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Tenure, Wage Profiles and Monitoring

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Abstract: Efficiency wage theory predicts that firms can induce worker effort by the carrot of high wages and / or the stick of monitoring worker performance. Another option available to firms is to *tilt* the remuneration package over time such that the lure of high future earnings acts as a deterrent to current shirking. In this paper we undertake the first empirical investigation of this relationship between the slope of the wage-tenure profile and the level of monitoring. On the assumption that firms strive for the optimal trade-off between these various instruments, we hypothesise that increased monitoring leads to a decline in the slope of the wage-tenure profile. Our empirical analysis, using two cross sections of matched employer-employee British data, provides robust support for this prediction.

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1. Introduction

> Personnel economics has grown over the past twenty years to become a major branch of labour economics. Although much has been learned, many important questions remain. For example, are worker wage profiles dependent on individual attributes or is the firm more important in determining wage growth. [Lazear (2000), p.611].

A firm has a number of weapons in its arsenal that it can use to raise worker productivity. It can establish a tournament competition in which a rank-order prize structure awards the largest prize to the most productive worker, the second-largest prize to the second-most productive worker, and so on [Lazear and Rosen (1981). It can implement contingent employment contracts in which wages are an increasing function of output, thereby educing effort as workers strive to maximize realized earnings net of effort [Mirrlees (1976), Holmstrom (1979)]. Or it can adopt a carrot and stick, efficiency-wage approach; paying a single wage that is independent of output but above the market clearing level, and dismissing any worker it detects as providing inadequate performance [Shapiro and Stiglitz (1985)].[1]

Another line of attack available to the firm is to *tilt* the remuneration package over time, paying workers less than the value of their marginal product when they are relatively short-tenured, and correspondingly more than the value of their marginal product when they are relatively long-tenured. Deferring compensation in this way imputes workers with *ex post* rents that they will be reluctant to jeopardise. If reducing effort increases the probability of involuntary termination, then upward sloping wage profiles raise the cost of shirking and encourage workers to raise effort.

A firm will therefore face optimal trade-offs between both the level and rate of change of remuneration and the quantity of resources it devotes to monitoring. The former trade-off, between the level of remuneration and monitoring, has been examined extensively in the literature. In this paper, however, we undertake the first empirical investigation of the latter

[1] The Shapiro-Stiglitz model regards worker effort as synonymous with productivity. This need not be the case. Other conduits through which efficiency wages might impact upon productivity include reduced turnover [Salop (1979), Stiglitz (1985)], adverse selection [Weiss (1980)] and worker morale [Akerlof (1982)].

trade-off; the relationship between the slope of the wage-tenure profile and the level of monitoring. On the assumption that firms strive for the optimal trade-off between these various instruments, we hypothesise that increased monitoring leads to a decline in the slope of the wage-tenure profile. Our empirical analysis, using two cross sections of matched employer-employee British data, provides robust support for this prediction.

The paper is set out as follows: Section 2 discusses the wage-seniority nexus; Section 3 outlines our theoretical underpinning whilst Section 4 discusses our data and methodology, Section 5 sets our preliminary analysis and Section 6 presents a number of robustness checks. The relationship between wages profiles and firm size is addressed in Section 7. And some final comments are collected in Section 8.

2. The Wage-Seniority Nexus

Efficiency wage theory predicts that firms can elicit effort from their employees by paying supra-competitive (i.e. efficiency) wages and / or by devoting resources to monitoring. Jobs in which it is difficult to monitor worker performance will generally merit high pay, and vice versa. This trade-off between the *level* of remuneration and monitoring - a central tenet of Bulow and Summer's (1986) dual labour market hypothesis - has been examined extensively in the empirical literature. Supportive evidence (among others) is offered by Cappelli and Chauvin (1991), Ewing and Payne (1999), Groshen and Krueger (1990), Konings and Walsh (1994), Krueger (1991), Kruse (1992), Machin and Manning (1992), Moretti and Perloff (2002), Raff and Summers (1987), Rebitzer (1995) and Vroman (1990). Less sympathetic conclusions are drawn by Neal (1993), Fitzroy and Kraft (1986) and Brunello (1995).[2]

[2] Recent theoretical work has questioned the notion that monitoring and pay are *generally* substitutable. Allgulin and Ellingsen (2002) argue that whilst lower monitoring costs induce a cut in the efficient wage, as firms substitute towards monitoring, this is only the case for a given level of effort. In such circumstances firms will typically find it optimal to demand a higher level of effort from their workforce, and the impact of this on the level of pay is ambiguous.

Another option available to the firm is to *tilt* the remuneration package over time such that pay increases with seniority. The correlation between seniority and pay is one of the most robust empirical findings in labour economics - for surveys of the theoretical and the empirical literature, see Carmichael (1989), Hutchens (1989), Polachek and Siebert (1992), and Lazear (2000). Conventional wisdom throughout most of the 1960s and 1970s as to the reason for the relationship was that earnings reflected the acquisition of, and reward to, human capital. Workers became more productive, and hence better remunerated, over time because of investments in training. Such investments could be either specific or general; the former increased a worker's productivity in the worker's current firm, whilst the latter increased a worker's productivity both in the worker's current firm and in any future firm. Worker's paid for general training, and subsidised specific training, by accepting early career (i.e. training) wages below the value of their marginal product to the firm. Latter career (i.e. trained) wages reflected the increase in worker productivity; fully in the case of general training and partially in the case of specific training. Since specific training is only of value within a worker's current firm, it is optimal for workers to neither pay the full cost nor reap the full benefit of such training - to do otherwise might tempt the firm into making redundancies in an attempt to replace trained with untrained workers. By paying a trained wage at a rate below the value of a trained workers' marginal product, firms are dissuaded from laying-off trained workers and, accordingly, workers are persuaded to participate in specific training programs. In either case an upward sloping wage profile emerges; wages increase with seniority because productivity increase with seniority [Mincer (1958), Becker (1962), Ben-Porath (1967)].

The human capital explanation was challenged in a series of papers by Lazear (1979, 1981, 1983) and Medoff and Abraham (1980, 1981). Lazear observed that mandatory retirement and actuarially unfair pension schemes that encourage early retirement were

incompatible with human capital theory. Why would firms establish human resource policies whereby an employee was paid, and thus evidently valued, today but then either forced or induced to quit tomorrow? Such policies contradict the human capital thesis that senior workers are paid no more than their marginal product, particularly when wages can be adjusted downwards if productivity declines with age.

Medoff and Abraham (1980, 1981) highlighted a related conundrum in their analysis of data on pay and supervisor performance ratings. They found that although relative performance ratings within a particular job grade did not increase with experience in the job grade, relative pay did. Again, such a finding is incompatible with the human capital position that earnings increase with seniority because productivity increases with seniority.

Several models of wage setting are able to explain the apparent failings of the human capital model. Freeman (1977) and Harris and Holmstrom (1982) develop models in which risk averse workers prefer upward sloping wage profiles because they offer insurance against the possibility that the workers' future productivity is lower than anticipated. Another possibility is that workers prefer rising consumption profiles over their life cycle but find voluntary saving difficult. Upward sloping earnings profiles are therefore desirable because they represent a mechanism for forced-saving [Loewenstein and Sicherman (1991), Frank and Hutchens (1993), Neumark (1995)]. And models of job search generally predict that more time in the labor market increases the chance of finding a better match and thus tends to be associated with higher earnings [Ruhm (1991), Jacobson and LaLonde (1993), Manning (2000)].

Perhaps the most persuasive explanation is the agency approach developed by Lazear (1979, 1981, 1983). Lazear reconciled the various phenomena by focussing on contracts that discourage employee shirking and other malfeasance over an employee's life cycle, especially in situations where monitoring worker effort is problematic. The basic idea is that

workers and firms enter into contracts, implicit or explicit, whereby workers are paid less than the value of their marginal product when they are in the early years of their job tenure, and correspondingly more than the value of their marginal product when they are in their latter years. By deferring compensation in this way, workers are provided with *ex post* rents that they are reluctant to lose. If reducing effort increases the probability of involuntary termination, then upward sloping wage profiles raise the cost of shirking and encourage workers to raise effort.

Lazear's explanation cuts the link between productivity and pay; wages grow with seniority irrespective of how product relates to seniority. And whilst it makes sense for the firm to pay wages in excess of the value of a worker's marginal product for a period of time, it would not make sense for the firm to do this indefinitely. There will come a point when the present discounted value of the worker's marginal product equals the present discounted value of his remuneration package. This would imply, from the firm's perspective, an optimal retirement date and hence the need for policies to force or encourage the worker's retirement.

The question as to whether it is human capital or agency considerations that drive the wage profile is not entirely academic. If human capital explanations are found wanting and agency considerations dominate, then issues arise concerning the credibility of long-term employment contracts. Firms will want to lose senior workers who are more expensive but perhaps not more productive. This could lead to time-consistency problems, with some firms finding it difficult to attract younger applicants because of their inability to guarantee long-term employment. If, on the other hand, the slope is primarily a reflection of human capital considerations, then such incentive-compatibility problems will not arise - older workers will

be more productive *ceteris paribus*. In this case, the wage profile provides some indication of the return to investments in on-the-job training and education.[3]

Several studies have attempted to discriminate empirically between the two explanations. Hutchens (1987) focuses on the implicit trade off between the use of deferred payment contracts and the difficulty of monitoring and finds that Lazear-type characteristics (i.e. wage profiles, mandatory retirement, pension schemes, long job tenures) tend not to be associated with jobs that are conducive to monitoring.

Lazear and Moore (1984) address the issue by considering the empirical evidence regarding the relative 'flatness' of self-employed workers' wage profiles [Wolpin (1977), Fuchs (1981)]. Such a finding is puzzling since investments in physical capital would tend to depress observed wages for the early career self-employed, whilst subsequent returns to those investments would tend to raise observed wages. Both factors imply that, other things equal, the wage profiles of self-employed workers will be steeper than those of wage and salary workers.

