengthen and become significant when workplace fixed effects are allowed for.

Considering the High Skill group of employees in the public sector, when workplace specific fixed effects are included in the analysis, similar changes are found as for the private sector but to a lesser extent. Whilst there is some evidence of segregation, the public sector workplaces appear to be offering a more homogenous work environment for the Highly Skilled than is the private sector.

The relationship between being employed on a fixed term contract and earnings is very different between the two sectors. Our results suggest that those on fixed term contracts are concentrated in low paying workplaces in the private sector and high paying workplaces in the public sector. Once workplace characteristics are fully allowed for, however, there is no significant relationship between earnings and this type of employment contract for High Skill employees in either sector.

The relationship between trade union membership and earnings can now be seen to be significantly different across the sectors for the Highly skilled. Being a union member, given workplace characteristics, is associated with 8 per cent more pay for the Highly Skilled in the public sector and 10 per cent less pay for the Highly Skilled in the private sector.

Considering the Unskilled employees in the private sector, there is some evidence of a decline in the returns associated with higher education levels and longer tenure, indicative of some concentration of higher paid unskilled workers into higher paying workplaces. The extent of this segregation is considerably lower, however, than for their High Skill colleagues. In the public sector, there is no substantial evidence of workplace segregation amongst Unskilled employee: again suggesting more homogenous work environments across workplaces in the public sector.

The substantially higher earnings associated with being a trade union member for the Unskilled employees in the private sector (a premium of 13.5 per cent, see table 3) is no longer apparent in the fixed effects results (table 4). Indeed, these results suggest that there is no relationship between trade union membership and earnings for Unskilled employees in either sector once workplace characteristics have been fully allowed for.<sup>11</sup>

## 7. Decomposing the Gaps

Following Oaxaca and Ransom (1994 and 1999), in general, the decomposition of the mean earnings gap between groups of employees in the public sector (*pu*) and the private sector (*pr*) is calculated as:

$$\bar{W}_{pu} - \bar{W}_{pr} = (\bar{X}_{pu} - \bar{X}_{pr}) \hat{\beta}_{pu} + \bar{X}_{pr} (\hat{\beta}_{pu} - \hat{\beta}_{pr}) + (\hat{\alpha}_{pu} - \hat{\alpha}_{pr}) \quad (3)$$

<sup>11</sup> Our results suggest that the relationship between earnings and trade union membership differs substantially according to the type of employee being considered. This is confirmed by other recent studies of earnings gaps based on analysis of the WERS04 data (for example, Chatterji *et al.* (2011) explore earnings gaps between men and women who are working in the public and private sectors; Mumford and Smith (2009) consider male and female, full and part-time earnings gaps).

In this calculation  $(\bar{X}_{pu} - \bar{X}_{pr}) \hat{\beta}_{pu}$  captures the impact of the difference in the value of the regressors weighted by the parameters from the model for the public sector  $pu$ , and  $\bar{X}_{pr} (\hat{\beta}_{pu} - \hat{\beta}_{pr}) + (\hat{\alpha}_{pu} - \hat{\alpha}_{pr})$  is the remaining unexplained gap. The decompositions for estimation with workplace specific fixed effects are presented in table 5.

As discussed above, the earnings gap between male full-time public and private sector employees is 11.73 lwp (or 8.9 per cent). This earnings gap can be decomposed into the component explained by differences in the mean values of their individual characteristics which make up 10.43 lwp and an unexplained component of 1.29 per cent. The two components summing (with rounding error) to the earnings gap of 11.73 lwp. This decomposition clarifies the previous result that the higher hourly wages public sector males earn over private sector males primarily reflect the relatively more productive characteristics the former group possesses (or, at least, characteristics associated with higher hourly pay). The unexplained component in their earnings gap is relatively small at 1.29 lwp or 11 per cent of the total wage gap.

When workplace specific fixed effects are included in the estimation, private sector employees can be seen to gain because they are more likely to be employed in a higher paying workplace (3.10 lwp). The decompositions otherwise show little change (panel one of table 5): the unexplained component rises slightly to 1.77 per cent (or 15 per cent of the total wage gap).

