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Wages, supervision and sharing

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Abstract

Instrumental efficiency wage models predict an inverse relationship between wages and supervision with this relationship being more pronounced amongst firms participating in employee sharing. My theoretical exposition predicts that an increase in remuneration reduces monitoring more in "sharing" than in "non-sharing" firms. I explore these predictions using the 1998 Workplace Employee Relations Survey. My empirical results confirm an inverse relationship between supervision and pay, but the trade-off is only heightened by performance-related pay and employee share ownership schemes. I find that employee share ownership and performance-related pay are more successful in alleviating the need to monitor.

JEL classification: J33; J41; J54

Keywords: Monitoring; Supervision; Profit sharing; Employee share ownership; Efficiency wages

1. Introduction

Efficiency wage theory suggests that employers can improve workforce productivity by paying wages above the opportunity cost of labor. Two schools of thought suggest how these wage premia operate. The "instrumentalist" view is that employees choose how hard to work by equating the marginal costs and benefits of shirking. Wage premia are thus carrots that employers use, along with the stick of dismissal, to encourage an optimal supply of work effort (Bowles, 1985; Shapiro & Stiglitz, 1984). The "sociological" approach, in contrast, argues that the premia represent a "gift" by the firm that appeals to norms of loyalty and mutual obligation on the part of its workforce (Akerlof, 1982). According to this view efficiency wages elicit effort by creating a climate of

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co-operation and reciprocity, rather than by entering an instrumental calculation of the expected net benefit of shirking.

Testing efficiency wage theory is difficult since standard competitive models also predict a positive correlation between productivity and wages. Moreover, one would expect to find such payments in situations where it is difficult to observe, and thus measure, worker performance. Economists have therefore attempted to test the theory by focusing on the relationship between wages and other forms of effort procurement. For example, if efficiency wages are successful in eliciting effort then, *ceteris paribus*, firms paying such premia should invest fewer resources in monitoring worker behavior.[1]

An alternative method of improving worker productivity is to divest a share of the firm into the hands of workers. Recent years have witnessed a resurgence of interest in employee sharing. Re-kindled by Weitzman's (1985) purported macroeconomic benefits of profit sharing, attention has turned towards the more readily discernible, and originally lauded, microeconomic benefits of employee sharing broadly defined (Blinder, 1990; Weitzman & Kruse, 1990).

Employee sharing has implications for both instrumental and gift-exchange models of efficiency wages. In terms of the former, a sharing scheme would directly reduce the marginal benefit of shirking. In the extreme case, a self-employed worker has no incentive to shirk. The temptation to free ride renders the issue somewhat less pellucid when a work group is considered, but even here the exchange environment is affected. Divesting part of the enterprise is perhaps the most generous gift a firm can offer its workforce and if it is *via* an exchange of gifts that wage premia elicit effort, the question arises as to the marginal utility that workers derive from such gifts.

An interesting, yet hitherto unexplored, question thus arises as to the relationship between employee sharing and the wage-monitoring nexus. *A priori* one would expect sharing to lessen the need to monitor. Whether sharing augments or assuages the relationship between pay and supervision, and thus its effect on the shape of the trade-off, is rather less obvious.

In what follows I explore the effects of "sharing" (*i.e.* profit sharing, performance-related pay and employee share ownership plans) on the relationship between supervision and pay. My empirical results, based on the British 1998 Work Place Employee Relations Survey, suggest an inverse relationship between supervision and pay with this trade-off being more pronounced amongst firms operating employee share ownership or performance-related pay schemes. This finding supports instrumental efficiency wage considerations. I also find that employee share ownership plans and performance-related pay are relatively more successful in alleviating the need to monitor.[2]

The paper is set out as follows: Section 2 discusses some background issues concerning the relationship between pay, supervision and sharing. Section 3 sets out the theoretical underpinning whilst Section 4 describes the data and methodology. Empirical results are presented in Section 5 and final comments in Section 6.

[1] See, for example, Bowles (1985), Calvo (1979) and Eaton and White (1983). It is possible, however, that high wages are a necessary compensating differential for occupations that require distastefully high rates of supervision (Aoki, 1984). Evidence of a positive (negative) relationship between wages and monitoring in the Swedish public (private) sector is obtained by Arai (1994).

[2] I use the terms "supervision" and "monitoring" interchangeably. Although supervisors have different functions at different firms, and firms may utilize other forms of technology to monitor employees (e.g., computers), the supervisor-to-staff ratio is likely to be highly correlated with the extent of employee monitoring (Groshen & Krueger, 1990).

2. Background

2.1. Wages and monitoring

Economists have long recognized that there are substantial differences in the rewards to similar occupations across industries. Only recently, however, have they associated these variations with differences in monitoring. In one of the earliest studies, Dunlop (1957) observed that the highest paying trucking firm in Boston in 1951 was paying its drivers 1.88 times as much as its lowest paying competitor. At any point in time such a range of pay could reflect a transitory demand shock driving up wages in particular industries along short-run inelastic labor supply curves. If this were the case, however, one would not expect to see the same industries remaining at the top (or bottom) of the distribution decade after decade. Yet industry wage differentials over the past century have been remarkably persistent (see, for example, Bell & Freeman, 1985; Cullen, 1956; Garbarino, 1950; Krueger & Summers, 1987; Reder, 1962; Slichter, 1950).

Two regularities emerge from the various attempts to account for such assiduity: Higher wages are usually associated with: (i) higher profits or concentration (Dickens & Katz, 1987; Krueger & Summers, 1987), and (ii) larger plant or firm size (see Brown & Medoff, 1985; Kruse, 1992). The first finding might be interpreted as support for Akerlof's (1982) gift-exchange model of efficiency wages.[3] And assuming that monitoring costs increase with plant size, the second would seem to confirm the wage-monitoring trade-off predicted by Shapiro and Stiglitz (1984).

Measuring this trade-off explicitly has proved to be surprisingly difficult.[4] Employers generally determine both the level of pay and the quantity of resources devoted to monitoring as part of an over-arching human resource policy. Such simultaneity is problematic because variables that affect such a policy might be omitted from the analysis, thereby shrouding the true nature of the wages-monitoring trade-off.[5] Moreover, monitoring is generally proxied by the ratio of supervisors to supervisees—a problematic approach because supervisors rarely devote all of their effort to monitoring, and basing a measure of monitoring on them could increase any bias already arising from the simultaneous setting of pay and supervision (Rebitzer, 1995).