Lazear and Moore (1984) rationalize the finding by highlighting the duality of principal and ownership intrinsic to self-employment. Observed wage profiles, they argue, are a reflection of the disharmony of interests prevalent in the employment relation that are, by definition, absent from self-employment. By raising the wage profile, employers are able to induce their employees to work harder, therefore raising the present value of the latter's lifetime earnings. The self-employed require no such internal incentive mechanism and thus may be used as a control group to test the theoretical prior that the profile is determined primarily by agency as opposed to human capital considerations.

Brown and Sessions (2006) generalise Lazear and Moore's approach by comparing the wage profiles of self-employed workers, wage and salary workers, and workers employed

[3] The profile may also affect quitting behavior. More experienced 'generally' trained workers will have more flexibility in the labor market than 'specifically' trained workers. But both types may have more options than senior workers whose rents primarily reflect agency considerations.

under performance related pay schemes. The latter, they argue, face an intermediate degree of agency consideration as compared to the two former, and if agency considerations are important then their profile should lay between those of self-employed workers and wage and salary workers. Both studies find convincing empirical support – Lazear and Moore from U.S. data, Brown and Sessions from British data - for the argument that agency considerations are extremely important in driving the profile.

In what follows we provide a further test of Lazear's arguments by focussing on the relationship between the slope of the earnings profile and the resources the firm devotes to monitoring. Setting out a simple, two-period model of efficiency wages that abstracts from considerations of human capital, we illustrate the relationship between monitoring and the wage-tenure profile. Our exposition suggests that there is a trade-off between current period monitoring and the slope of the profile, which we then test empirically using two cross sections of British matched employer-employee data. This is the first formal empirical investigation into what remains one of the key issues in labour economics. Our results provide robust support for the hypothesis that firms trade-off the quantity of resources they devote to monitoring against the slope of the wage profile.

In using matched employer-employee data we also contribute to the fast growing literature that is used matched employer employee data to obtain a better understanding of the workings of the labour market [Arai (2003), Barth (1997), Hellerstein and Neumark (1995), Hellerstein *et al*. (1999)].

3. Theoretical Underpinning

Assume for ease of analytical exposition that workers are homogenous risk neutral with a working life of two periods and separable periodic utility functions $u_t = m_t - e_t$, t = 1, 2, where m_t and e_t denote income and effort respectively in period t. Assume further that

employed workers make a discrete, all or nothing choice regarding the provision of effort to their employer such that $e_t = (0, \bar{e})$, where $\bar{e} > 0$. Firms have access to some monitoring technology defined through the function $p(k)$, where *k* denotes the value of resources devoted to monitoring and $p(k) \in [0,1]$ the probability that a shirker (i.e. a worker setting $e_t = 0$) will be detected. To avoid unnecessary complications, we assume that the criteria on which this judgement is based are verifiable by an independent arbitrator such that there is no dispute about the firm's assessment. We assume that monitoring technology is such that $dp(k)/dk \equiv p'(k) > 0$, $d^2 p(k)/dk^2 \equiv p''(k) < 0$, $p(0) = 0$ and $p(\tilde{k}) = 1$. It is thus technically possible for the firm to perfectly monitor worker performance. Since our focus of interest is not the optimal level of monitoring, we assume that production and monitoring technologies are such that it is always in the interests of the firm to monitor imperfectly. Detection implies instantaneous dismissal and unemployment utility *b*.

There are two types of firms. One type of firms is able to obtain revenue from a worker in a single period via the function: $y = f(e)$, where $f(0) = 0$ and $f(\bar{e}) = y < \tilde{k}$. These firms offer single-period, 'spot-market' employment contracts of the form $(w, \bar{e})$. The other type of firms requires two periods of effort input from workers to produce revenue via the function: $y = g(e_1, e_2)$, where $g(\bar{e}, \bar{e}) = (1+\beta)y < \tilde{k}$, $\beta > 1$, and $g(\bar{e}, 0) = g(0, \bar{e}) = g(0,0) = 0$. These firms offer 'life-time' employment contracts of the form $(w_1, w_2, \bar{e}, \bar{e})$ and are obliged to set their monitoring intensity for two periods. One could envisage these firms as requiring a period of training on the part of the worker before any output is produced.

A 'spot' firm's problem is to maximize its profits subject to the constraints that workers receive at least their reservation wage, $w^r = \bar{e} + b$, and that, once employed, they do

not shirk. A 'spot-market' employment contract will therefore necessitate workers being paid the lowest wage that satisfies the single period 'non-shirking constraint' (NSC):

$$w - \bar{e} \geq p(k)b + \left[1 - p(k)\right]w \tag{1}$$

Satisfaction of (1) implies an optimal (*vis*. 'efficiency') wage of $w^*(k) = b + e/p(k) > w^r$, such that workers receive some employment rents but are just indifferent between shirking and not shirking.

Consider now the specification of a two-period 'lifetime' contract. In the second period of such a contract, firms offering such contracts will be faced with the same effort elicitation problem as those firms offering spot contracts such that $w_2^*(k) = w^*(k) = b + e/p(k)$ as before. In the first period, however, the firm can set w_1 such that the worker's *lifetime* NSC is satisfied:

$$w_1 + w_2^* - 2\bar{e} \geq p(k)2b + \left[1 - p(k)\right]\left(w_1 + w_2^* - \bar{e}\right) \tag{2}$$

Undetected shirkers enjoy utility of w_1 now and $w_2^* - \bar{e}$ tomorrow - i.e. given w_2^*, workers will not shirk in period two. Note the assumption that detected shirkers are fired and forced into *permanent* unemployment. This is an expository device. Allowing a more realistic scenario whereby detected shirkers receive unemployment benefits in period one and then have a chance of obtaining a (single period) employment contract in period two would not change our qualitative results. Satisfaction of (2) implies an equilibrium first period wage of $w_1^* = b + \bar{e}$, with workers acquiring rents on account of the firm's inability to perfectly monitor. The firm, however, can reduce these rents by offering lifetime contracts that induce workers to queue up to access the second period wage that exceeds their reservation utility.

Since it is in the firm's interest to pay neither more nor less than the efficient wages levels $w^* = \left(w_1^*, w_2^*\right)$ derived from the two non-shirking constraints, we can substitute them directly into the firm's profit function:

$$\pi\left(w^*, k\right) = \beta y - \left[w_1^* + w_2^* + c\left(k\right)\right]$$
$$\Rightarrow \tag{3}$$
$$\pi^*\left(k\right) = \beta y - \left\{2b + \left[\frac{1 + p\left(k\right)}{p\left(k\right)}\right]\overline{e} + c\left(k\right)\right\}$$

Although the firm is obliged, if it wishes to produce revenue, to pay workers their efficient wages, it can reduce these efficient wages by increasing the resources it devotes to monitoring. The firm will thus optimise profit with respect to *k* by equating the marginal benefit and marginal cost of increasing the quantity of resources devoted to monitoring:

$$\frac{\partial \pi^*\left(k\right)}{\partial k} = \frac{p'\left(k^*\right)}{\left[p\left(k^*\right)\right]^2} - c'\left(k^*\right) = 0 \tag{4}$$

Workers employed under lifetime contracts thus face an upward sloping earnings profile:

$$\Delta w^*\left(k^*\right) = w_2^*\left(k^*\right) - w_1^* = \left[\frac{1 - p\left(k^*\right)}{p\left(k^*\right)}\right]\overline{e} > 0 \tag{5}$$

It is apparent from equation (5) that increased monitoring on the part of the firm assuages the slope of the experience-earnings profile:

$$\frac{\partial \Delta w\left(k^*\right)}{\partial k^*} = -\frac{p'\left(k^*\right)}{\left[p\left(k^*\right)\right]^2}\overline{e} < 0 \tag{6}$$

The above illustration is, clearly, highly simplified. Complications to the basic story could, for example, involve risk-averseness on the part of the worker. In such a situation, workers

would prefer relatively flatter profiles, other things equal, especially if it is possible for the firm to make a type-2 error and inadvertently fire a non-shirker, if there is a chance that the firm will default on its promise of future high wages, or if the firm's survival in future periods is not guaranteed. Such risk would be especially pronounced in relatively smaller firms that, other things equal, will be more likely to go out of business and whose promise of future wage premia will be, consequently, less credible.

There is also the assumption that the choice over effort is dichotomous. In more general, continuous effort settings, the relationship between the level of pay and monitoring is less clear-cut. Essentially, changes in the cost of monitoring will invoke both substitution and scale effects. An increase in the cost of monitoring will induce firms to place a greater reliance on wage incentives, but it may also lead to a reduction in the desired level of effort itself, and this latter effect may conceivably outweigh the former [Rebitzer (1995), Walsh (1999), Goerke (2001), Allgulin and Elllingson (2002)]. Empirical analysis of this issue suggests that supervision has a significant and negative impact on the wages of high-effort workers, but not on the wages of low-effort workers [Strobl and Walsh (2007)].

The relationship between monitoring and the experience-earnings profile under continuous effort is, to our knowledge, still to be investigated. A trade-off between the *level* of monitoring and the slope of the earnings profile has been found in more complex dichotomous effort models – see, for example, Lazear (1981), Arvan (1989) and Bai (1997).

Finally, firms evidently do not restrict themselves to simple 'detect and fire' technologies but often employ more sophisticated incentive schemes such as performance related pay, career tournaments, profit sharing and employee share-ownership. Although we do not investigate such considerations here, we do control for a number of workplace incentive schemes in our empirical analysis.

4. Data and Methodology

4.1 Data

Our data are derived from the 1998 and 2004 *Workplace Employee Relations Survey* (*WERS*). These are the fourth and fifth instalments of a Government funded series of cross-section surveys conducted at British workplaces. The previous surveys were conducted in 1980, 1984 and 1990.

The sample of workplaces was randomly drawn from the Interdepartmental Business Register (*IDBR*). This is maintained by the Office for National Statistics (ONS) and is considered to be the highest quality-sampling frame of workplaces available in the United Kingdom. The sample is stratified by workplace size and industry and larger workplaces and some industries are over represented [see Chaplin *et al*. (2005)]. A workplace is defined as the activities of a single employer at a single set of premises.

