Wages, Supervision and Sharing

Sarah Brown*, Fathi Fakhfakh** and John G. Sessions***

* Public Sector Economics Research Centre
Department of Economics
University of Leicester
University Road, Leicester LE1 7RH
England

**Universite Pantheon-Assass Paris II
92 Rue D'Assas
75006 Paris
France
and
Equipe de Recherche sur les Marches, l'Emploi et la Simulation (ERMES),
83 Bis Rue Notre Dame des Champs
75006 Paris
France

*** Brunel University
Uxbridge
Middlesex UB8 3PH
England

Abstract: We investigate the relationship between pay, supervision and employee sharing. Our results suggest an inverse relationship between supervision and pay across both sharing and non-sharing firms, although the trade-off is somewhat assuaged within the former. This would appear to contradict instrumental efficiency wage considerations, but could be rationalised within a gift-exchange context. In terms of specific sharing schemes, it would seem that employee share ownership plans are relatively more successful in alleviating the need to monitor, with higher rates of profit sharing inducing more, rather than less, supervision

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I. Introduction

Efficiency wage theory suggests that employers can improve the productivity or quality of their workforce by paying wages in excess of the opportunity cost of labour. There are two schools of thought as to 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 [Shapiro and Stiglitz (1984), Bowles (1985)]. 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 co-operation and reciprocity, rather than by entering an instrumental calculation of the expected net benefit of shirking.

It is difficult to test efficiency wage theory 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, one would expect firms paying such premia to invest fewer resources in monitoring worker behaviour.[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 [Weitzman and Kruse, (1990), Blinder (1990)].

[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).

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, then 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 mitigate 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 rather less obvious.

In this paper we present the first cross-plant/time series study of the effects of profit sharing and employee share ownership plans (ESOPs) on the relationship between supervision and pay. Our results suggest an inverse relationship between supervision and pay across both sharing and non-sharing firms, although the trade-off is somewhat assuaged within the former - i.e. an increase in remuneration induces a relatively smaller cut in monitoring amongst sharing firms than amongst their non-sharing counterparts ceteris paribus. This would appear to contradict instrumental efficiency wage considerations, but could be rationalised within a gift-exchange context. In terms of specific sharing schemes, it appears that employee share ownership plans are relatively more successful in alleviating the need to monitor.[2]

The paper is set out as follows: Section II discusses some background issues concerning the relationship between pay, supervision, and sharing. Section III sets out the

[2] We use the terms 'supervision' and 'monitoring' interchangeably in what follows. Although supervisors have different functions at different firms, and firms may utilise 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 and Kruegger (1990)].

theoretical underpinning to our study whilst Section IV describes our data and methodology. Our empirical results are presented in Section V and our final comments in Section VI.

II. Background

Wages and Monitoring

Economists have long recognised that there are substantial differences in the rewards to similar occupations across industries. It is only recently, however, that they have 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 that of its lowest paying competitor. At any point in time such a range of pay could reflect a transitory demand and shock driving up wages in particular industries along short-run inelastic labour 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, Garbarino (1950), Slichter (1950), Cullen (1956), Reder (1962), Bell and Freeman (1985) and Krueger and Summers (1987)].

Two regularities emerge from the various attempts to account for such assiduity vis. higher wages are usually associated with: (i) higher profits and / or concentration [see Dickens and Katz (1987) and Krueger and Summers (1987)]; and (ii), larger plant and / or firm size [see Brown and 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).[4]

Measuring the trade-off between wages and monitoring explicitly, however, has proved almost as vexing as studying the direct effect of high wages on employee behaviour. Two problems are particularly irksome. The first concerns omitted variable bias. In many

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[3] It could also be the case that there are 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) and Kruse (1992). Somewhat ambiguous results are reported in Neal (1993), Fitzroy and Kraft (1986) and Brunello (1995).

employment relationships a single employer optimally chooses both the level of wages and supervision. Such simultaneity is problematic because omitted aspects of human resource policies that affect wages (e.g. employee screening or training procedures) may also be correlated with supervisory intensity and might, therefore, mask the underlying trade-off between wages and supervision.[5]

The second difficulty is the measurement of supervisory intensity. Most studies measure supervision by the ratio of supervisors to supervised. Such 'span of control' measures are problematic because many supervisors spend only a fraction of their work time monitoring non-supervisors and their inclusion in a measure of monitoring intensity may exasperate any bias resulting from the simultaneous determination of wages and supervision [Kruse (1992)].