This latter issue is illustrated by Leonard (1987) who regresses the wages of staff workers across six occupations on the supervisor-to-staff ratio in a sample of U.S. high-technology firms. Leonard's results indicate a positive, but generally insignificant, relationship between pay and supervision and lead him to conclude against the shirking efficiency wage model. The absence of correlation may, however, result from endogeneity problems relating to a possible substitution between supervisors and staff workers in the production function. Any production technology exhibiting a non-zero marginal rate of technical substitution between supervisory and non-supervisory inputs will induce a positive trade-off between wages and the supervisor-to-staff ratio.[6] Only if supervisory and staff wage rates vary independently, or if the supervisor-to-staff

[3] There may also be unobserved quality differences in workers inducing both higher profits and higher wages (Cain, 1976).

[4] Studies that find explicit evidence of a wage-supervision trade-off include Krueger (1991), Kruse (1992) and Rebitzer (1995). Somewhat ambiguous results are reported in Brunello (1995), Fitzroy and Kraft (1986) and Neal (1993).

[5] See Rebitzer (1995). The presence of wage bargaining would, of course, abate this problem.

[6] Assume, for example, a Cobb–Douglas production function $Q = AL^{\alpha}S^{\beta}$, where L and S denote non-supervisory and supervisory inputs, respectively, and Q denotes output. If the firm faces a competitive cost function $C = wL + rS$ then cost minimisation implies $S/L = (\beta/\alpha)(w/r)$ such that increases in w – the wage rate of non-supervisory workers – will raise the supervisor-to-staff ratio even if supervision has no direct effect on employee utility or monitoring.

ratio is exogenously determined, will it be possible to statistically identify the impact of supervision on wages from such a regression. In Leonard's analysis it is likely that any trade-off between supervision and pay is biased and perhaps dominated by such substitution effects.

An imaginative attempt to circumvent this type of endogeneity problem is undertaken by Groshen and Krueger (1990) who focus on the supervisor-to-staff ratios for various registered occupations across 300 U.S. hospitals. The specificity of their study is rationalized by Federal regulations which render the supervisor-to-staff ratio largely exogenous. Consistent with the monitoring version of efficiency wage theory, they find a strong hospital-specific effect on wages that cuts across occupations—if a hospital paid relatively high wages to one occupation it was likely to pay relatively high wages to other occupations as well. The inter-occupational pattern of the supervisor-to-staff ratio, however, was much less uniform. The wages of staff nurses, for example, were negatively correlated with the extent of supervision which suggested that such workers did not receive compensating premia in return for closer supervision. The authors conclude that although their findings suggest a wage-monitoring trade-off, they are also consistent with the alternative explanation that hospitals which supervise their staff more closely might prefer to employ low-quality/low-pay workers.

A similar focus on a specific industry enables Rebitzer (1995) to girdle the omitted variable problem. Here the focus is contract workers in the U.S. petrochemical industry. Such workers are answerable to two different employers – the host plant and the contractor – who together shape the personnel practices governing their employment contracts. Concerns about legal liability limit the degree to which host plants can interfere in the contractors' human resource practices. As a result, estimates of the effects of host safety supervision on the wages set by contractors are relatively less embroiled by omitted variable bias than estimates derived from conventional employment relationships. Rebitzer finds evidence that high levels of supervision are indeed associated with lower wage levels, and since the likely effect of omitted variable bias is to reduce the observed trade-off between supervision and wages, he concludes that such evidence is likely to be a conservative estimate of the wage–supervision trade-off.

Other studies that find generally supportive evidence of a wage–supervision trade-off are Ewing and Payne (1999), Krueger (1991) and Kruse (1992). Krueger examines pay in company-owned fast-food outlets where managers were paid a fixed salary and in franchised outlets where the owner's income depended on the outlet's performance. Krueger hypothesises that pay in company-owned outlets would be relatively high because supervision by highly motivated owners is less costly than supervision by hired managers. Consistent with this hypothesis, he finds total compensation to be approximately 2 (3.5)% higher in company-owned outlets. Kruse investigates the 1980 Survey of Job Characteristics and concludes that hourly wages increase with establishment size even after controlling for personal characteristics, occupation and industry. Moreover, employee self-reported supervision exhibited a generally negative relationship with wages—daily supervised workers received 1.2% lower pay than their weekly supervised counterparts, *ceteris paribus*.[7]

Ewing and Payne (1999) argue that workers employed in environments where shirking is more difficult to observe will tend to earn a wage premium. They find empirical support for this hypothesis from the National Longitudinal Surveys of Youth data, which suggests that workers employed in larger (and so more difficult to monitor) work groups are paid relatively

[7] Kruse concedes that whilst such findings are generally consistent with efficiency wage theory, they are also compatible with the idea that supervision is negatively correlated with otherwise unobserved higher ability.

higher wages *ceteris paribus*, a finding consistent with a trade-off between supervision and wages.

Studies that fail to find conclusive evidence of a wage-monitoring trade-off include Brunello (1995), Fitzroy and Kraft (1986) and Neal (1993). Neal (1993), using supervision data from the 1977 wave of the Panel Survey of Income, finds that workers in high-wage industries are at least as intensively supervised as low-wage, secondary-sector workers and no evidence that inter-industry differences in monitoring contribute to inter-industry wage differentials. Similarly, Fitzroy and Kraft (1986) find that the supervisor-to-staff ratio is insignificantly related to wages in a sample of 65 West German metal-working firms. Brunello (1995) explores the relationship between pay and both the quantity (proxied by the supervisor-to-staff ratio) and quality of supervision (proxied by factors such as the age and experience of the supervisors). Without controlling for quality, a small but significant trade-off between pay and the supervision ratio is found for both manual and non-manual workers. The inclusion of quality measures, however, abates the trade-off to the extent of insignificance in the case of manual workers.

2.2. *Employee sharing*

Employee sharing has implications for instrumental and gift-exchange models of efficiency wages, affecting both the marginal net benefit of shirking and the wider exchange environment.[8] An interesting, yet hitherto unexplored, question thus arises as to the consanguinity of pay, supervision and sharing. Introspection suggests that sharing alleviates the need to monitor. Whether it augments or assuages the relationship between pay and supervision, and thus its effect on the shape of the trade-off, is less clear.

In terms of the instrumental approach, one might expect the trade-off to be sharpened—an increase in remuneration inducing a larger cut in monitoring *ceteris paribus*. The conventional efficiency wage trade-off between pay and monitoring arises because an increase in the former will increase the expected net benefit of *not* shirking—if a worker chooses to shirk he risks being detected, fired, and thus not receiving the extra pay. Since the firm benefits by giving the worker a zero net benefit, it can economize on monitoring, and thus raise the utility of shirking, by permitting workers a greater chance of obtaining the pay. If a sharing scheme relates, or is perceived by workers to relate, individual remuneration to individual effort, then the net benefit of not shirking is increased further—a shirker faces the compounded loss of being detected and of losing money.