The survey comprises three main sections: The 'Management Questionnaire' (face-to-face interviews with senior managers with day-to-day responsibility for employee relations); the 'Worker Representative Questionnaire'; and the 'Employee Questionnaire'. The survey population for the Management Questionnaire is all British workplaces barring those in agriculture, hunting and forestry, fishing, mining and quarrying, private households with employed persons, and extra-territorial organisations. [4]

The response rate in the 1998 (2004) Management Questionnaire was 80% (64%). The respective figure for the Employee Questionnaire was 66% (61%) – see Airey *et al*. (1999) and Kersley *et al*. (2006) for discussions as to why the response rates differ. At those workplaces responding to the manager survey, a questionnaire was presented to 25 randomly

[4] There is a panel element to *WERS*, but it only provides information on a subset of establishment characteristics, not on employees.

selected employees in workplaces with more than 25 employees, or to all the employees in workplaces with fewer than 25 employees.

Changes in the nature of interest in employment relations led to substantial redesign of the 2004 wave. A major modification was the incorporation of small workplaces (i.e. those employing between 5 and 9 employees). There were also a number of changes to the format of the various survey questions [see Kersley *et al*. (2006)].

For the purposes of our study, we combine the data from the Management and Employee Questionnaires. Thus, our 1998 (2004) sample comprises 19847 (16773) employees linked to a set of 1762 (1705) establishments. Due to the stratified nature of the survey, we weight our estimates using establishment level weights so that our estimates are representative of the sampling population.

4.2 Methodology

Our equation of interest is:

$$w_{ij} = \alpha + \beta_0 t_{ij} + \beta_1 t_{ij}^2 + \beta_2 m_j + \beta_3 \left(t_{ij} \cdot m_j \right) + \beta_4 \mathrm{X}_{ij} + u_{ij} \qquad (7)$$

where $i = 1,...,M$ and $j = 1,...,N$ denote individual worker and firm-specific subscripts respectively. The dependent variable, w_{ij}, denotes the log weekly wage earned by individual *i* at firm *j*, t_{ij} denotes the employment tenure of individual *i* at firm *j*, m_j denotes the level of monitoring within firm *j*, X_{ij} denotes a vector of individual regressors and u_{ij} denotes the error term.

Earnings are recorded as a categorical variable in *WERS*. The specific question in both surveys is:

> *How much do you get paid for your job here, before tax and other deductions are taken out? If your pay changes before tax from week to week because of overtime, or because you work different hours each week, think of what you earn on average.*

Respondents in the 1998 survey were asked to place their weekly pay level within 12 bands, chosen to approximate decile bands and the top and bottom 5% of the earnings distribution as estimated from the 1996 *New Earnings Survey*. The available bands were: less than £50, £51-£80, £81-£140, £141-£180, £181-£220, £221-£260, £261-£310, £311-£360, £361-£430, £431-£540, £541-£680, £681 or more. The number of bands was increased to 14 in 2004: less than £50, £51-£80, £81-£110, £111-£140, £141-£180, £181-£220, £221-£260, £261-£310, £311-£360, £361-£430, £431-£540, £541-£680, £681-£870, £871 or more. Given the categorical nature of the wage variable, we estimate equation (7) via an interval regression model. We construct *lower* and *upper* bounds of wages by taking the midpoints of each band and then aggregating.

We proxy monitoring intensity *via* the proportion of supervisory employees within the firm. A similar approach has been adopted by a number of researchers, for example Leonard (1987), Gordon (1990, 1994) and Neal (1993). Such an approach is not, however, uncontentious. Drago and Perlman (1989) support the use of supervision as a proxy for monitoring, although they acknowledge that supervision may occur for non-monitoring purposes - for example, to co-ordinate production. Indeed, monitoring may not entail direct supervision but may instead rely on factors such as output measurement and piece rates. More problematic, the number of supervisors might be high because monitoring is difficult [Allgulin and Ellingsen (2002)] and supervisors may spend only a fraction of work time monitoring [Rebitzer (1995)]. Despite these problems, our data compel us to rely on the proxy defined above.

Supervisors, which include foremen and line managers, are defined in the *WERS* as '… those people directly concerned with the detailed supervision of work'. The specific variable (*Monitoring*) is derived from the following question asked in both the 1998 and 2004 'Management Questionnaire':

What proportion of non-managerial employees here have job duties that involve supervising other employees? (BINVMANG).

Managers were asked to indicate in which range their firm lay: 0% ('None'), 1 – 19% ('Just a few'), 20 – 39% ('Some'), 40 – 59% ('Around half'), 60 – 79% ('Most'), 80 - 99% ('Almost all') and 100% (All). From this information, we constructed a 7-point supervision index ('*Monitoring'*) where 6 (0) represents the highest (lowest) level of monitoring. The distribution of the index across the sample of firms in 1998 (2004) is as follows: 0 [223 (319) firms], 1 [1,009 (967) firms], 2 [600 (680) firms], 3 [166 (197) firms], [85 (73) firms], 5 [47 (28) firms], and 6 [51 (16) firms].[5] Full variable definitions and summary statistics for the explanatory variables are detailed in Tables 1-4 (Appendix).

Given that firms set wages and monitoring jointly as part of their profit-maximising strategy, we instrument monitoring by estimating a fitted version of equation (7):

$$w_{ij} = \alpha + \beta_0 t_{ij} + \beta_1 t_{ij}^2 + \beta_2 \hat{m}_j + \beta_3 \left(t_{ij} \cdot \hat{m}_j \right) + \beta_4 \mathrm{X}_{ij} + \varepsilon_{ij} \tag{8}$$

$$\hat{m}_j = \beta_5 \Theta_j + \delta_j \tag{9}$$

$\hat{m}_j$ denotes the 'fitted' level of monitoring within firm *j* and Θ_j is a vector of explanatory variables that influence this level of monitoring. We experimented with a number of firm-specific explanatory variables in estimating equation (9). Our results were robust to this experimentation and our preferred specification is set out in Table 5 (Appendix).

We test for the exogeneity of the endogenous variable (*Monitoring*) in equation (8) using the weak test of erogeneity proposed by Smith and Blundell (1986). As suggested by Gourieroux *et al*. (1987), we calculate the generalised residuals from the first-stage ordered probit regression equation (9), and then insert these into the second-stage interval regression

[5] There is clearly an issue as to managers reporting that either 'all' or 'none' of their non-managerial employees were involved in supervision. The former firms might be worker-owned cooperatives of some form whilst the latter could be employing some other means of monitoring worker performance. For an excellent discussion between different types of firms and monitoring see Alchian and Demsetz (1972).

equation (8). For both the 1998 and 2004 samples, we are unable to reject the null hypothesis that the generalised residuals have no explanatory variable.[6]

Because we predict monitoring from an ordered probit model (non-linear model) and then interact the predicted value of monitoring with tenure, we test the statistical significance of the interaction variable (*Fitted Monitoring*Tenure*) using the following procedure (see Cameron and Trivedi, 2005): For each sample, we first draw a bootstrap resample of size equal to the original sample size with replacement and compute the parameter of the interaction variable. We then simulate this procedure using 1000 replications. For both the 1998 and 2004 samples, we are able to reject the null hypothesis that the interaction variable is equal to zero at the 5 percent level. The *p*-value of the interaction variable in the 1998 sample is equal to 0.035 and in the 2004 sample is equal to 0.019.

5. Results

Our preliminary regression results are set out in Table 6 (Appendix).[7] The regressions for both samples are well specified and the estimated coefficients are consistent with the standard human capital model of wages. Wages increase concavely with job tenure and are positively and significantly related to educational attainment and the amount of training undertaken in the previous twelve months. We also note significant occupational differentials and evidence of racial and gender bias. There are significant and positive returns to trade union membership whilst fixed-term and temporary employees receive lower wages than their full-time counterparts, other things equal. In terms of firm characteristics, pay is higher in larger

[6] For 1998, the coefficient of the generalized residual is -0.004 (*t*-test = -0.10) whilst for 2004, the coefficient of the generalized residual is -0.042 *(t*-test = -0.80). Graphical representations of the generalized residuals using a kernel density show that they follow a normal distribution.

[7] Our results for 2004 are based on a sample of all workplaces surveyed. Restricting the sample to establishments with more than 10 employees, in order to render the sample comparable with the 1998 sample, does not affect our results. These results are available on request.

firms but lower in firms the more skewed the age demographic and in firms with a higher percentage of part-time employees.

In terms of our key regressor, it is evident that higher fitted monitoring (*Fitted Monitoring*) impacts negatively on the slope of the wage profile in both samples. In 1998, a unit increase in *Fitted Monitoring* reduces the slope of the wage profile by 0.8 percent for each year of tenure, whilst in 2004, a unit increase in *Fitted Monitoring* reduces the slope of the profile by 1.0 per cent for each year of tenure. Increased monitoring, therefore, not only reduces the slope of the wage tenure profile, but it does so more for employees with longer tenure.

The effect of monitoring on the shape of the wage-tenure profile is illustrated graphically in Figure 1 for our 1998 sample and in Figure 2 for our 2004 sample. In Figure 1, we simulate four wage-tenure profiles representing four values of our 'fitted' monitoring variable (i.e. *Fitted Monitoring* = 0, *Fitted Monitoring* = 1, *Fitted Monitoring* = 1.5 and *Fitted Monitoring* = 2.0). These values are within the range of *Fitted Monitoring* for 1998. In Figure 2, we undertake a similar exercise, with the four *Fitted Monitoring* values equal now to 0, 0.2, 0.4 and 0.6 respectively. Again, these values are within the range of *Fitted Monitoring* for 2004. For ease of graphical exposition, we set the constants in both graphs equal to zero.

It is clear from Figure 1 and Figure 2 that even when we control directly for human capital and demographic variables, and indirectly for a battery of firm-specific variables, there is a significant and consistent negative relationship between monitoring and the slope of the wage profile. In Figure 1, wages peak at 14.2 years of tenure when *Fitted Monitoring* = 0. When *Fitted Monitoring* = 1, the peak occurs at 11.9 years, falling to 10.8 years and 8.3 years as *Fitted Monitoring* = 1.5 and *Fitted Monitoring* = 2 respectively. In Figure 2, wages peak at

13.7, 12.7, 11.8 and 10.8 years of tenure as *Fitted Monitoring* = 0.0, 0.2, 0.4 and 0.6 respectively.