A good illustration of this latter issue is found in the study by Leonard (1987) which regresses the wages of staff workers across six occupations on the supervisor-to-staff ratio in a sample of US 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 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.

[5] The presence of wage bargaining would, of course, abate this problem.

[6] Assume, for example, a Cobb-Douglas production function $Q = AL^a S^b$ where L and S denote non-supervisory and supervisory inputs respectively and where Q denotes output. If the firm faces a competitive cost function $C = wL + rS$ then cost minimization implies $S/L = (b/a)(w/r)$ 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.

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 US 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 US petrochemcial 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 human resource practices of the contractors. 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.

Two other studies that find generally supportive evidence of a wage-supervision trade-off are 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) per cent 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 was found to exhibit a generally negative relationship with wages – daily supervised workers received 1.2 per cent lower pay than their weekly supervised counterparts ceteris paribus.[7]

Studies that fail to find conclusive evidence of a wage-monitoring trade-off include Neal (1993), Fitzroy and Kraft (1986) and Brunello (1995). 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 the supervisor-to-staff ratio to be 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.

Employee sharing

Employee sharing has implications for instrumental and gift-exchange models of efficiency wages, impacting on both the marginal net benefit of shirking and on the wider exchange environment.[8] An interesting, yet hitherto unexplored, question thus arises as to the

[7] It should be noted that 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.

[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

consanguinity of pay, supervision and sharing. Introspection would suggest 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 efficieny 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/she runs some risk of being detected, fired, and thus of not receiving the extra pay. Since it is in the firm's interest to give the worker a zero net benefit, it can economise on monitoring and thus raise the utility of shirking by giving workers a bigger 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 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. A rise in wages may be regarded as a gift on the part of the firm and thus may induce more effort and 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 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

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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 and Whitfield (1998), p.174].

> 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 of his/her 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 and/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 remains an open question. 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 and Demsetz (1972), Jensen and 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 [O'Dell and McAdams (1987), Kanter (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]

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[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 ostracising 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 and Kraft (1986, 1987)].

[10] It should be noted, however, that although risk considerations reduce the optimal profit share, a contract comprising fixed remuneration only is very unlikely [Hart and Holmstrom (1987)].

[11] To ascertain the merit of such arguments Levine and Tyson (1990) surveyed twenty-nine empirical studies of worker participation and found only two concluding against participation. In contrast, fourteen studies found in favour of participation with the remaining thirteen offering somewhat ambiguous results. Levine and Tyson concluded that successful participation requires: (i) some form of profit sharing to reward co-operative

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 the estimates of the employee ownership variables that arise from such studies may have the wrong sign." [Ben-Ner and 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 [see, for example, Greenberg (1986), Bartlett et al (1992)] but to our knowledge no one has explored the situation within profit sharing firms.

III. Theoretical Underpinning

Some insight into the possible relationship between employee sharing and supervision may be discerned from the following expository model. 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 effort to their employer such that $e = (0, \bar{e})$, $\bar{e} > 0$. The firm has access to some monitoring technology defined though 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] We assume $p'(k) > 0$

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behaviour; (ii) guaranteed long term employment to increase the time horizons of workers 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.

[12] 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.

$p''(k) < 0$, $p(0) = 0$ and $\lim_{k \to \bar{k}} p(k) = 1$.[13] Detection implies instantaneous dismissal and unemployment utility b.[14]

Fixed Wages

Consider first the fixed wage scenario. The firm's problem is to maximise profits subject to the constraints that the worker receives at least his/her reservation utility (viz. $b + \bar{e}$) and that, once employed, he/she 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 (2) 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 follows:

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

Fixed Wages with Remunerative Shirking Costs

Consider now a more general case in which the individual's wage is some function of his/her performance such that there is some remunerative penalty associated with shirking. To be sure, assume that the shirking wage is given by $w = w(1 - z)$ where $z \in (0,1)$ is a parameter 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 loses all his/her wage as z approaches unity. The non shirking constraint is now:

[13] 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.

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

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

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 equation (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:

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

$$\lim_{z \to 1, k \to \tilde{k}} w^* = \bar{e} + b^* \tag{9}$$

$$\lim_{z \to 0, k \to 0} w^* = \infty \tag{10}$$

$$\lim_{z \to 1, k \to 0} w^* = \bar{e} \tag{11}$$

Thus irrespective of the remunerative cost associated with shirking the firm can hold the worker down to his/her reservation wage providing it perfectly monitors.