If, however, it is through an exchange of gifts that wages induce effort, then the situation is less clear. Wage increases may be regarded as a gift on the part of the firm and thus may induce more effort and so less need to monitor. Similarly, a sharing arrangement between the firm and its workforce could generate the same feelings irrespective of the level of remuneration. If wages are increased in a sharing firm then the crucial issue is the marginal utility the workforce derives from this gift—is it more or less than they would have derived had they received such wages in a conventional non-sharing environment?

One might expect that any group-incentive scheme advocating equal profit shares regardless of individual performance will have little effect on the attitudes and performance of individual

[8] Indeed: "Offering workers increased involvement in decision-making, a financial stake in the performance of the firm, disclosing information about, *inter alia*, future investment plans and the firm's financial situation, and the development of communication channels between management and workers, are all seen as central to encouraging loyalty, motivation and commitment and, thereby, to reducing the need to invoke close monitoring." (McNabb & Whitfield, 1998, p. 174)

workers. For example:

> A dilution or free rider problem seems to arise whenever it is hard to monitor a single person's contribution, as is presumably frequently the case. An externality is present because any one person's reward depends on everyone else's effort. With n members of the group, the extra profit sharing reward associated with marginal effort on any single worker's part is diluted by a factor of $1/n$. The result is an inefficiently low level of effort, which is lower as n is larger. Weitzman and Kruse (1990, p. 98)

The problem has been interpreted as a "prisoners' dilemma" with each worker holding back effort in order to free ride off his colleagues. Accepting this argument, one would expect sharing schemes to impact negligibly, if at all, on large organisations.[9]

Dilution aside, however, there are other problems associated with employee sharing. First, all schemes that tie pay to performance expose workers to unwanted risk. The optimal contract must now balance the contradictory requirements of linking pay to effort and limiting risk, and the optimal profit share is typically inversely related to the degree of risk aversion or level of uncertainty, and positively related to the elasticity response of output to increased effort.[10]

And finally, all group-incentive schemes have implications for worker participation in management and control. Requiring workers to bear more risk may open the door to demands for co-determination. Whether or not this is desirable is moot. The "property rights" view is that profit sharing is inefficient because it diverts control and ownership towards individualistically oriented workers whose motivation is diluted by free rider issues (Alchian & Demsetz, 1972; Jensen & Meckling, 1979). Participation may, however, raise productivity if workers are better equipped to motivate and monitor each other than management, or if they can provide technical information to management that would otherwise be too costly or time consuming to obtain (Kanter, 1987; O'Dell & McAdams, 1987). Similar benefits might include the potential for improved channels of communication, better conflict resolution, a greater willingness to accept new technology, and an increased possibility of acquiring on-the-job human capital from other workers.[11]

Whatever the true relationship between employee sharing, participation and productivity, this study is hindered by a lack of information regarding the extent of co-determination within the panel of firms. This is potentially serious: "... many studies include variables only on financial participation (return rights) or participation in decision-making (control rights), but not both. This is extremely problematic because ... there are strong theoretical reasons to believe that the two rights interact with each other and do so non-monotonically. The omitted variable is severe, and

[9] There is an important caveat to this argument. If the "game" is repeated, then co-operation may be sustainable. Intuitively, long-term employment relationships enable co-operating members to punish their free-riding colleagues by, for example, withholding their own effort or ostracizing the offending anti-social culprits. Moreover, it has been shown that an insignificantly small amount of co-operation is sufficient to deter free riding (Fitzroy & Kraft, 1986).

[10] Note, however, that although risk considerations reduce the optimal profit share, a contract comprising fixed remuneration only is very unlikely (Hart & Holstrom, 1987).

[11] To ascertain the merit of such arguments Levine and Tyson (1990) surveyed 29 empirical studies of worker participation and found only two concluding against participation. In contrast, 14 studies found in favor of participation with the remaining 13 offering somewhat ambiguous results. Levine and Tyson concluded that successful participation requires: (i) some form of profit sharing to reward co-operative behavior; (ii) guaranteed long-term employment to increase workers' time horizons and so render them more adaptable to change; (iii) relatively narrow wage differentials to promote group cohesiveness; and (iv) guaranteed worker rights—for example, dismissal only for just cause.

the estimates of the employee ownership variables that arise from such studies may have the wrong sign". (Ben-Ner & Jones, 1995, p. 551)

Somewhat surprisingly there has been relatively little contemporary research into these issues. Several researchers have focused on the extreme case of employee-owned firms and co-operatives (Bartlett, Cable, Estrin, Jones, & Smith, 1992; Greenberg, 1986) but to my knowledge no one has explored the situation within profit-sharing firms.

3. Theoretical underpinning

Some insight into the possible relationship between employee sharing and supervision may be discerned from the following sketch. Assume that workers are homogenous risk neutral with utility functions of the form $u = m - e$. m represents income and e represents effort. Employed workers make a discrete all-or-nothing choice as regards the provision of work effort such that $e = (0, \bar{e}), \bar{e} > 0$. The firm has access to some monitoring technology defined through the function $p(k)$, where k denotes the value of resources devoted to monitoring and $p(k)$ the probability that a shirker will be detected.[12] I assume $p'(k) > 0, p''(k) < 0, p(0) = 0$ and $\lim_{k \to \tilde{k}} p(k) = 1$.[13] Detection implies instantaneous dismissal and unemployment utility b.[14]

3.1. Fixed wages

Consider first the fixed-wage scenario. The firm's problem is to maximize profits subject to the constraints that the worker receives at least his reservation utility (*viz.* $b + \bar{e}$) and that, once employed, he does not shirk. This latter necessitates the worker being paid the lowest wage that satisfies the "non-shirking constraint" (NSC):

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

Satisfaction of (1) implies an optimal (*viz.* "efficiency") wage of:

$$w^* = \frac{\bar{e} + p(k)b}{p(k)} \tag{2}$$

such that workers receive some employment rents but are just indifferent between shirking and not shirking. The trade-off between wages and monitoring is:

$$\frac{\mathrm{d}k}{\mathrm{d}w} = -\frac{p(k)^2}{p'(k)}\bar{e} < 0 \tag{3}$$

3.2. Fixed wages with remunerative shirking costs

Consider now a more general case in which the individual's wage is some function of his performance such that there is some remunerative penalty associated with shirking. To be sure,

[12] To avoid unnecessary complications I assume that the criteria on which this judgment is based are verifiable by an independent arbitrator such that there is no dispute about the firm's assessment.