Our results also exhibit an insignificant relationship between the level of monitoring (i.e. *Fitted Monitoring*) and *LnWage* in both 1998 and 2004. To investigate this further, we first set out in Table 7 (Appendix) cross tabulations between the natural logarithm of wages and our 'raw' monitoring variables (i.e. *Monitoring* 0 - *Monitoring* 6). It is apparent from comparing the first and the last rows of the table, that at the highest level of monitoring the mean value of the log wage is lower than it is when there is no monitoring. Such a result is consistent with a relationship in which workplaces that pay lower wages have higher levels of monitoring.

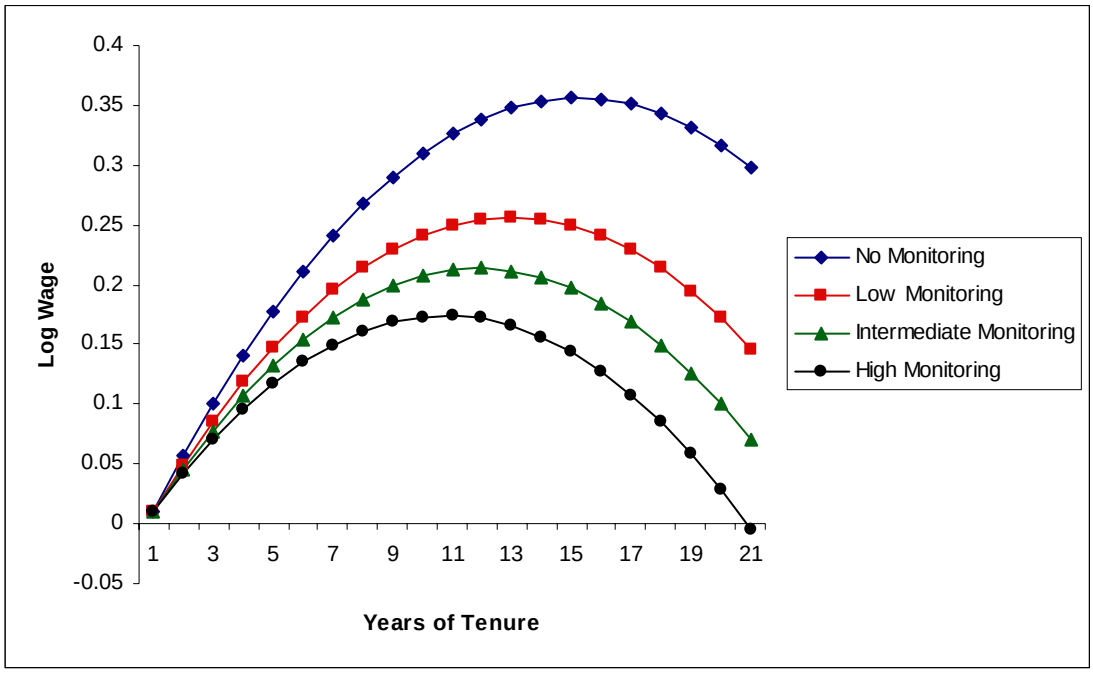

Figure 1: Wages, Monitoring and Tenure - 1998

Note: Low, Intermediate and High Monitoring are defined as when Fitted Monitoring is equal to 1.0, 1.5 and 2.0 respectively. These values are within the range of Fitted Monitoring for 1998.

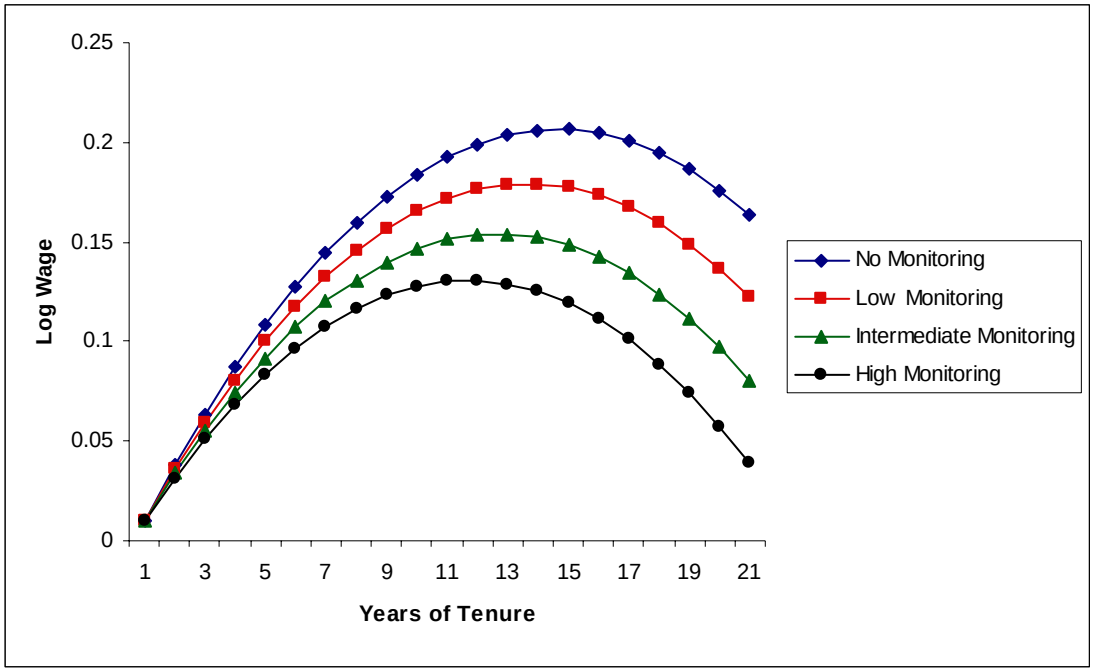

Figure 2: Wages, Monitoring and Tenure - 2004

Note: Low, Intermediate and High Monitoring are defined as when Fitted Monitoring is equal to 0.2, 0.4 and 0.6 respectively. These values are within the range of Fitted Monitoring for 2004.

We then re-estimated our Table 6 specifications replacing *Fitted Monitoring* and *Fitted Monitoring*Tenure* with six 'raw' monitoring dummy variables derived from the *Binvmang* survey question (i.e. *Monitoring* 1, *Monitoring* 2, *Monitoring* 3, *Monitoring* 4, *Monitoring* 5, *Monitoring* 6). Our results are set out in Table 8 and suggest that the quantity of resources devoted to monitoring do no affect the level of wages, other things equal; only in establishments in 1998 where managers record that 'around half' of all non-managerial employees have supervisory responsibility, are wages significantly lower than in otherwise comparable firms.

This result accords with the existing, somewhat ambiguous, evidence on the relationship between monitoring and wages [Cappelli and Chauvin (1991), Goerke (2001), Walsh (1999)]. Increased levels of monitoring have been found to impact both positively and negatively on wages, with negative effects being found for high effort workers [Strobl and Walsh (2007)].

6. Robustness

To examine the robustness of our findings regarding the relationship between monitoring and the earnings profiles, we estimate a series of regressions that incorporate additional regressors into our standard specification.

Firstly, we endeavour to capture as much unobserved individual heterogeneity in our data as possible by including (additively) a battery of demographic and occupational variables, as well as controls for alternative measures of workplace incentives that may mask the relationship between supervision and tenure. We do this by incorporating a number of variables into our standard (i.e. Table 6) interval regression to control for: age (*Age1 - Age5*); dependent children (*Dependent Children*); working hours (natural logarithm of weekly working hours); teamwork (*Teamwork2–Teamwork7*); performance related pay (*PRP1-PRP5*); (iv) training (Training% 1 - Training% 5); (iv) wage bargaining (*Wage-Bargain1–Wage-Bargain5*); productivity (*Productivity* 1–*Productivity* 6); (iv) pension schemes (*Pension Scheme*); personality and aptitude Tests (*Personality & Aptitude*). We also test for robustness with respect to the nature of the workforce by including managers and professional employees into our sample and by incorporating the following zero-one dummy variables into our standard (i.e. Table 6) interval regressions (*Manager* & *Professional*).

Our results for 1998 and 2004 are set out in Table 9 and Table 10 respectively. It is apparent that our key finding of an inverse relationship between fitted monitoring and the slope of the wage profile remains impermeable to the presence of these additional controls.

All of the robustness checks set out in Tables 9 and 10 take account of *within-firm* heterogeneity. Our results may, however, also reflect *between-firm* heterogeneity. It may be, the case, for example, that those firms which supervise more intensely tend to employ a generally older than average workforce, and also that they tend to pay everyone at the

establishment a generally below average wage. This would imply a spurious relationship between supervision, tenure and pay. We control for such *between-firm* heterogeneity by re-estimating in Table 11 our standard (i.e .Table 6) specification using a random effects model. It is evident that our estimates are also robust to this alternative specification, which would suggest that our results do not reflect any underlying spurious relationship between monitoring, tenure and pay.

We also control for any unobserved heterogeneity that is constant over time and correlated with independent variables by estimating a fixed effects model that wipes out individual firm characteristics, but which retains our *Fitted Monitoring*Tenure* interaction variable. Our results from this exercise are set out in Table 12, and it would appear that our key finding is again robust.

As a final robustness check we utilise information from the following question which is provided in the 2004, but not in the 1998 Employee Questionnaire:

> *Do you supervise any other employees? A supervisor, foremen or line manager is responsible for overseeing the work of other employees on a day to day basis (yes / no). (e13)*

Our aim here is to test whether our results are robust to an alternative, employee-recorded measure of supervision. Given the dichotomous nature the above question, we aggregated employees' responses to by establishment and used the derived variable to predict a 'fitted' value of monitoring using the same regressors as in Table 6. We then interacted this 'fitted' measure of monitoring with tenure. Our results from this exercise are set out in Table 13 and again emphasise the robustness of our central finding.

7. Wage Profiles and Firm Size

According to Lazear (1979), large firms are generally less likely to default on wage contracts, are generally less likely to go bankrupt, and are generally more concerned with reputation. In contrast, small firms are more likely to go out of business and to renege on promises of future

wage rents. We would therefore expect wage profiles observed in larger firms to be steeper than those observed in smaller firms. These later, being unable to procure employee effort by ostensibly vacuous assurances of higher future wages, should therefore place a heavier reliance on employee monitoring than their larger counterparts.