Decomposition results for the analysis for the occupational skill groups within and across sectors are presented in the lower panels of table 5. The (within skill but across sector) earnings gap between Highly Skilled public sector and Highly Skilled private sector full-time male employees in Britain can be seen to be very small at one log wage points, lwp. This suggests that Highly Skilled private sector workers earn a modest premium over their public sector counterparts when raw earnings gaps are considered. The unexplained gap in earnings is substantial between these workers at 5.5 lwp, especially if it is considered relative to the original gap in their raw earnings. The earnings gap between public sector and private sector Highly Skilled employees is therefore found to be due to the former having more productive characteristics (or at least characteristics that are more likely to be associated with higher pay). The size and sign of the negative unexplained component suggests that Highly Skilled employees in the private sector are being relatively over-rewarded for their characteristics: given the distribution of characteristics across the sectors, the observed earnings gap could be expected to be substantially larger than it is.

The gap for Unskilled employees in the public and private sectors is 13 lwp higher than the gap for Highly Skilled employees across the sectors, at 14 lwp. This gap is roughly equally divided between differences in the mean characteristics displayed by the two different groups of workers and differences in their returns to those characteristics (the unexplained component is 7.19 lwp or 51 per cent of the earnings gap). Implying that unskilled employees in the public sector have substantially higher earnings (as compared to their private sector counterparts) than would be expected given their levels of those characteristics that are commonly included in an earnings function.

Table 5 - Decomposing the Earnings Gaps

|  | <i>Earnings gap<br/>Lwp</i> | <i>Decomposition<br/>lwp</i> |
|--|-----------------------------|------------------------------|
| (i) All full time male employees                     | -11.73                      |                              |
| Differences in characteristics (explained)           |                             | -9.95                        |
| Differences in returns (unexplained)                 |                             | -1.8                         |
| <i>Within skill across sector</i>                    |                             |                              |
| (ii) high skill public and high skill private sector | -1.00                       |                              |
| Differences in characteristics (explained)           |                             | -6.5                         |
| Differences in returns (unexplained)                 |                             | 5.5                          |
| (iii) low skill public and low skill private         | -14.0                       |                              |
| Differences in characteristics (explained)           |                             | -6.4                         |
| Differences in returns (unexplained)                 |                             | -7.2                         |
| <i>Within sector across skill</i>                    |                             |                              |
| (iv) high skill private and low skill private        | -74.2                       |                              |
| Differences in characteristics (explained)           |                             | -22.6                        |
| Differences in returns (unexplained)                 |                             | -51.5                        |
| (v) high skill public and low skill public           | -61.2                       |                              |
| Differences in characteristics (explained)           |                             | -13.1                        |
| Differences in returns (unexplained)                 |                             | -48.3                        |

*Source:* WERS, 2004. For each total bilateral earnings gap the contribution of each group of variables is evaluated using the parameters from the model for the higher earnings group. All figures are expressed in log wage points.

Similar analyses can be carried out for the other bilateral earnings gaps<sup>12</sup> presented in table 4. There is a sizeable gap between Highly Skilled and Unskilled employees in the private sector, with the Highly Skilled earning 74.2 lwp more. Of this difference, the unexplained component is substantial at 51.53 lwp (or 70 per cent of the total earnings gap). The decomposition of the gap between Highly Skilled and Unskilled employees in the public sector is similar. The Highly Skilled earns 61.2 lwp more and, in this case, the unexplained component is even more substantial at 48.32 lwp (or 79 per cent of the total wage gap). The Highly Skilled in both sectors have much higher earnings (relative to their respective Unskilled counterparts) as would be expected given the relative levels of their characteristics that are commonly included in an earnings function.

In aggregate, across-sector but within-skill comparisons reveal that public sector employees are more likely to have individual characteristics associated with higher pay. Highly Skilled public sector employees are, however, less likely to work in high paying workplaces. In contrast, Unskilled employees in the public sector are more likely to work in higher paying workplaces.

<sup>12</sup> Unsurprisingly, given the information in table 5, the earnings gap between Highly Skilled public sector and Unskilled private sector employees is 75.2 lwp; the unexplained component is 55.38 lwp (of 74 per cent of the gap).

## 8. Conclusion

Public sector employees enjoyed an 8.9 per cent earnings premium over their private sector counterparts in Britain in 2004. Other things being equal, higher educated private sector employees receive a higher rate of return for education than do their public servant counterparts. The public sector rate of return associated with skilled occupations is however clearly higher than for their private sector counterparts. Introducing workplace specific fixed effects has little impact on the parameters for the public sector suggesting that workplace characteristics are not strongly related to the individual characteristics that are associated with wages in this sector.

In the private sector there is evidence of high wage workers being concentrated in high wage workplaces and vice versa and that this concentration is associated with earnings potential. For example, once the workplace specific effects are allowed for, being a trade union member is associated with lower earnings. Similarly, the lower parameters on training and higher education levels may indicate some segregation of high wage workers into high productivity workplaces.