[13] It is thus technically possible for the firm to perfectly monitor worker performance. Since my focus of interest is not the optimal level of monitoring, I assume that production and monitoring technologies are such that it is always in the interests of the firm to monitor imperfectly.

[14] Allowing technically dismissed shirkers some chance of re-employment would not change the qualitative aspects of my conclusions.

assume that the shirking wage is given by $w = w(1 - z)$, where $z \in (0, 1)$ a parameter is denoting the remunerative cost associated with shirking. If $z = 0$, then we return to the standard fixed-wage case as above. As z increases the individual suffers an increasing financial penalty from shirking and in the limit looses his entire wage as z approaches unity. The non-shirking constraint is now[15]:

$$w - \bar{e} \geq p(k)b + [1 - p(k)]w(1 - z) \tag{4}$$

Satisfaction of which implies an efficiency wage of:

$$w^* = \frac{\bar{e} + p(k)b}{p(k)(1 - z) + z} \tag{5}$$

The nature of the z parameter is crucial to the shape of the wage-monitoring trade-off. The two limiting cases are:

$$\lim_{z \to 0} w^* = \frac{\bar{e} + p(k)b}{p(k)} \tag{6}$$

$$\lim_{z \to 1} w^* = \bar{e} + p\,(k)\,b \tag{7}$$

As z tends to zero there is no remunerative cost associated with shirking and we derive the efficiency wage defined in Eq. (2) above. As z tends to unity the remunerative cost associated with shirking is absolute and the efficiency wage is consequently reduced. Moreover, considering the effect of monitoring on the efficiency wage it is apparent that:

$$\lim_{z \to 0, k \to \tilde{k}} w^* = \bar{e} + b^*, \qquad \lim_{z \to 1, k \to \tilde{k}} w^* = \bar{e} + b^* \tag{8}$$

$$\lim_{z \to 0, k \to 0} w^* = \infty, \qquad \lim_{z \to 1, k \to 0} w^* = \bar{e} \tag{9}$$

Thus, irrespective of the remunerative cost associated with shirking, the firm can hold the worker down to his reservation wage providing it perfectly monitors. The wage-monitoring trade-off is given by:

$$\frac{\mathrm{d}k}{\mathrm{d}w} = \frac{[p(k)(1 - z) + z]^2}{p'(k)[bz - (1 - z)\bar{e}]} \tag{10}$$

with limits:

$$\lim_{z \to 0} \frac{\mathrm{d}k}{\mathrm{d}w} = -\frac{p(k)^2}{p'(k)\bar{e}} < 0, \qquad \lim_{z \to 1} \frac{\mathrm{d}k}{\mathrm{d}w} = \frac{1}{p'(k)b} > 0 \tag{11}$$

The trade-off depends crucially on the value of z. With no remunerative shirking costs, we derive the conventional inverse relationship. With full costs (*i.e.* $z = 1$), the trade-off is positive; in this case, the expected utility of shirking actually increases with the level of monitoring since it is now in the worker's interest to be detected and fired, because it is only then that any remuneration will be received. Considering the denominator of (10), it is apparent that the critical z value occurs when:

$$bz^* - (1 - z^*)\bar{e} = 0 \Rightarrow z^* = \frac{\bar{e}}{\bar{e} + b} \in (0, 1) \tag{12}$$

[15] I am abstracting here from issues regarding the relationship between z and the ability of the firm to observe shirking. Such a possibility is, however, dealt with in the subsequent section.

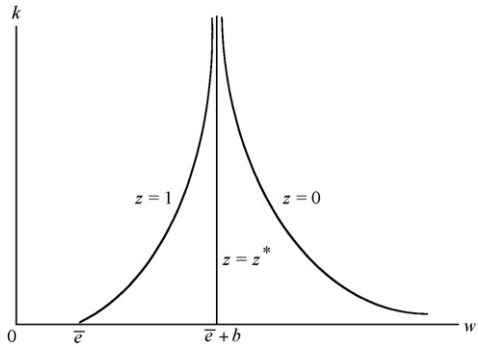

Fig. 1. Wage-monitoring trade-offs.

Thus, the trade-off is negative (positive) for values of z less than (greater than) z^*. The key point is illustrated in Fig. 1.

Note that the requirement of the firm to pay the worker at least his reservation wage of $w^{\mathrm{r}} = \bar{e} + b$ would preclude the possibility of a positive trade-off in practice.

3.3. Wages, monitoring and sharing

I now develop a slightly more complicated model of employee sharing. I assume for simplicity that firms employ a single worker and face a stochastic revenue function $f(e; \theta_i)$, where θ_i is a parameter representing a random shock to demand or productivity. I assume that θ_i takes one of two values, θ_{H} with probability s or θ_{L} with probability $(1 - s)$. θ_i is revealed to both the worker and the firm after the employment contract has been signed and impacts on revenue as follows:

$$f(\bar{e}, \theta_{\mathrm{H}}) > f(\bar{e}, \theta_{\mathrm{L}}) = f(0, \theta_{\mathrm{H}}) > f(0, \theta_{\mathrm{L}}) \tag{13}$$

I envisage a simple employee sharing contract of the form:

$$w = (1 - \lambda)\bar{w} + \lambda f(e; \theta_i) \tag{14}$$

where w represents total remuneration, $\bar{w}$ the component of total remuneration that is "fixed" (*i.e.* independent of worker performance) and $\lambda \in [0, 1]$ the level of worker equity (*viz.* the fraction of total remuneration that depends on individual effort).[16] The NSC now takes the form:

$$\begin{aligned} s[(1 - \lambda)\bar{w} + \lambda f(\bar{e}, \theta_{\mathrm{H}})] + (1 - s)[(1 - \lambda)\bar{w} + \lambda f(\bar{e}, \theta_{\mathrm{L}})] - \bar{e} \geq p(k)b \\ + [1 - p(k)]\{s[(1 - \lambda)\bar{w} + \lambda f(0, \theta_{\mathrm{H}})] + (1 - s)[(1 - \lambda)\bar{w} + \lambda f(0, \theta_{\mathrm{L}})]\} \end{aligned} \tag{15}$$

It is apparent from the above that the probability of detection is given by the probability that the firm monitors plus the probability that it does not monitor but that the worker is "unlucky", *viz.* $p(k) + (1 - s)[1 - p(k)]$. I can therefore reduce Eq. (15) to:

$$(1 - \lambda)\bar{w} + \lambda[sf(\bar{e}, \theta_{\mathrm{H}}) + (1 - s)f(\bar{e}, \theta_{\mathrm{L}})] - \bar{e} \geq (1 - \tilde{s})b + \tilde{s}[(1 - \lambda)\bar{w} + \lambda f(0, \theta_{\mathrm{H}})] \tag{16}$$

[16] I assume in what follows that the extent of worker equity, as measured by λ, is exogenous being fixed by custom or government directive. This is obviously a simplistic assumption and a fuller exposition would seek to explain the distribution of different contractual arrangements.