We empirically test this hypothesis by decomposing our analysis to 'small' and 'large' firms. In the 1998 sample, the average size of the firm is 62.6 employees whilst in the 2004 sample, the average size of the firm is 49.5 employees - see Table 14). In the 1998 sample, we therefore define 'small' firms to be those firms with less than 62.6 employees and 'large' firms to be those firms with at least 62.6 employees. Similarly, in the 2004 sample, we define 'small' firms to be those firms with less than 49.5 and 'large' firms to be those firms with at least 49.5 employees.[8]

We test Lazear's prediction by examining the relationship beween log wages, and *Fitted-Monitoring*, log wages and the *Fitted-Monitoring*Tenure* interaction, and also between log wages and a *Fitted-Monitoring*Tenure*Log Firm Size* triple interaction.[9]

Our results are set out in Table 14 and would appear to offer strong support for Lazear (1979). We find that small firms are more likely to monitor their employees than large firms. Somewhat surprisingly, the interaction between fitted monitoring and tenure is negative and significant in both samples only for small firms. The triple interaction term, however, is negative and significant in both samples, suggesting that the slope of the wage profile does indeed fall as firm size increases.

[8] The average size of the firms in the 2004 sample is smaller than in the 1998 sample, as the 2004 sample includes establishments with less than 10 employees (see Section 3).
[9] Note, fitted-monitoring is now our standard *BINVMANG* derived measure of monitoring.

8. Final Comments

Efficiency wage theory predicts that firms can elicit effort from their employees by paying supra-competitive (i.e. efficiency) wages and/or by devoting resources to monitoring. Another option available to firms is to tilt the remuneration package over time such that the prospect of higher future earnings acts as a deterrent to current period shirking. It follows, therefore, that a potential trade-off, and one not hitherto investigated in the literature, is that between the level of monitoring and the shape of the wage-tenure profile.

In what is the first empirical investigation of its kind, we have explored these predictions using two cross-section surveys of matched employer-employee British data. Our analysis finds robust evidence of an inverse relationship between the level of monitoring and the slope of the wage-tenure profile, and may be interpreted as further evidence in support of of efficiency wage theory. They also support the Lazear (1979, 1981, 1983) and Medoff and Abraham (1980, 1981) view that it is agency rather than human capital considerations that drive the wage-tenure profile.

It would appear from our results that British establishments elicit optimal effort from their employees by trading off higher current period monitoring against future wage rents. Whether or not firms in other countries replicate this strategy is an issue for future research.

Appendix

Table 1: Variable List and Definitions - Employee Questionnaire

Variable	*Definition*
Individual Characteristics	
Female	*Female: 0-1 dummy*
Ethnicity	*Ethnic minority: Black, Indian, Pakistani, Bangladeshi, Chinese: 0-1 dummy*
Single	*Current marital status: 0-1 dummy*
Disabled	*Long standing health problems or disabilities which limit work, home or leisure time: 0-1 dummy*
Academic Qualifications	
Low CSE	*GCSE (grades D-G): 0-1 dummy*
High CSE	*GCSE (grades A-C): 0-1 dummy*
A-Level	*A level or equivalent: 0-1 dummy*
Degree	*Undergraduate Degree or equivalent: 0-1 dummy*
Postgraduate	*Postgraduate degree or equivalent: 0-1 dummy*
Vocational	*Recognised vocational qualifications (i.e. trade apprenticeship): 0-1 dummy*
Job Characteristics	
LnWage	*Log Average Gross Weekly Wages*
Lower	*Log of lower bound of each of 12 wage bands, (14 bands in 2004)*
Upper	*Log of upper bound of each of 12 wage bands, (14 bands in 2004)*
Tenure	*Years of work at this workplace (mid-points of 5 bands)*
Tenure-Sq/100	*Tenure squared divided by 100*
Fixed-Term	*Employed on a fixed term contract: 0-1 dummy*
Temporary	*Employed on a temporary contract: 0-1 dummy*
Union Member	*Employee is a trade union member: 0-1 dummy*
Occupational Categories	
Technical	*Associate professional and technical: 0-1 dummy*
Clerical	*Clerical and secretarial (typist, postal clerk, secretary): 0-1 dummy*
Crafts	*Craft and skilled service (tool maker, electrician, fitter): 0-1 dummy*
Services	*Personal and protective service (police officer, bar staff): 0-1 dummy*
Sales	*Sales (till operator, sales assistant): 0-1 dummy*
Operatives	*Operative and assembly (assembly line worker, packer, truck driver): 0-1 dummy*
Training Dummies	
Training Days	*Numbers of days training received in past 12 months:*
Training Days ($TD = 0$)	*No days: 0-1 dummy*
Training Days ($0 \leq TD < 1$)	*Less than 1 day: 0-1 dummy*
Training Days ($1 \leq TD < 2$)	*1 to less than 2 days: 0-1 dummy*
Training Days ($2 \leq TD < 5$)	*2 to less then 5 days: 0-1 dummy*
Training Days ($5 \leq TD < 10$)	*5 to less than 10 days: 0-1 dummy*
Training Days ($TD \geq 10$)	*10 days or more: 0-1 dummy*

Table 2: Variable List and Definitions - Management Questionnaire

Variable	*Definition*
Establishment Characteristics	
Monitoring	*Percentage of non-managerial employees who are supervisors*
% Absence	*Percentage workdays lost through employee sickness or absence in last 12 months*
% Disabled	*Percentage of employees who are disabled*
% Dismissed	*Percentage of permanent employees dismissed the last 12 months (full and part time)*
% Entrants	*Percentage of new employees (new entrants)*
% Non-White	*Percentage of employees from non-white ethnic background*
% Part-Time	*Percentage of employees who are part-time*
% Quits	*Percentage of employees voluntarily quit last the 12 months*
% Redundant	*Percentage of permanent employees made redundant the last 12 months (full and part time)*
% Retired	*Percentage of employees retired in the last 12 months*
% Trade Union	*Percentage of employees who are trade union members*
Ln Size	*Log of the total number of employees at the establishment*
Missing Absence	*Missing information on absence rate: 0-1 dummy*
Human Resources	
Equal Opportunities	*Formal written policy on equal opportunities or managing diversity: 0-1 dummy*
New Technology	*Introduction of new technology over the last 5 years: 0-1 dummy*
Organisational Change	*Changes in the organization of work over the last 5 years: 0-1 dummy*
Long-Term Employment	*Strongly agree / agree that employees led to expect long-term employment in this organization: 0-1 dummy*
Organizational Values	*Strongly agree / agree that employees are fully committed to values of the organization: 0-1 dummy*
Non-Specified Help	*Strongly agree / agree that employees asked to help in ways not specified in their job: 0-1 dummy*
Manager Time	*Manager spends a major part of his time on employee relations matters: 0-1 dummy*
Freelance	*People presently working for this establishment on a freelance basis: 0-1 dummy*
Productivity Targets	*Productivity targets are set at the establishment: 0-1 dummy*
Absenteeism Targets	*Absenteeism targets are set at the establishment: 0-1 dummy: 0-1 dummy*
Job-Sharing Entitlement	*Non-managerial employees are entitled to job sharing schemes: 0-1 dummy*
Part-Time Entitlement	*Non-managerial employees are entitled to switch from full-time to part-time employment: 0-1 dummy*
Term-Time Entitlement	*Non-managerial employees are entitled to term-time only contracts: 0-1 dummy*
Home-Work Entitlement	*Non-managerial employees are entitled to work at or from home in normal working hours: 0-1 dummy*
Flexitime	*If the establishment has flexitime for any non-managerial employees: 0-1 dummy*
Zero-Hour Contracts	*If the establishment has zero-hour contracts for any non-managerial employees: 0-1 dummy*
Annualised Hours	*If the establishment has annualized hours for any non-managerial employees: 0-1 dummy*
Shift-Working	*If the establishment has shift working for any non-managerial employees: 0-1 dummy*
Short-Term Cover	*Establishment is using temporary agency employees for short-term cover for absence/vacancies: 0-1 dummy*
Long-Term Unemployed	*Special procedure to encourage applications from people unemployed for 12 months or more: 0-1 dummy*
Motivation	*Motivation is important when recruiting new employees: 0-1 dummy*
Joint Consultative Committee	*Joint consultative committee: 0-1 dummy*
Supervisory Authority	*Supervisors have authority to dismiss employees for unsatisfactory performance: 0-1 dummy*
References	*References are important when recruiting new employees: 0-1 dummy*
Personality & Aptitude	*Firms conduct pre-screening personality and/or aptitude tests: 0-1 dummy*
Industry Classification	
Construction	*Construction: 0-1 dummy*
Education	*Education: 0-1 dummy*
Financial	*Financial services: 0-1 dummy*
Health	*Health: 0-1 dummy*
Hotels and Restaurants	*Hotels and restaurants: 0-1 dummy*
Manufacturing	*Manufacturing: 0-1 dummy*
Other Businesses	*Other businesses: 0-1 dummy*
Public Administration	*Public administration: 0-1 dummy*
Transportation	*Transportation: 0-1 dummy*
Utilities	*Electricity, water, gas: 0-1 dummy*
Wholesale and Retail	*Wholesale and retail: 0-1 dummy*
Regional Dummies	*10 regional dummies (Standard Statistical Region)*
Teamwork	
Teamwork 1	*Some (20-39%) employees work in formally designated teams: 0-1 dummy*
Teamwork 2	*Just a few (1-39%) employees work in formally designated teams: 0-1 dummy*
Teamwork 3	*None (0%) employees work in formally designated teams: 0-1 dummy*
Workplace Relations	
Workplace Relations 1	*Good management-employee relationship: 0-1 dummy*
Workplace Relations 2	*Neither good nor bad management-employee relationship: 0-1 dummy*
Workplace Relations 3	*Poor management-employee relationship: 0-1 dummy*
Workplace Relations 4	*Very poor management-employee relationship: 0-1 dummy*