The wage-monitoring trade-off is given by:

$$\frac{dk}{dw} = \frac{[p(k)(1 - z) + z]^2}{p'(k)[bz - (1 - z)\bar{e}]} \tag{12}$$

with limits:

$$\lim_{z \to 0} \frac{dk}{dw} = -\frac{p(k)^2}{p'(k)\bar{e}} < 0 \tag{13}$$

$$\lim_{z \to 1} \frac{dk}{dw} = \frac{1}{p'(k)b} > 0 \tag{14}$$

The trade-off depends crucially on the value of z. With no remunerative shirking costs we derive the conventional inverse relationship. With complete costs the trade off is positive, the expected utility of shirking increasing with the level of with monitoring since it is now in the worker's interest to be detected and fired since only then will any remuneration be received. The critical z value occurs when:

$$bz^* - (1 - z^*)\bar{e} = 0 \;\; \rightarrow \;\; z^* = \frac{\bar{e}}{\bar{e} + b} \tag{15}$$

Thus the trade off is negative (positive) for values of z less than (greater than) z^*. The key point is illustrated in Figure I below.

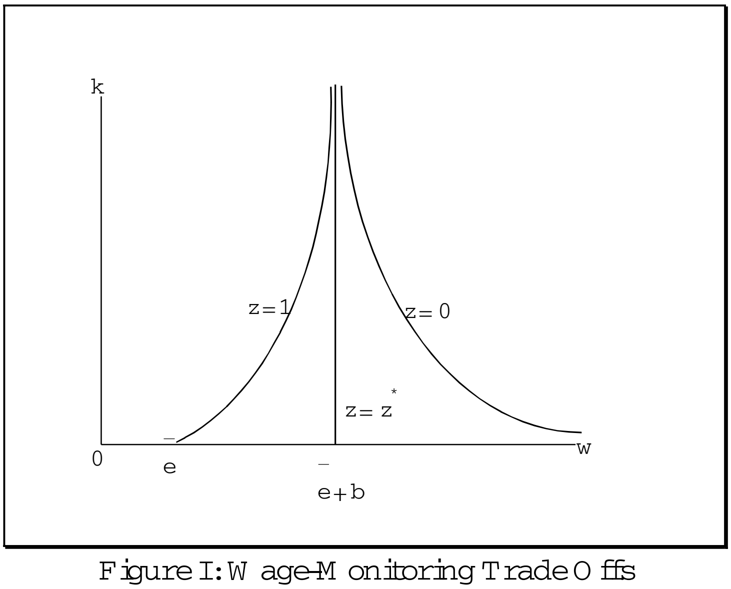

Figure I: Wage-Monitoring Trade Offs

Wages, Monitoring and Sharing

We now develop a somewhat more formal model of employee sharing. We assume for simplicity that firms employ a single worker and face a stochastic revenue function $f(e;q_i)$ where q_i is a parameter representing a random shock to demand or productivity. We assume that q_i takes one of two values, q_H with probability s or q_L with probability $(1 - s)$. q_i is revealed to both the worker and the firm after the employment contract has been signed and impacts on revenue as follows:

$$f(\bar{e}, q_H) > f(\bar{e}, q_L) = f(0, q_H) > f(0, q_L) \tag{17}$$

We envisage a simple employee sharing contract of the form:

$$w = (1 - l)\bar{w} + l f(e; q_i) \tag{18}$$

where w represents total remuneration, $\bar{w}$ the component of total remuneration that is 'fixed' (i.e. independent of worker performance), and $l_j \in [0,1]$ the level of worker equity (vis. the fraction of total remuneration that depends on individual effort).[15]

The NSC now takes the form:

$$\begin{aligned} & s[(1 - l_j)\bar{w} + l f(\bar{e}, q_H)] + (1 - s)[(1 - l_j)\bar{w} + l_j f(\bar{e}, q_L)] - \bar{e} \\ & \geq \\ & p(k)b + [1 - p(k)]\{s[(1 - l_j)\bar{w} + l_j f(0, q_H)] + (1 - s)[(1 - l_j)\bar{w} + l_j f(0, q_L)]\} \end{aligned} \tag{19}$$