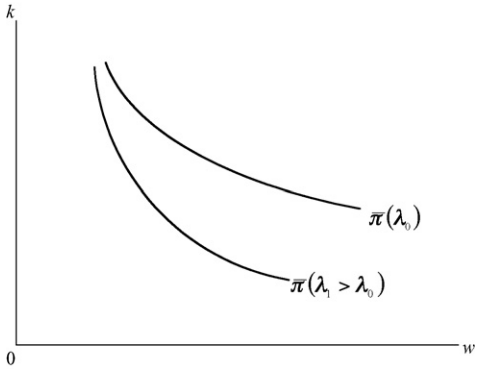

Fig. 2. Optimal pay-monitoring trade-offs: $dk/dw < 0$.

where $\tilde{s} = s[1 - p(k)]$. Solving for the base wage yields:

$$\bar{w} = \frac{1}{(1-\lambda)(1-\tilde{s})}[(1-\tilde{s})b + e - \lambda\langle sf(e,\theta_H) - \{s[2-p(k)]-1\}f(e,\theta_L)\rangle] \tag{17}$$

And implies total "efficiency" remuneration of:

$$w^* = b + \frac{1}{1-\tilde{s}}(e - \lambda s\tilde{s}\,\Delta f) \tag{18}$$

where $\Delta f = f(e;\theta_H) - f(e;\theta_L)$. Totally differentiating this expression yields the trade-offs between pay, supervision and sharing:

$$\left.\frac{dk}{d\lambda}\right|_{dw=0} = \left\{\frac{s(1-\tilde{s})\,\Delta f}{p'(k)(\lambda s\,\Delta f - e)}\right\} \begin{matrix}\leq\\>\end{matrix} 0 \tag{19}$$

$$\left.\frac{dk}{dw}\right|_{d\lambda=0} = \left\{\frac{(1-\tilde{s})^2}{p'(k)s(\lambda s\,\Delta f - e)}\right\} \begin{matrix}\leq\\>\end{matrix} 0 \tag{20}$$

$$\frac{d^2k}{dw\,d\lambda} = -\left\{\frac{(1-\tilde{s})^2\,\Delta f}{p'(k)(\lambda s\,\Delta f - e)^2}\right\} < 0 \tag{21}$$

Eq. (21) is unequivocally negative. The sign of Eqs. (19) and (20) depend crucially on the term $(\lambda s\,\Delta f - e)$. If $\Delta f > (e/\lambda s)$, then Eqs. (19) and (20) are positive implying that sharing firms monitor relatively more and face an upward sloping trade-off. If $\Delta f \leq (e/\lambda s)$, then Eqs. (19)–(21) are all negative implying that: (a) sharing firms devote relatively less resources to monitoring than their non-sharing counterparts; (b) like their non-sharing counterparts, sharing firms also face a trade-off between total remuneration and monitoring; and (c) the trade-off between total remuneration and monitoring is heightened amongst sharing firms—an increase in total remuneration induces a relatively larger decline in monitoring amongst sharing firms *ceteris paribus*.

The latter is illustrated graphically in Fig. 2. The two curves represent iso-profit lines in (w, k) space. An increase in the sharing coefficient sharpens the trade-off between pay and monitoring. Intuitively, raising pay within a sharing firm will induce a relatively larger cut in monitoring expenditure: (i) the less sensitive is the monitoring function—*i.e.* the smaller is the fall in the probability of detection brought about by the reduction in monitoring; (ii) the larger is the level of

effort required by the firm; and (iii) the larger is the potential loss to shirking that is independent of the firm's ability to monitor *viz.* $\lambda \Delta f$—that is the share of profits given over to workers multiplied by the reduction in profits induced by the worker's decision to shirk. This will be zero for non-sharing firms. Within a large sharing environment it could be zero—the second term of the product in particular is likely to be negligible. It is very unlikely, however, to be positive and if the sharing arrangements are made over smaller sub-divisions, then the predictions would hold.[17]

These predictions are, however, derived from a stylised *instrumental* exposition of efficiency wages. More generally, we would expect efficiency wages to operate in both an instrumental and gift-exchange capacity, and it remains open to question as to how workers might interpret such gifts within a sharing environment. Do they confer increasing or diminishing marginal utility? If employee sharing is interpreted favorably by workers, does the additional gift of supra-competitive wages elicit relatively more or less effort in a sharing or a non-sharing firm? The sociological basis of gifts renders such issues virtually impenetrable to theoretical exposition, and it is thus to the empirical evidence that we are obliged to turn.

4. Data and methodology

4.1. Data

My data are derived from 1998 Cross-Section Workplace Employee Relations Survey (WERS) which is the fourth in a Government-funded series of surveys conducted at British workplaces. The previous surveys were conducted in 1980, 1984 and 1990. The surveys are intended to provide nationally representative data on the current state of workplace relations and employment practices in Britain, and they are regarded as a principal source of information pertaining to changes in British industrial relations. The overall purpose of the WERS is "... to provide information on the state of management–employee relations in Britain".

The National Centre for Social Research is responsible for sampling and statistical consultancy, the conduct of the fieldwork, and the coding and preparation of the final data. The survey population for the WERS being all British workplaces with at least 10 employees except for those in agriculture, hunting and forestry, fishing, mining and quarrying, private households with employed persons and extra-territorial organisations.

The sampling frame for WERS is the Inter-Departmental Business Register (IDBR). The IDBR is maintained by the Office for National Statistics and is generally regarded as the most comprehensive sampling frame in the UK covering employment in the manufacturing, service, banking and finance, public (including the NHS and education) and private sector. The sample was restricted to establishments with 10 or more employees from all but the following Standard Industrial Classifications (SIC); agriculture, hunting, forestry and fishing, mining and quarrying, and private households with employees, persons and extra-territorial bodies. The establishments remaining in the sampling frame were then divided into strata defined in terms of the remaining SIC major groups (D to O) and employee numbers (10–24 employees; 25–49 employees; 50–99 employees; 100–199 employees; 200–499 employees; and >500 employees). A random sample of establishments was selected from each of the 72 cells so created to yield a final sample of 3200 establishments.

[17] Note that the level of monitoring expenditure will also determine the shape of the trade-off depending on the linearity or otherwise of the available monitoring technology.