Table 2: Variable List and Definitions - Management Questionnaire (Continued)

Variable	*Definition*
Training	
Percentage Employees Trained	*Percentage of employees who received formal 'off-the-job' training over past 12 months*
Training% 1	*Almost all (80-99%): 0-1 dummy*
Training% 2	*Most (60-79%): 0-1 dummy*
Training% 3	*Around half (40-59%): 0-1 dummy*
Training% 4	*Some (20-39%): 0-1 dummy*
Training% 5	*Just a few (1-19%): 0-1 dummy*
Training% 6	*None (0%): 0-1 dummy*
Average Training in Days	*Average number of days employees spent in formal off-the-job training over past 12 months*
Training Days 1	*No training: 0-1 dummy*
Training Days 2	*Less than 1 day: 0-1 dummy*
Training Days 3	*1 to less than 2 days: 0-1 dummy*
Ownership	
Ownership Control 1	*Establishment is UK owned / controlled: 0-1 dummy*
Ownership Control 2	*Establishment is predominantly UK owned (51% of ownership or more): 0-1 dummy*
Ownership Control 3	*Establishment is UK and foreign owned: 0-1 dummy*
Ownership Control 4	*Establishment is predominantly foreign owned (51% of ownership or more): 0-1 dummy*
Single Establishment	*Establishment does not belong to another body: 0-1 dummy*
Owns/Control Subsidiaries	*Organization owns or controls subsidiary companies or establishments outside the UK: 0-1 dummy*
Proprietor / Owner	*Proprietor / owner/Managing director/Partner of the establishment;: 0-1 dummy*
Production & Supply	
Local market	*Establishment supplies goods to the local market: 0-1 dummy*
Regional market	*Establishment supplies goods to the regional market: 0-1 dummy*
National market	*Establishment provides goods to the national market: 0-1 dummy*
Downstream firm	*Establishment supplies goods to consumers: 0-1 dummy*
Upstream firm	*Establishment supplies goods to other companies: 0-1 dummy*
Internal firm	*Establishment supplies goods to other parts of organization to which it belongs: 0-1 dummy*
Non-Open Market	*Establishment does not supply goods for sale in the open market : 0-1 dummy*
High competition	*Degree of competition is high / very high: 0-1 dummy*
Just-In-Time	*System designed to minimize inventories, supplies or work in progress: 0-1 dummy*
Different goods	*Establishment produces different products or services: 0-1 dummy*
Wage Bargaining	
Wage Bargain 1	*Collective bargaining for more than one employer (e.g. industry-wide agreement) : 0-1 dummy*
Wage Bargain 2	*Collective bargaining at an organization level: 0-1 dummy*
Wage Bargain 3	*Collective bargaining at this workplace: 0-1 dummy*
Wage Bargain 4	*Pay set by management at a higher level in this organization: 0-1 dummy*
Wage Bargain 5	*Pay set by management at this workplace: 0-1 dummy*
Wage Bargain 6	*Pay determined by negotiation with individual employees: 0-1 dummy*
Wage Bargain 7	*Pay determined in some other way (e.g. pay review body) : 0-1 dummy*
Wage Bargain 8	*Pay determined by none of these methods: 0-1 dummy*
Other	
Old establishment	*Establishment operating at current or previous address for more than 5 years: 0-1 dummy*
Pension scheme	*Employees entitled to an employer pension scheme: 0-1 dummy*
Monitoring	
Monitoring	*% of non-managerial employees have job duties that involve supervising other employees?*
Monitoring 0	*0% ('None') : 0-1 dummy*
Monitoring 1	*1%– 19% ('Just a few') : 0-1 dummy*
Monitoring 2	*20% – 39% ('Some') : 0-1 dummy*
Monitoring 3	*40% – 59% ('Around half') : 0-1 dummy*
Monitoring 4	*60% – 79% ('Most') : 0-1 dummy*
Monitoring 5	*80% - 99% ('Almost all') : 0-1 dummy*
Monitoring 6	*100% ('All') : 0-1 dummy*
Workforce	
% Young	*Percentage of workforce that are 'young' (less than 20 years old)*
% Old	*Percentage of workforce that are 'old' (more than 51 years old)*
% Part-Time	*Percentage of workforce employed on part-time contracts*
Trade Union Density	*Percentage of workforce that are covered by a trade union agreement*
% Technical Staff	*Percentage of workforce that are employed as technical staff*
% Clerical	*Percentage of workforce that are employed as clerical staff*
% Craft	*Percentage of workforce that are employed as craft staff*
% Serpc	*Percentage of workforce that are employed as protective and personal service staff*
% Operative	*Percentage of workforce that are employed as operative and assembly staff*
% Sales	*Percentage of workforce that are employed as sales staff*
% Routine / Unskilled	*Percentage of workforce that are employed as routine / unskilled staff*
Unemployment-Vacancy	*Unemployment-vacancy rate by travel-to-work area*
Number of Employees	*Number of Employees*

Notes:
1. *Goods* refers to goods and / or services throughout;

Table 3: Descriptive Statistics: Establishment Characteristics[1]

	1998		*2004*	
	Mean	*Std Error*	*Mean*	*Std Error*
Industry				
Manufacturing	0.169	.0035	0.122	0.003
Utilities	0.003	0.000	0.001	0.000
Construction	0.049	0.003	0.037	0.002
Wholesale & Retail	0.203	0.003	0.200	0.002
Hotel & Restaurants	0.067	0.002	0.057	0.001
Transportation	0.055	0.002	0.052	0.001
Financial	0.047	0.001	0.053	0.001
Other Businesses	0.100	0.002	0.141	0.003
Public Administration	0.055	0.002	0.038	0.001
Education	0.077	0.001	0.067	0.001
Health	0.134	0.001	0.161	0.002
Region				
East Anglia	0.054	0.004	0.039	0.003
East Midlands	0.074	0.004	0.141	0.005
London	0.082	0.004	0.068	0.004
North East	0.053	0.003	0.101	0.004
North West	0.109	0.005	0.112	0.004
Scotland	0.094	0.004	0.085	0.004
South East	0.196	0.006	0.122	0.005
South West	0.101	0.005	0.087	0.004
Wales	0.035	0.002	0.110	0.004
West Midlands	0.115	0.006	0.039	0.003
Workforce				
Percentage Young	0.080	0.002	0.083	0.002
Percentage Old	0.155	0.002	0.219	0.003
Percentage Part-Time	0.309	0.005	0.324	0.004
Trade Union Density	0.240	0.004	0.191	0.003
% Technical Staff	0.055	0.002	0.083	0.002
% Clerical	0.172	0.003	0.168	0.003
% Craft	0.120	0.003	0.079	0.003
% Serpc	0.097	0.003	0.099	0.003
% Operative	0.099	0.003	0.090	0.003
% Sales	0.146	0.004	0.166	0.004
% Routine / Unskilled	0.124	0.003	0.110	0.002
Unemployment-Vacancy	3.615	0.022	3.339	0.031
Number of Employees	62.605	0.533	49.504	0.341
Number of Observations	19653		16773	

Notes:
1. Estimates are weighted.

Table 4: Descriptive Statistics – Individual Questionnaire

	1998		*2004*	
	Mean	*Std. Error*	*Mean*	*Std. Error*
Education				
Low CSE	0.146	0.004	0.113	0.003
High CSE	0.299	0.005	0.279	0.005
A-Level	0.148	0.004	0.145	0.004
Degree	0.074	0.003	0.139	0.004
Postgraduate	0.011	0.001	0.032	0.002
Vocational	0.368	0.006	0.560	0.006
Occupation				
Technical	0.107	0.005	0.194	0.006
Clerical	0.197	0.007	0.228	0.007
Crafts	0.130	0.006	0.100	0.006
Services	0.103	0.007	0.092	0.004
Sales	0.121	0.008	0.119	0.007
Operatives	0.166	0.010	0.112	0.006
Demographic				
Fixed-Term	0.027	0.002	0.027	0.002
Temporary	0.048	0.003	0.053	0.003
Minority	0.027	0.002	0.064	0.004
Female	0.519	0.011	0.528	0.008
Trade Union Member	0.389	0.012	0.314	0.009
Marries	0.674	0.006	0.647	0.005
Long-Term Illness	0.065	0.003	0.117	0.003
Training				
Training Days ($TD = 0$)				
Training Days ($0 \leq TD < 1$)	0.103	0.003	0.104	0.003
Training Days ($1 \leq TD < 2$)	0.127	0.003	0.141	0.004
Training Days ($2 \leq TD < 5$)	0.161	0.004	0.192	0.005
Training Days ($5 \leq TD < 10$)	0.075	0.003	0.080	0.003
Training Days ($TD \geq 10$)	0.081	0.004	0.076	0.003
Number of Observations	19653		16773	

Notes:
1. Estimates are weighted.