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. $p(k) + (1 - s)[1 - p(k)]$. We can therefore reduce equation (17) to:

$$(1 - l_j)\bar{w} + l_j[sf(\bar{e}, q_H) + (1 - s) f(\bar{e}, q_L)] - \bar{e} \geq (1 - \tilde{s})b + \tilde{s}[(1 - l_j)\bar{w} + l_j f(0, q_H)] \tag{20}$$

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

$$\bar{w} = \frac{1}{(1 - l_j)(1 - \tilde{s})}\left[(1 - \tilde{s})b + e - l_j \langle sf(e, q_H) - \{s[2 - p(k)] - 1\} f(e, q_L)\rangle\right] \tag{21}$$

and implies total 'efficiency' remuneration of:

$$w^* = b + \frac{1}{(1 - \tilde{s})}(e - l_j s\tilde{s}\Delta f) \tag{22}$$

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[15] We assume in what follows that the extent of worker equity, as measured by l, 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.

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

$$\left.\frac{dk}{dl_j}\right|_{dw=0} = \left\{\frac{s(1-\tilde{s})\Delta f}{p'(k)(l_j s\Delta f - e)}\right\} \tag{23}$$

$$\left.\frac{dk}{dw}\right|_{dl_j=0} = \left\{\frac{(1-\tilde{s})^2}{p'(k)s(l_j s\Delta f - e)}\right\} \tag{24}$$

$$\frac{d^2k}{dw\,dl_j} = -\left\{\frac{(1-\tilde{s})^2\Delta f}{p'(k)(l_j s\Delta f - e)^2}\right\} \tag{25}$$

Equation (25) is unequivocally negative. The sign of equations (23) and (24) depend crucially on the term $(l_j s\Delta f - e)$. If $\Delta f \leq (e/l_j s)$ then equations (23) and (24) are negative such that profit sharing firms face the same inverse trade-off but monitor relatively less than their non-profit sharing counterparts.[16] If $\Delta f > (e/l_j s)$ then equations (23) and (24) are positive implying that profit sharing firms monitor relatively more and face an upward sloping trade off.

Under these assumptions, $s\Delta f = e$ such that $l_j s\Delta f < e$ and equations (23) - (25) 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.

[16] Note that $\Delta f = 0$ – akin to the $z = 0$ case previously – ensures the conventional inverse trade off.

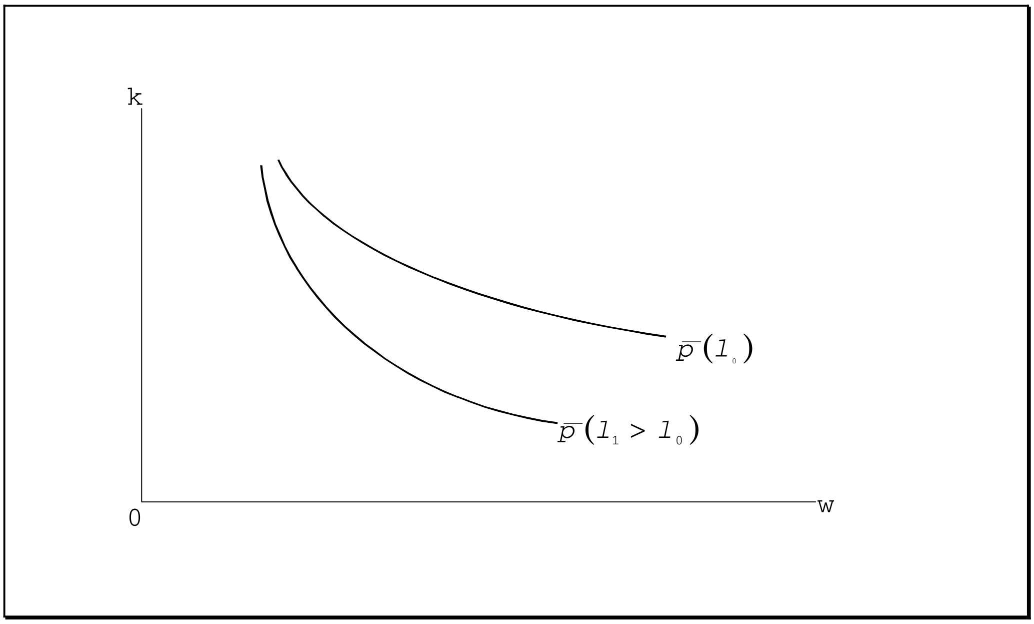

Figure II: Optimal Pay-Monitoring Trade Offs: $dk/dw < 0$

The latter is illustrated graphically in Figure I above. 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 vis. $l\Delta f$ – 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 our 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

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

diminishing marginal utility? If employee sharing is interpreted favourably 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 our empirical evidence that we are obliged to turn.