The WERS comprises three main sections; the "Management Questionnaire", the "Worker Representative Questionnaire" and the "Employee Questionnaire". For my purposes, I have used the data from the Management Questionnaire—out of the 3200 establishments these were completed *via* face-to-face interviews with 2191 managers, yielding a response rate of approximately 80%.[18]

4.2. Methodology

In what follows I denote m_i^* as the true monitoring intensity employed by Firm i. m_i^* is a latent variable that depends on vectors of compensation, W_i, firm environment characteristics, Z_i, and some independent random error u_i:

$$m_i^* = \alpha W_i + \beta Z_i + u_i \tag{22}$$

where $i = 1, \ldots, N$ denotes the firm-specific subscript, and N denotes the total number of firms in the cross-section. Following Gordon (1990, 1994), Leonard (1987) and Neal (1993), I proxy monitoring intensity *via* the ratio of supervisory to non-supervisory employees. 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 question asked in the "Management Questionnaire" of the WERS is as follows: "*What proportion of non-managerial employees here have job duties that involve supervising other employees?*" Managers were asked to indicate in which range their firm lay—0, 1–19, 20–39, 40–59, 60–79, 80–99 and 100%. From this information, I was able to construct a seven-point supervision index where 6 (0) represents the highest (lowest) level of monitoring.[19] "Reported" monitoring m_i thus takes a score k with $0 \leq k \leq 6$ whenever m_i^* is between two thresholds λ_{k-1} and λ_k *viz.*:

$$m_i = k \Leftrightarrow \lambda_{k-1} < m_i^* \leq \lambda_k \tag{23}$$

Given the nature of the dependant variable in Eq. (22), *i.e.* an ordered supervision index, a weighted ordered probit model was specified, the data being weighted to compensate for the fact that firms had different probabilities of being selected for the survey.[20] To be sure, each establishment (*i.e.* observation) is weighted by the inverse of the probability that the establishment is included in the sample due to the design of the sampling.[21]

[18] The management respondent was defined as "... the senior manager dealing with personnel, staff or employee relations" at the establishment.

[19] The distribution of the index across the sample of firms is as follows: 0 (232 firms), 1 (1009 firms), 2 (601 firms), 3 (166 firms), 4 (85 firms), 5 (47 firms) and 6 (51 firms).

[20] The ordered probit approach was originated by Zavoina and McKelvey (1975) who developed a procedure to choose estimates for α and β as well as for the thresholds λ so that the estimated probability of the observed responses is maximized. Mathematically, α and β are chosen so that $\Sigma \ln(p_k)$ is maximized with the probability p of observing level k being given by $p_k = \text{prob}(\lambda_{k-1} < \alpha W_i + \beta Z_i \leq \lambda_{k-1})$. For more information on the ordered probit technique, see Greene (2000).

[21] The probability of selection was determined by three factors: (i) the Standard Industrial classification major group and the size band assigned by the IDBR maintained by the Office for National Statistics; (ii) whether the establishment on the IDBR accords with the definition of an establishment on the WERS; and (iii) the probability that the establishment was selected for the 1990 WERS, as these establishments where possible were excluded from the 1998 WERS. The overall probability of selection for an establishment is given by: $Prob(selection) = Prob(selection\ from\ IDBR\ once\ 1990\ WERS\ records\ excluded) + [1 - Prob(record\ excluded\ from\ IDBR)]$. For further details, see Airey et al. (1999).

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 & Ellingsen, 2002) or that supervisors only spend a fraction of work time monitoring (Rebitzer, 1995). Despite these problems, the relative paucity of data compels, us like so many other researchers, to rely on the proxy defined above.[22]

I incorporate a number of variables into my analysis to control for firm compensation and environmental factors including variables representing the characteristics of the work force. The inclusion of such variables is particularly important as certain types of individual may be attracted to certain types of firms, *e.g.* those operating performance-related pay schemes. Full variable definitions and summary statistics for the explanatory variables are detailed in Tables A.1 and A.2 in Appendix A. Wages clearly play a key role in my analysis. It is apparent, however, that a potential issue of endogeneity may exist with respect to wages and, hence, in the empirical specifications that follow I instrument for my wage proxy variable.[23] My wage proxy variable captures the importance of wages and other labor costs for each firm relative to sales revenue. I argue that such an approach captures the importance of labor costs within a particular firm and, as such, is more appropriate than a measure such as the average wage in each firm which has frequently been used in the literature. The average wage within a particular firm may be dominated by a small number of either low- or high-wage individuals and hence may not be representative of the firm as a whole. Clearly, my variable does not suffer from such drawbacks.

In particular, and given my objective of investigating the relationship between supervision, pay, and employee sharing, I include three variables representing the proportion of non-managerial employees participating in profit sharing, employee share ownership, or performance-related pay schemes.

Profit sharing is generally interpreted as a scheme in which a part of the employee's total remuneration is based on a share of the firm's profits. The perceived advantage to the firm is that such schemes motivate workers to perform given the presumed positive impact on profits. Moreover, since wage costs are a function of profitability, there is less pressure on employment levels during economic downturns. The downside is that workers are exposed to unattractive levels of risk in their compensation, although this could be compensated by the increased security of tenure alluded to above. And any scheme basing individual remuneration on collective performance indicators will fall prey to free riding.

Employee share ownership schemes are a variant of profit sharing in which employees are offered a number of shares in their firm and are thereby encouraged to align themselves more closely with the enterprise's longer term aims and objectives. Performance-related pay is a more general definition, usually associated with an individualized incentive scheme. Such schemes potentially by-pass the problem of free riding, but do little to encourage cooperation amongst

[22] Two exceptions here are Kruse (1992) and Wunnnava and Ewing (2004). The former proxies monitoring by an employee reported measure of how often the supervisor checks his/her work; the latter base their measure on the average cost of supervision.

[23] Over-identifying instruments for the wage equation include industry dummy variables as well as the proportion of managers, senior administrative and professional staff, the proportion of technical staff, the proportion of clerical and secretarial staff, the proportion of craft and skilled service staff, the proportion of protective and personal service staff, the proportion of sales staff and the proportion of operative, assembly and routine unskilled staff.

workers. For more details of profit sharing, share ownership and performance-related pay schemes, see Blinder (1990) and Estrin, Grout, and Wadhwani (1987).

It is apparent from Table A.2 that the average rate of supervision is relatively lower amongst "sharing" firms (*i.e.* those operating profit sharing, employee share ownership, or performance-related pay schemes). It is misleading, however, to read too much into this since there are significant differences across the two types of firms that may themselves be correlated with employee sharing or supervision. To control for such factors, I turn to my econometric analysis.