Table 5: Instrumenting Equation (Ordered Probit)

Dependent Variable: Monitoring

	1998		*2004*	
	Coefficient	*T-Stat*	*Coefficient*	*T-Stat*
Proprietor / Owner	0.136	0.91	-0.295	-2.12
Equal Opportunities	0.105	0.81	0.179	1.59
% Absence	0.009	1.57	0.002	0.30
Missing Absence	0.110	0.83	-0.056	-0.53
New Technology	-0.076	-0.69	-0.009	-0.11
Organizational Change	0.215	2.13	-0.029	-0.34
Workplace Relations 2	-0.034	-0.31	-0.051	-0.61
Workplace Relations 3	-0.051	-0.27	0.102	0.44
Workplace Relations 4	0.868	3.50	-0.520	-1.27
Workplace Relations 5	-2.803	-4.59	-0.391	-0.92
Long-Term Employment	-0.028	-0.22	0.026	0.27
Organizational Values	0.086	0.77	0.158	1.58
Non-Specified Help	0.130	1.34	-0.079	-1.01
Manager Time	-0.047	-0.37	-0.078	-0.84
Downstream Firm	0.149	0.62	0.042	0.42
Upstream Firm	0.254	0.98	-0.055	-0.46
Internal Firm	0.734	2.87	-0.158	-0.86
Non-Open Market	0.121	0.47	-0.921	-2.61
Freelance	-0.047	-0.33	0.114	0.71
Owns/Controls Subsidiaries	0.026	0.19	0.151	1.35
Just-In-Time	-0.007	-0.07	0.166	1.63
Different Goods	0.020	0.18	-0.070	-0.83
Productivity Targets	-0.166	-1.64	-0.135	-1.50
Absenteeism Targets	0.191	1.70	-0.094	-0.95
Job Sharing	0.059	0.46	0.068	0.78
Part-Time Entitlement	-0.106	-0.86	-0.151	-1.53
Term-Time Entitlement	0.460	3.35	0.165	1.81
Home-Work Entitlement	-0.106	-0.70	0.339	3.08
Flextime	-0.194	-1.52	-0.134	-1.56
Zero-Hours Contracts	-0.240	-0.99	0.104	0.65
Annualized Hours	0.139	0.88	0.355	3.06
Shift-Working	0.005	0.06	0.118	1.32
Short Term Cover	0.169	1.32	0.207	1.94
Long-Term Unemployed	-0.139	-0.72	-0.085	-0.37
Motivation	0.380	2.37	-0.076	-0.70
Joint Consultative Committee	0.334	3.16	0.233	2.71
% Entrants	0.327	1.64	0.054	0.21
% Dismissed	-1.454	-0.94	0.740	0.88
% Redundant	-0.523	-2.02	-1.404	-2.42
% Resigned	-0.003	-0.01	0.047	0.14
% Retired	-0.403	-1.14	0.125	0.36
% Disabled	3.671	2.07	0.173	0.22
Supervisory Authority	0.727	3.49	0.620	6.24
References	0.009	0.08	-0.004	-0.04
Cut Points				
Cut 1	-0.086	-0.259	-0.591	2.997
Cut 2	1.324	3.992	0.594	3.000
Cut 3	2.148	6.332	1.403	6.992
Cut 4	2.574	7.736	1.859	9.060
Cut 5	2.866	8.528	2.214	10.397
Cut 6	3.055	8.938	2.591	10.560
Number of Observations	2181		2280	
Wald Chi-Squared	146.02_{44}		152.12_{44}	
Log Pseudo Likelihood	-2953.4664		-3130.3389	
Pseudo R-Squared	0.0583		0.0409	

Table 5: Instrumenting Equation (Ordered Probit) - Continued
Dependent Variable: Monitoring

Notes:
1. Estimates are weighted and standard errors are adjusted for workplace clustering.
2. The omitted categories are: being neither a proprietor/owner/managing director/partner, no introduction of new technology over the last 5 years, relationship between management and employees is very good, managers neither agree nor disagree/disagree/strongly disagree that employees are led to expect long term employment in this organization, managers neither agree nor disagree/disagree/strongly disagree that employees are fully committed to the values of this organization, managers neither agree nor disagree/disagree/strongly disagree that frequently ask employees at the workplace to help managers in ways not specified in their job, there is no manager or director at a higher level and at a separate establishment who spends a major parts of his/her time on personnel or employee relations matters, administrative office only, no people presently working for this establishment on a freelance basis, does not own or control subsidiary companies or establishments outside the UK, no system designed to minimize inventories/supplies or work in progress, output of the establishment concentrates on one product or service, no productivity targets, no absenteeism targets, no job sharing schemes for non-managerial employees, no switching from full to part time employment for non-managerial employees, no term-time only contracts for non-managerial employees, no working at or from home for non-managerial employees, no flextime for non-managerial employees, no zero-hour contracts for non-managerial employees, no annualized hours for non-managerial employees, no shift-work for non-managerial employees, no short term cover for staff absence/vacancies, no special procedures to encourage applications from people who have been unemployed for 12 months or more, motivation is not important when recruiting new employees, no joint consultative committee, supervisors do not have the authority to dismiss workers for unsatisfactory performance, reference letters are not important when recruiting new employees.

Table 6: Interval Regression

Dependent Variable: Log Wage

	1998		2004	
	Coefficient	*T-Stat*	*Coefficient*	*T-Stat*
Individual Characteristics				
Tenure	0.049	6.55	0.029	4.43
Tenure-Squared/100	-0.172	-4.48	-0.106	-2.67
Fitted Monitoring	0.047	1.50	0.038	1.14
*Fitted Monitoring*Tenure*	-0.008	-2.03	-0.010	-2.62
Education				
Low CSE	-0.015	-0.68	0.044	1.61
High CSE	0.039	1.76	0.054	2.49
A Level	0.069	2.45	0.092	3.28
Degree	0.158	5.03	0.195	6.41
Postgraduate	0.162	2.81	0.288	5.60
Vocational	0.067	3.92	0.097	5.61
Occupation				
Technical	0.380	10.69	0.507	11.63
Clerical	0.238	6.31	0.364	10.37
Craft	0.315	6.57	0.326	7.90
Services	0.158	3.89	0.377	8.76
Sales	0.229	4.61	0.305	6.58
Operative	0.096	2.79	0.211	4.86
Demographics				
Fixed-Term Employee	-0.201	-4.17	0.015	0.36
Temporary Employee	-0.279	-5.78	-0.287	-6.63
Non-White	-0.115	-2.27	-0.058	-1.85
Female	-0.272	-9.63	-0.275	-12.96
Trade Union Member	0.161	6.66	0.172	7.03
Married	0.110	6.71	0.059	3.39
Long Term Disability	-0.080	-2.28	0.007	0.29
Training				
Training Days ($0 \leq TD < 1$)	0.017	0.66	-0.016	-0.57
Training Days ($1 \leq TD < 2$)	0.070	3.46	0.099	3.83
Training Days ($2 \leq TD < 5$)	0.149	5.91	0.144	6.42
Training Days ($5 \leq TD < 10$)	0.182	6.79	0.190	5.74
Training Days ($TD \geq 10$)	0.108	2.88	0.085	2.37
Firm Characteristics				
Log Size	0.035	4.10	0.036	3.81
% Young	-0.292	-3.13	-0.191	-2.36
% Old	-0.286	-2.83	-0.037	-0.59
% Part-Time	-1.012	-16.19	-0.970	-17.15
% Trade Union	0.048	1.41	-0.135	-3.76
% Technical	-0.251	-3.25	-0.137	-1.88
% Clerical	-0.069	-0.76	-0.041	-0.55
% Craft	-0.192	-2.21	-0.123	-1.81
% Services	-0.229	-2.72	-0.305	-4.21
% Operatives	-0.132	-1.50	-0.134	-1.79
% Sales	-0.305	-3.00	-0.202	-2.45
% Other	-0.163	-1.90	-0.059	-0.76
Other Controls				
Unemployment-Vacancy %	-0.028	-3.67	-0.001	-0.23
Constant	4.980	48.20	5.075	60.59
Industry Controls	Yes		Yes	
Regional Controls	Yes		Yes	
Number of Observations	19653		16773	
Wald Chi-Squared	5908.10 $_{62}$		4327.00 $_{62}$	
Log Pseudo Likelihood	-1334.1321		-1056.3854	

Notes:

1. Estimates are weighted and standard errors are adjusted for workplace clustering.

Table 7: Ln Wage and Monitoring (Cross Tabulations)

	1998		*2004*	
	Mean	*Std. Error*	*Mean*	*Std. Error*
Monitoring 0	5.002	0.879	5.581	0.861
Monitoring 1	4.908	0.814	5.539	0.838
Monitoring 2	4.990	0.806	5.704	0.827
Monitoring 3	5.057	0.765	5.699	0.936
Monitoring 4	5.000	0.850	5.769	0.913
Monitoring 5	5.140	0.771	5.736	0.703
Monitoring 6	4.921	0.826	5.533	0.692

Note. Means are weighted.

Table 8: Interval Regression

Dependent Variable: Log Wage

	1998		*2004*	
	Coefficient	*T-Stat*	*Coefficient*	*T-Stat*
Individual Characteristics				
Tenure	0.041	7.21	0.028	4.61
Tenure-Squared	-0.169	-4.98	-0.111	-3.02
Monitoring 1	-0.071	-2.43	-0.033	-1.35
Monitoring 2	-0.094	-3.10	-0.044	-1.63
Monitoring 3	-0.049	-1.22	-0.071	-2.08
Monitoring 4	-0.063	-1.49	0.016	0.36
Monitoring 5	0.045	1.08	0.033	0.74
Monitoring 6	-0.076	-1.64	-0.091	-1.22
Constant	5.059	66.78	5.098	70.24
LnSigma	-0.816	-53.49	-0.631	-36.96
Sigma	0.442	65.55	0.532	58.54
Number of Observations	19653		16673	
Wald Chi-Squared	7398.03 $_{66}$		6359.50 $_{66}$	
Log Pseudo Likelihood	-1333.1036		-1056.3887	

Notes:
1. Both the 1998 and 2004 specifications include all the other regressors as per Table 6.
2. Estimates are weighted and standard errors are adjusted for workplace clustering.
3. The omitted “Monitoring” dummy variable is “No Monitoring”.