Nevertheless, decomposition analysis shows that the majority of the public sector pay premium is associated with public servants being more likely to have individual characteristics associated with higher pay and to their working in higher paid occupations.

Within skill levels but across sectors, the public sector to private sector gap for the Highly Skilled is only 1 lwp; this is clearly considerably smaller than the public sector to private sector gap for the Unskilled which is 14 lwp. Within sectors but across skill levels, the earnings gaps are considerable: the Highly Skilled public sector to Unskilled public sector gap is 61.2 lwp, whilst the Highly Skilled private sector to Unskilled private sector gap is 74.2 lwp.

In aggregate, across-sector but within-skill comparisons further reinforce the finding that public sector employees are more likely to have individual characteristics associated with higher pay. Once these (and other observable factors which contribute to the wage gap) are taken into account, we find that for the Highly Skilled group, private sector employees earn a substantial premium over their public sector counterparts. By contrast, for the Unskilled Group, public sector employees earn a considerable premium over their private sector counterparts.

These findings suggest that there is no simple relationship between public sector pay and private sector pay. The High skilled receive a premium in the private sector and, at the opposite end, Unskilled public sector workers receive a premium over their private sector counterparts. The earnings inequality between the Highly Skilled group and the unskilled is however similar in the two sectors. In both, the premium for being in the Highly Skilled group compared to the Unskilled group is considerable at over 60 per cent. When managing public sector pay, these differences between the opposite ends of the occupational hierarchy are important characteristics of the labour market that need to be borne in mind.

## Appendix

Table A1 - Variable Definitions

| <i>Variable Name</i>             | <i>Variable Definition</i>   |
|----------------------------------|--|
| Hourly pay                       | Average pay [midpoints of 14 bands] divided by usual hours worked (including overtime)   |
| Log hourly pay                   | The natural log of average hourly pay  |
| Potential experience (years)     | Age minus (approximate years of schooling plus 5), measured in years.  |
| Training (days in previous year) | Days of training in the previous twelve months   |
| Education measures:              |  |
| minimal                          | Does not have any of the academic qualifications listed  |
| cse25                            | Lower level of middle secondary education generally taken by children aged 14 to 16 years: Highest level of education is General Certificate of Secondary Education (GCSE) grades D-G; Scottish Certificate of Secondary Education (CSSE) grades 2-5 Scottish Certificate of Education (SCE); O (ordinary) grades D-; Scottish Certificate of Secondary Education (SCE) Standard grades 4-7.   |
| cse1                             | Higher level of middle secondary education generally taken by children aged 14 to 16 years: Highest level of education is General Certificate of Secondary Education (GCSE) grades A-C; General Certificate of Education (GCE) O (ordinary) level passes; Certificate of Secondary Education (CSE) grade 1 Scottish Certificate of Secondary Education (SCE); O (ordinary) grades A-C; or Scottish Certificate of Secondary Education (SCE) Standard 1-3 |
| gceae                            | Lower level of upper secondary education generally taken by children aged 17 to 18 years: Highest level of education is General Certificate of Education (GCE) A (advanced)-level grades A-E; 1-2 Scottish Certificate of Education (SCE); Higher grades A-C, As (advanced) levels   |
| gce2ae                           | Higher level of upper secondary education generally taken by children aged 17 to 18 years: Highest level of education is 2 or more General Certificate of Education (GCE); A (advanced) levels grades A-E; 3 or more Scottish Certificate of Education (SCE); or Higher grades A-C   |
| Degree                           | Highest level of education is a first degree, eg BSc, BA, HND, HNC Ma at first degree level  |
| postgraduate                     | Highest level of education is a higher degree, eg MSc, MA, PGCE, PhD   |
| Child                            | Has a dependent child aged below 18  |
| Married                          | Married or living with a partner   |
| Disabled                         | Has a long term (>1 year) illness/disability   |
| Ethnic                           | Employee considers they are white and black Caribbean; white and black African; white and Asian; any other mixed background; Indian; Pakistani; Bangladeshi; any other Asian background; Caribbean; African; any other black background; Chinese; or any other ethnic group.   |