5. Results

My ordered probit results are set out in Table A.3 (Appendix A). I estimated three specifications focusing on the relationship between supervision and wages, supervision and "sharing" and supervision and the interaction between wages and "sharing". In general, my results are reasonably robust across all three specifications. I find evidence of a highly significant inverse relationship between wages and supervision as predicted by the instrumental efficiency wage model. The magnitude of this effect is especially heightened in specification (i) where the variables relating to sharing schemes are omitted. In specification (ii), I augment the basic model with variables denoting the extent of profit sharing, employee share ownership, and performance-related pay. Evidently, the extent of participation in employee share ownership and performance-related pay schemes, in accordance with the theoretical priors derived from the instrumental efficiency wage model, appears to be strongly inversely related to supervision. Surprisingly, however, that the extent of participation in profit-sharing schemes is insignificantly related to supervision.

In specification (iii), I include three variables that capture the interaction between total remuneration and the extent of participation in profit sharing, employee share ownership and performance-related pay. My aim here is to explore the prediction encapsulated by Eq. (21) of a heightened instrumental trade-off between remuneration and monitoring in "sharing" firms. My empirical results accord with this prior as regards performance-related pay and employee share ownership—an increase in total remuneration accompanying a larger fall in monitoring the larger the percentage of non-managerial employees covered by such schemes *ceteris paribus*. As regards profit sharing, however, my results suggest that the trade-off is actually alleviated—an increase in total remuneration is associated with a smaller fall in monitoring the larger is the percentage of non-managerial employees who received profit-related pay in the past 12 months. This contradicts an instrumentalist interpretation of efficiency wages, but may accord with a sociological interpretation. A trade-off between wages and monitoring can be rationalized in terms of Akerlof's (1982) gift-exchange model of efficiency wages, with workers responding to the firm's "gift" of higher wages by working more intensely, and therefore requiring less monitoring. If workers are concerned with both the level and the method of pay, then an interesting issue arises regarding the marginal utility of gifts. If workers regard profit sharing favorably, *i.e.* as a "gift" in its own right, then the marginal utility of the additional gift of higher wages may be less than that it would have been within an otherwise less benign environment. Although the ethereal nature of the sociological approach to efficiency wages hinders precise econometric interpretation, my results do raise the question as to why profit sharing, but not performance-related pay and employee share ownership, are regarded by workers as a gift.[24]

[24] It could, of course, be the case that all three methods of pay are regarded as gifts to varying degrees, but that only profit sharing is able to over turn instrumental considerations.

Table A.4 presents the marginal effects of changes in selected regressors for the seven probabilities pertaining to each level of the supervision index. In specification (ii), it is apparent that for values of the supervision index ranging from 2 to 6, in accordance with my theoretical priors, the marginal effects for the three explanatory variables %ESOP, %PRP and Wage are all negative. The marginal effects are largest for %ESOP, indicating that employee involvement in the firm may be more important in effort elicitation than remuneration *per se*. This overall pattern is repeated in specifications (i) and (iii) with the exception of the interactive term %PS × Wage, which reflects the findings of Table A.3.

In all three specifications, monitoring is inversely associated with dismissals and redundancies yet positively associated with the extent of new recruitment. Firms experiencing difficulties filling vacancies appear to monitor more—these firms may have a strong incentive to encourage their current work force to "work" rather than "shirk". Fixed term contract employment is inversely associated with the extent of supervision. Perhaps concerns regarding the renewal of such contracts are sufficient to spur individual performance?

I also incorporate employment as a proxy for firm size, differences in which may induce differences in monitoring with turnover and adverse selection costs encouraging larger firms to pay higher wages (Brunello, 1995; Bulow & Summers, 1986; Kruse, 1992). The sign of the estimated coefficient on employment supports the hypothesis that large firms devote more resources to monitoring. Finally, off-the-job training is positively associated with supervision suggesting that firms investing heavily in training are more inclined to monitor perhaps in order to ensure returns from the expansion of human capital.

6. Final comments

Instrumental efficiency wage models predict an inverse relationship between wages and monitoring, with the relationship becoming more pronounced amongst firms that participate in some form of employee sharing. Predictions from sociological models of efficiency wages are less clear, although a trade-off between monitoring and wages could be rationalized in terms of an exchange of gifts. The relationship between employee sharing and the trade-off in this latter interpretation depends critically on how workers regard the gift of higher wages within a sharing environment.

I have explored these predictions using the British 1998 Workplace Employee Relations Survey. My results confirm an inverse relationship between supervision and pay. The trade-off, however, is only heightened by the presence of performance-related pay and employee share ownership schemes. Profit sharing actually alleviates the trade-off, a finding that could be rationalized in terms of a gift-exchange interpretation of efficiency wages. I also find that employee share ownership and performance-related pay are relatively more successful in alleviating the need to monitor, with the rate of profit sharing impacting insignificantly on the level supervision.

Some caution is, however, warranted. Although introspection would suggest otherwise, I am unable to dismiss the possibility that it is supervision, or some other factor, which drives employee sharing. Perhaps firms operating employee share ownership plans can economize on monitoring because they are relatively more receptive to the needs and desires of their employees, who themselves respond positively to this ethos, with the implementation of the employee share ownership plan being but one of many such by-products.

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Appendix A

Table A.1
Variable list and definitions

Variable	Definition
Supervise	Index denoting percent of non-managerial employees who are supervisors
Wage proxy	Index denoting operating costs accounted for by wages, salaries and other labor costs such as pensions and national insurance as a proportion of sales revenue[a]
%PS	Percent of non-managerial employees who received profit-related pay in the past 12 months
%ESOP	Percent of non-managerial employees participating in employee share ownership scheme
%PRP	Percent of non-managerial employees who received performance-related pay in the past 12 months
Off-the-job training	Percent of employees who have received formal "off-the-job" training over the past 12 months
Training days	Average number of days per employee received in "off-the-job" training over the past 12 months
Vacancy difficulties	Dummy variable = 1 if firm has had difficulty filling non-managerial, senior administrative or non-professional vacancies in the last 12 months
Discretion	Index denoting how much discretion employees have over their work
Pace	Index denoting how much control employees have over the pace of their work
Fixed term contracts	Percent of employees employed on fixed term contracts
Female	Percent of female employees
Part-time	Percent of part-time employees (*i.e.* employees working fewer than 30 h/week)
Dismissals	Number of dismissals over the past 12 months
Redundancies	Number of redundancies over the past 12 months
New entrants	Number of people starting work over the past 12 months
Young	Percent of employees aged less than 20
Old	Percent of employees over age of 50
Ethnicity	Percent of employees from non-white ethnic background
Trade union members	Number of trade union members/number of employees
Firm size	Number of employees

[a] The "Employee Questionnaire" represents an alternative source of wage data. For this survey, a sample of employees, randomly selected from all employees, was asked to indicate in which band their wage or salary lay. A maximum of 25 employees were selected from each firm. Given that in very large firms such a sample size is somewhat small and may not, therefore, be representative of the workplace as a whole, I decided to use the alternative source of wage information presented in the "Management Questionnaire".