Table 9: Robustness Checks - 1998

Dependent Variable: Log Wage (Interval Regressions)

	(1) Age		(2) Dep. Children		(3) Log of Working Hours		(4) Teamwork		(5) PRP		(6) Training		(7) Bargaining		(8) Productivty		(9) Pension Scheme		(10) Personality & Attitude Tests		(11) Manag. & Profes.	
	Coef.	*T-Stat.*	*Coef.*	*T-Stat.*	*Coef.*	*T-Stat.*	*Coef.*	*T-Stat.*	*Coef.*	*T-Stat.*	*Coef.*	*T-Stat*	*Coef.*	*T-Stat*	*Coef.*	*T-Stat.*	*Coef.*	*T-Stat.*	*Coef.*	*T-Stat.*	*Coef.*	*T-Stat.*
Fitted Monitoring	0.038	1.29	0.038	1.31	0.042	1.46	0.048	1.65	0.043	1.53	0.042	1.48	0.045	1.61	0.048	1.71	0.046	1.65	0.044	1.58	0.051	2.01
Interaction	-0.007	-1.84	-0.007	-1.93	-0.007	-2.02	-0.008	-2.22	-0.007	-2.10	-0.007	-2.16	-0.007	-2.20	-0.008	-2.29	-0.008	-2.28	-0.008	-2.29	-0.005	-1.79
Robustness Checks[1]																						
Age	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		No	
Dependent Children	No		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		No	
Log of working hours	No		No		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		No	
Teamwork	No		No		No		Yes		Yes		Yes		Yes		Yes		Yes		Yes		No	
PRP	No		No		No		No		Yes		Yes		Yes		Yes		Yes		Yes		No	
Training	No		No		No		No		No		Yes		Yes		Yes		Yes		Yes		No	
Bargaining	No		No		No		No		No		No		Yes		Yes		Yes		Yes		No	
Productivity	No		No		No		No		No		No		Yes		Yes		Yes		Yes		No	
Pension scheme	No		No		No		No		No		No		No		No		Yes		Yes		No	
Persn. & attitude test	No		No		No		No		No		No		No		No		No		Yes		No	
Nos of Observations	19653		19653		19653		19653		19653		19653		19653		19653		19653		19653		27434	
Nos of Groups	1749		1749		1749		1749		1749		1749		1749		1749		1749		1749		1761	
Logseudolikelihood	-1309.13		-1307.12		-1300.15		-1298.27		-1297.31		-1296.93		-1295.67		-1294.56		-1294.01		-1293.72		-1908.13	
Wald Chi-Square	6464.47	68	6460.11	69	6480.89	70	6775.08	76	7725.45	81	7354.13	87	7955.19	93	8840.37	98	9078.71	99	9078.71	100	7734.04	64

Notes:

1. All specifications include the regressors as per Table 6. Estimates are weighted and standard errors are adjusted for clustering.
2. Robustness with respect to age, teamwork, performance related pay and bargaining is checked by incorporating the following zero-one dummy variables into our standard (i.e. Table 6) interval regression: (i) Age (*Age1 - Age5*); (ii) Dependent children (0/1 dummy); (iii) Log of working weekly hours; (iv) Teamwork (*Teamwork2 – Teamwork7*); (v) Performance Related Pay (*PRP1- PRP5*); (vi) Training; (vii) Wage Bargaining (*Wage-Bargain1 – Wage-Bargain5*); (viii) Productivity (Productivity1-Productivity6), (ix) Pension scheme; (x) Personality and attitude tests when filling vacancies.
3. Robustness with respect to managerial and professional staff (column 11) is checked by including managers and professional employees into our sample and by incorporating the following zero-one dummy variables into our standard (i.e. Table 6) interval regressions (*Manager*, *Professional*).
4. *Interaction = Fitted Monitoring*Tenure*

Table 10: Robustness Checks - 2004

Dependent Variable: Log Wage (Interval Regressions)

	(1) Age		(2) Dep. Children		(3) Log of Working Hours		(4) Teamwork		(5) PRP		(6) Training		(7) Bargaining		(8) Productivty		(9) Pension Scheme		(10) Personality & Attitude Tests		(11) Manag. & Profes.	
	Coef.	*T-Stat.*	*Coef.*	*T-Stat.*	*Coef.*	*T-Stat.*	*Coef.*	*T-Stat.*	*Coef.*	*T-Stat.*	*Coef.*	*T-Stat*	*Coef.*	*T-Stat*	*Coef.*	*T-Stat.*	*Coef.*	*T-Stat.*	*Coef.*	*T-Stat.*	*Coef.*	*T-Stat.*
Fitted Monitoring	0.028	0.86	0.028	0.87	0.035	1.15	0.040	1.32	0.035	1.17	0.035	1.18	0.031	1.05	0.024	0.85	0.022	0.75	0.022	0.77	0.009	0.32
Interaction	-0.009	-2.33	-0.010	-2.42	-0.010	-2.67	-0.011	-2.83	-0.011	-2.83	-0.010	-2.76	-0.010	-2.66	-0.009	-2.50	-0.009	-2.49	-0.009	-2.49	-0.009	-2.60
Robustness Checks[1]																						
Age	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		No	
Dependent Children	No		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		No	
Log of working hours	No		No		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		No	
Teamwork	No		No		No		Yes		Yes		Yes		Yes		Yes		Yes		Yes		No	
PRP	No		No		No		No		Yes		Yes		Yes		Yes		Yes		Yes		No	
Training	No		No		No		No		No		Yes		Yes		Yes		Yes		Yes		No	
Bargaining	No		No		No		No		No		No		Yes		Yes		Yes		Yes		No	
Productivity	No		No		No		No		No		No		Yes		Yes		Yes		Yes		No	
Pension scheme	No		No		No		No		No		No		No		No		Yes		Yes		No	
Persn. & attitude test	No		No		No		No		No		No		No		No		No		Yes			
Nos of Observations	16773		16773		16773		16773		16773		16773		16773		16773		16773		16773		21872	
Nos of Groups	1705		1705		1705		1705		1705		1705		1705		1705		1705		1705		1724	
Logseudolikelihood	-1053.45		-1052.43		-1036.97		-1036.16		-1035.93		-1035.24		-1034.92		-1034.07		-1033.88		-1033.86		-1386.45	
Wald Chi-Square	4659.79	68	4680.52	69	5063.67	70	5222.65	76	5382.03	81	5584.20	87	5577.52	93	6025.62	98	6039.90	99	6039.55	100	5593.85	64

Notes:

5. All specifications include the regressors as per Table 6. Estimates are weighted and standard errors are adjusted for clustering.
6. Robustness with respect to age, teamwork, performance related pay and bargaining is checked by incorporating the following zero-one dummy variables into our standard (i.e. Table 6) interval regression: (i) Age (*Age1 - Age5*); (ii) Dependent children (0/1 dummy); (iii) Log of working weekly hours; (iv) Teamwork (*Teamwork2 – Teamwork7*); (v) Performance Related Pay (*PRP1- PRP5*); (vi) Training; (vii) Wage Bargaining (*Wage-Bargain1 – Wage-Bargain5*); (viii) Productivity (Productivity1-Productivity6), (ix) Pension scheme; (x) Personality and attitude tests when filling vacancies.
7. Robustness with respect to managerial and professional staff (column 11) is checked by including managers and professional employees into our sample and by incorporating the following zero-one dummy variables into our standard (i.e. Table 6) interval regressions (*Manager, Professional*).
8. *Interaction = Fitted Monitoring*Tenure*

Table 11: Random Effects

Dependent Variable: Log Wage

	1998		*2004*	
	Coefficient	*T-Stat*	*Coefficient*	*T-Stat*
Fitted Monitoring	0.023	1.37	0.031	1.49
*Fitted Monitoring*Tenure*	-0.005	-3.58	-0.004	-1.90
sigma u	0.207		0.198	
sigma e	0.450		0.565	
rho	0.175		0.110	
Number of Observations	19653		16773	
Number of Groups	1749		1705	
Wald chi2(62)	12916.54		7998.46	
R-Square Within	0.209		0.155	
R-Square Between	0.812		0.728	
R-Square Overall	0.586		0.441	

Notes:

1. Both the 1998 and 2004 specifications include all the other regressors as per Table 6.
2. Since there is no a random effects interval regression estimator, the dependent variable is the log of weekly wages where we take the mid-point of the income bands.

Table 12: Fixed Effects

Dependent Variable: Log Wage

	1998		*2004*	
	Coefficient	*T-Stat*	*Coefficient*	*T-Stat*
Fitted Monitoring	---	---	---	---
*Fitted Monitoring*Tenure*	-0.014	-3.51	-0.013	-2.92
sigma u	0.502		0.498	
sigma e	0.489		0.560	
rho	0.513		0.442	
Number of Observations	19653		16773	
Number of Groups	1749		1705	
F-statistic	31.69		31.46	
R-square Within	0.186		0.164	
R-square Between	0.489		0.358	
R-square Overall	0.338		0.239	

Notes:

1. Both the 1998 and 2004 specifications include all the other regressors as per Table 6.
2. "---" suggests that firm characteristics drop from the fixed effects regression.
3. Since there is no a fixed effects interval regression estimator, the dependent variable is the log of weekly wages where we take the mid-point of the income bands.

Table 13:

Dependent Variable: Log Wage

	2004	
	Coefficient	*T-Stat*
Employee-Recorded Fitted Monitoring	2.611	1.54
*Employee-Recorded Fitted Monitoring*Tenure*	-0.492	-2.17
Number of Observations	16225	

Notes:

1. The Fitted Monitoring variable is an aggregate measure of supervision obtained from the 2004 employee questionnaire only. Relevant information is not available in the 1998 survey.

Table 14: Wage and Firm Size

Dependent Variable: Log Wage (Interval Regressions)

	1998						*2004*					
	Small Firms		*Large Firms*		*All Firms*		*Small Firms*		*Large Firms*		*All Firms*	
	Coef.	*T-Stat.*	*Coef.*	*T-Stat.*	*Coef.*	*T-Stat.*	*Coef.*	*T-Stat.*	*Coef.*	*T-Stat.*	*Coef.*	*T-Stat.*
Fitted Monitoring	0.067	1.71	0.009	0.34	0.028	1.06	0.037	0.82	0.079	2.48	0.012	0.38
*Fitted Monitoring*Tenure*	-0.010	-1.87	-0.002	-0.86	-	-	-0.016	-2.79	-0.002	-0.64	-	-
*Fitted Monitoring*Tenure*Log Firm Size*	-	-	-	-	-0.001	-1.92	-	-	-	-	-0.002	-2.20
Number of Observations	6594		13059		19653		5427		11346		16773	
Number of Groups	675		1074		1749		729		976		1705	
Log Pseudoliklihood	-1046.057		-279.722		-1334.288		-832.344		-221.895		-1056.58	
Wald Chi-Square	4115.23		5497.06		5722.75		2851.61		3909.40		4323.03	

Notes:

1. All specifications include the regressors as per Table 6. Estimates are weighted and standard errors are adjusted for clustering.

2. In the 1998 (2004) sample, *Small Firms* are defined as those with less than 62.6 (49.5) employees, which was the mean size of firms in 1998 (2004), and *Large Firms* those with 62.6 (49.5) or more employees..

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