Table A1 - Variable Definitions (continued)

| <i>Variable Name</i>       | <i>Variable Definition</i>  |
|----------------------------|---|
| Fixed term                 | Employed on a fixed term contract   |
| Hours                      | Usual hours worked per week (includes over time)  |
| Tenure                     | Years at this workplace   |
| Union                      | Employee is a union member  |
| occupation categories;     |   |
| managerial                 | Managerial  |
| professional               | Professional  |
| technical                  | Technical   |
| clerical                   | Clerical  |
| craft                      | Craft service   |
| personal                   | Personal service  |
| sales                      | Sales and customer services   |
| operative                  | Operative and assembly workers  |
| unskilled                  | Unskilled   |
| Highly skilled occupations | Managerial, professional or technical occupation.   |
| Public sector              | The formal status of this establishment (or the organisation) is described as: government-owned limited company / nationalised industry/T); public service agency; other non-trading public corporation; quasi autonomous national government organisation (QUANGO); local/central government (inc. NHS and Local Education Authorities). |
| Private sector             | The formal status of this establishment (or the organisation) is described as: public limited company (plc); private limited company; company limited by guarantee; partnership (inc. limited liability partnership/self-prop); trust / charity; body established by royal charter; co-operative / mutual / friendly society.             |

*Source:* WERS 2004.

Table A2 - Sub Sample Means: By Skill Groups and Sector

|                          | Highly skilled |      |                |       | Unskilled     |      |                |      |
|--------------------------|----------------|------|----------------|-------|---------------|------|----------------|------|
|                          | Public Sector  |      | Private Sector |       | Public Sector |      | Private Sector |      |
|                          | Mean           | s.e. | Mean           | s.e.  | Mean          | s.e. | Mean           | s.e. |
| ln(hourly pay)           | 2.532          | 0.02 | 2.522          | 0.02  | 1.917         | 0.03 | 1.781          | 0.02 |
| Potential experience     | 25.454         | 0.48 | 22.478         | 0.36  | 29.332        | 0.94 | 24.721         | 0.88 |
| Training                 | 4.506          | 0.17 | 2.892          | 0.11  | 1.809         | 0.29 | 1.597          | 0.15 |
| Education measures;      |                |      |                |       |               |      |                |      |
| minimal                  | 0.102          | 0.01 | 0.110          | 0.01  | 0.457         | 0.03 | 0.486          | 0.03 |
| cse25                    | 0.061          | 0.01 | 0.069          | 0.01  | 0.164         | 0.03 | 0.154          | 0.02 |
| cse1                     | 0.181          | 0.02 | 0.205          | 0.01  | 0.191         | 0.03 | 0.180          | 0.02 |
| gceae                    | 0.039          | 0.01 | 0.041          | 0.01  | 0.031         | 0.01 | 0.034          | 0.01 |
| gee2ae                   | 0.076          | 0.01 | 0.093          | 0.01  | 0.094         | 0.02 | 0.047          | 0.01 |
| degree                   | 0.341          | 0.03 | 0.344          | 0.01  | 0.040         | 0.02 | 0.070          | 0.01 |
| postgraduate             | 0.195          | 0.02 | 0.127          | 0.01  | 0.008         | 0.01 | 0.015          | 0.01 |
| Vocational qualification | 0.748          | 0.02 | 0.625          | 0.02  | 0.457         | 0.04 | 0.419          | 0.01 |
| Child                    | 0.499          | 0.02 | 0.437          | 0.01  | 0.401         | 0.04 | 0.369          | 0.02 |
| Married                  | 0.799          | 0.02 | 0.742          | 0.01  | 0.740         | 0.03 | 0.591          | 0.02 |
| Disabled                 | 0.126          | 0.01 | 0.108          | 0.01  | 0.149         | 0.02 | 0.122          | 0.01 |
| Ethnic                   | 0.051          | 0.01 | 0.039          | 0.01  | 0.031         | 0.01 | 0.095          | 0.02 |
| Fixed term               | 0.049          | 0.01 | 0.024          | 0.004 | 0.008         | 0.01 | 0.029          | 0.01 |
| Tenure                   | 6.197          | 0.22 | 5.373          | 0.12  | 6.662         | 0.34 | 4.724          | 0.23 |
| Union                    | 0.722          | 0.02 | 0.142          | 0.01  | 0.818         | 0.03 | 0.254          | 0.03 |
| No. observations         |                | 805  |                | 2095  |               | 222  |                | 640  |

Source: WERS 2004.