Table A.2
Descriptive statistics

Variable	All firms ($n=2191$)				Sharing firms ($n=985$)		Non-sharing firms ($n=1233$)	
	Mean	S.D.	Minimum	Maximum	Mean	S.D.	Mean	S.D.
Wage proxy	2.26	1.28	0.00	4.00	1.90	1.17	2.54	1.29
%PS	0.26	0.42	0.00	1.00	0.58	0.45	–	–
%ESOP	0.11	0.27	0.00	1.00	0.25	0.36	–	–
%PRP	0.13	0.32	0.00	1.00	0.31	0.42	–	–
Supervise	1.64	1.25	0.00	6.00	1.55	1.20	1.71	1.28
Off-the-job training	0.48	0.37	0.00	1.00	0.50	0.36	0.46	0.38
Training days	3.24	2.84	0.00	10.00	3.40	2.84	3.11	2.83
Vacancy difficulties	0.43	0.50	0.00	1.00	0.47	0.50	0.39	0.49
Discretion	1.80	0.87	0.00	3.00	1.72	0.85	1.86	0.88
Pace	1.70	0.89	0.00	3.00	1.68	0.88	1.71	0.90
Fixed term contracts	0.04	0.09	0.00	0.50	0.03	0.07	0.05	0.10
Female	0.49	0.29	0.00	1.00	0.42	0.26	0.55	0.29
Part-time	0.26	0.28	0.00	1.00	0.20	0.26	0.30	0.29
Dismissals	2.29	6.94	0.00	162.00	3.02	9.01	1.72	4.67
Redundancies	4.72	27.60	0.00	835.00	6.59	36.18	3.27	18.23
New entrants	43.66	112.37	0.00	2665.00	53.23	131.61	36.22	94.14
Young	0.06	0.11	0.00	0.89	0.07	0.11	0.06	0.11
Old	0.15	0.12	0.00	0.86	0.13	0.10	0.16	0.12
Ethnicity	0.05	0.10	0.00	0.89	0.05	0.10	0.05	0.10
Trade union member	0.31	0.35	0.00	1.00	0.31	0.35	0.31	0.34
Firm size	288.74	847.31	10.00	28971.00	300.47	449.83	279.63	1057.75

Table A.3
All firms

Variable	Specification (i)		Specification (ii)		Specification (iii)	
	Coefficient	T statistic	Coefficient	T statistic	Coefficient	T statistic
Wage proxy	−0.0471	−7.095	−0.0274	−4.040	−0.0337	−4.965
%PS	–	–	0.0112	0.487	–	–
%ESOP	–	–	−0.2383	−4.412	–	–
%PRP	–	–	−0.2364	−8.293	–	–
%PS × Wage	–	–	–	–	0.0193	2.627
%ESOP × Wage	–	–	–	–	−0.0740	−3.771
%PRP × Wage	–	–	–	–	−0.0467	−5.119
Off-the-job training	0.2439	13.493	0.2779	14.851	0.2680	13.879
Training days	0.0044	2.007	0.0038	1.716	0.0044	1.984
Vacancy difficulties	0.2200	16.948	0.2081	15.695	0.2107	15.897
Discretion	0.0096	1.259	0.0131	1.695	0.0124	1.617
Pace	−0.0371	−4.768	−0.0391	−4.991	−0.0375	−4.784
Fixed term contracts	−0.3470	−4.771	−0.3753	−5.189	−0.3532	−4.869
Female	0.0445	1.835	0.0466	1.906	0.0527	2.159
Part-time	−0.1612	−7.176	−0.1854	−8.174	−0.1710	−7.507
Log dismissals	−0.1219	−8.105	−0.1316	−8.718	−0.1278	−8.399
Log redundancies	−0.0584	−2.617	−0.0615	−2.755	−0.0609	−2.712
Log new entrants	0.0961	11.961	0.0968	11.872	0.0975	11.954
Young	0.2174	4.816	0.2025	4.455	0.2128	4.690
Old	0.0553	1.311	−0.0043	−0.101	0.0423	0.991

Table A.3 (*Continued*)

Variable	Specification (i)		Specification (ii)		Specification (iii)	
	Coefficient	*T* statistic	Coefficient	*T* statistic	Coefficient	*T* statistic
Ethnicity	−0.0369	−0.755	0.0390	0.753	0.0118	0.230
Trade union members	0.0637	2.634	0.0898	3.587	0.0764	3.101
Log firm size	0.0468	2.775	0.0613	3.618	0.0550	3.235
Constant	0.6927	12.389	0.6261	11.028	0.6295	11.229
Log likelihood function	−3126.871		−3120.975		−3123.393	
Restricted log likelihood	−3157.561		−3157.561		−3157.561	
Chi-squared statistic	61.38024 (17d.f.)		73.17099 (20d.f.)		68.33645 (20d.f.)	
Number of observations	2191		2191		2191	

Dependent variable: supervise—weighted ordered probit model.

Table A.4
All firms

Variable	Supervision index						
	0	1	2	3	4	5	6
Specification (i)							
Wage	0.0115	0.0063	−0.0075	−0.0040	−0.0024	−0.0012	−0.0027
Specification (ii)							
%PS	−0.0027	−0.0015	0.0018	0.0009	0.0006	0.0003	0.0006
%ESOP	0.0579	0.0319	−0.0380	−0.0202	−0.0119	−0.0062	−0.0135
%PRP	0.0575	0.0316	−0.0377	−0.0201	−0.0118	−0.0061	−0.0134
Wage	0.0066	0.0037	−0.0044	−0.0023	−0.0014	−0.0007	−0.0015
Specification (iii)							
%PS × Wage	−0.0047	−0.0026	0.0031	0.0016	0.0010	0.0005	0.0011
%ESOP × Wage	0.0180	0.0099	−0.0118	−0.0063	−0.0037	−0.0019	−0.0042
%PRP × Wage	0.0114	0.0062	−0.0074	−0.0040	−0.0023	−0.0012	−0.0027
Wage	0.0082	0.0045	−0.0054	−0.0029	−0.0017	−0.0009	−0.0019

Dependent variable: supervise—weighted ordered probit model (marginal effects).

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