## References

- Almeida-Santos, F., Chzhen, Y. and Mumford, K. (2010), 'Employee Training and Wage Dispersion: White and Blue Collar Workers in Britain.' *Research in Labour Economics*, 30, 35-60.
- Bayard, K., Hellerstein, J., Neumark, D. and Troske, K. (2003), 'New Evidence of Sex Segregation and Sex Differences in Wages from Matched Employee-Employer Data.' *Journal of Labor Economics*, 21, 887-922.
- Becker, G.S. (1962), 'Investment in Human Capital: A Theoretical Analysis', *Journal of Political Economy*, 70, 9-49.
- Becker, G.S. (1964), *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*, The University of Chicago Press, Chicago.
- Bender, K.A. and Elliot, R. (1999), 'Relative Earnings in the UK Public Sector: The Impact of Pay Reform on Pay Structure' in *Public Sector Pay Determination in the European Union*, (ed.) by Elliot, R., Lucifora, C. and Meurs, D., Macmillan 1999.
- Blackaby, D. Murphy, P. and O'Leary, N. (1999), 'The Payment of Public Sector Workers in the UK: Reconciliation with North-American Findings', *Economics Letters*, 65, 239-243.
- Borland, J., Hirschberg, J. and Lye, J. (1998), 'Earnings of Public Sector and Private Sector Employees in Australia: Is There a Difference?,' *Economic Record*, 74, 36-53.
- Burgess, S. and Metcalfe, D. (1999), 'The Use of Incentive Schemes in the Public and Private Sectors: Evidence from British Establishments', CMPO Working Paper 99/015.
- Burgess, S. and Ratto, M. (2003), 'The Role of Incentives in the Public Sector: Issues and Evidence', *Oxford Review of Economic Policy*, 19, 285-300.
- Chatterji, M., Mumford, K. and Smith, P.N. (2011), 'The Public-Private Sector Gender Wage Differential in Britain: Evidence from Matched Employer-Workplace Data', *Applied Economics*, 43, 3819-3833.
- Deaton, A. (1998), *The Analysis of Household Surveys. A Microeconomic Approach to Development Policy*, World Bank, John Hopkins University Press, Baltimore.
- Department of Trade and Industry (2006), *Workplace Employee Relations Survey: Cross-Section, 2004 (computer file)*, 5th (ed.) Colchester: The Data Archive (distributor), SN: 5294.
- Elliott, R.F., Lucifora, C. and Meurs, D. (1999), 'Public Sector Pay Determination in the European Union: Issues and Outcomes' in *Public Sector Pay Determination in the European Union*, (ed.) by Elliot, R., Lucifora, C. and Meurs, D., Macmillan.
- Heckman, J. (1979), 'Sample Selection Bias as a Specification Error', *Econometrica*, 47, 153-161.
- Kersley, B., Alpin, C., Forth, J., Bryson, A., Bewley, H., Dix, G. and Oxenbridge, S. (2006), *Inside the Workplace: First Findings from the 2004 Workplace Employment Relations Survey*.



- Luciflora, C. and Meurs, D. (2006), 'The Public Sector Pay Gap in France, Great Britain and Italy', *Review of Income and Wealth*, 52, 43-59.
- Makepeace, G. and Marcenaro, O. (2006), 'The Earnings of Workers Covered by Pay Review Bodies: Evidence from the Labour Force Survey', *Report for the Office of Manpower Economics*, <http://www.ome.uk.com/research.cfm>.
- Millward, N., Woodland, S., Bryson, A., Forth, J., Kirby, S. and Stokes, L. (2004), *A Bibliography of Research Based on the British Workplace Industrial Relations Survey Series*, London: National Institute for Economic and Social Research.
- Mumford, K. and Smith, P.N. (2009), 'What Determines the Part-Time and Gender Earnings Gaps in Britain: Evidence from the Workplace', *Oxford Economics Papers*, 61, 56-75.
- Nickel, S. and Quintini, G. (2002), 'The Consequences of the Decline in Public Sector Pay in Britain: A Little Bit of Evidence', *Economic Journal*, 112, F85-F118
- Oaxaca, R.L. and Ransom, M.R. (1994), 'On Discrimination and the Decomposition of Wage Differentials', *Journal of Econometrics*, 61, 5-24.
- Oaxaca, R.L. and Ransom, M.R. (1999), 'Identification in Detailed Wage Decomposition', *Review of Economics and Statistics*, 81, 154-157.
- Stewart, M. (1983), 'On Least Square Estimation when the Dependent Variable is Grouped', *Review of Economic Studies*, 50, 737-753.
- Yu, K. Vam Kerm, P. and Zhang, J. (2005), 'Bayesian Quantile Regression: An Application to the Wage Distribution in 1990s Britain', *The Indian Journal of Statistics*, 67, 359-377.