IV. Data and Methodology

Data

Our data are derived from the Equipe de Recherche sur les Marches, l'Emploi et la Simulation (ERMES) database over the period 1981-1991.[18] The database was constructed to improve understanding of the French labour market and contains a firm level survey of a sample of French-based firms which employ more than 300 employees. There were 1002 such firms in existence in 1983 when the database was setup, 500 of which were surveyed by post and 230 of which provided information.[19] The survey includes questions relating to the employment practices adopted by the firm as well as firm characteristics such as industrial affiliation. The industries covered were Engineering and Capital Goods (Eng/Cap); Agriculture (Agric); Energy; Intermediate Goods (Int Gds); Motor Vehicles (Mtr Veh); Telecommunications (Telecom), Transport (Transp) and Services.[20]

We selected companies from the database according to the following criteria. First, only those companies providing information on a number of key variables such as the company's 'Sirene' (i.e. registration code) and the total wage bill were selected. Our initial

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[18] ERMES is a labour market research group based in Paris II University and is affiliated to the National Centre of Scientific Research (CNRS).

[19] The survey is derived from the 'social accounts' that all firms employing more than 300 workers are legally obliged to furnish. Each annual sweep contains accounting information on the current and two preceding years. Thus, although the database was setup in 1983, we have data from 1981.

[20] Sharing arrangements in France are relatively recent phenomena, with profit sharing and employee share ownership plans only receiving official recognition in 1959 and 1970 respectively. They have, however, proven to be extremely popular. By 1986 (1990) over 0.6 (2.0) million workers were covered by a profit sharing arrangement. ESOP's have been more popular amongst larger firms with 350 firms having such arrangements in place covering 0.6 million people by 1989 [see Uvalic (1991), DARES (1995)]. Extensive details of the ERMES database are contained in Ballot and Fakhfakh (1996) and d'Arcimol (1995).

sample thus comprised 195 companies, 76 of which appeared for the whole ten year period, thereby forming an unbalanced panel of data.

We estimated eight regression specifications focusing on the following five sub-samples: (1) all firms [specifications (i) – (iii)]; (2) sharing firms [specification (iv)]; (3) non-sharing-firms [specification (v)]; (4) profit sharing only firms [specifications (vi) – (vii)]; and (5) ESOP only firms [specification (viii)]. Having selected the appropriate sub-sample from the 195 companies for each specification, we then eliminated: (i) any company which appeared in the database for less than three years in total; and (ii) any 'appearance' by a company of less than three years occurring immediately before or after a 'disappearance' of more than two years. Our aim here was to exclude lengthy disappearances during which companies may experience unobservable, and thus potentially misleading, changes.

The number of firms introducing and abolishing sharing schemes and the sectoral distribution of sharing and non-sharing firms across the panel are set out in Tables I and II following.

Table I

Table II

It is apparent from Tables I and II that the sectoral distribution of companies remained relatively stable over the sample period with the majority of companies that were eliminated, whether temporally or permanently, being generally those which had not supplied information for the pre-1983 period. This derives from the fact that the database only became fully operational in 1984 and no means of verification were available for the preceding years.[21]

Methodology

Our estimating equation is specified as follows:

[21] It is apparent from Table II that there has been a three-fold increase in the proportion of sampled firms operating some form of employee sharing arrangement. This is not specific to our sample, but rather accords with general trends in the growth of such schemes in France over the 1980s, especially following the 1986 Ministry of Labour Ordinance abolishing the requirement of firms to obtain prior ministerial approval before the implementation of any profit sharing scheme. By the end of 1985 (1990), 1300 (10000) profit sharing contracts had been signed covering 0.4 (2.0) million employees [see Fakhfakh and Mabile (1997)].

$$m_{it_i} = \alpha W_{it_i} + \beta Z_{it_i} + u_{it_i} \quad (14)$$

where $i = 1,\ldots,N$ denotes the firm specific subscript, N denotes the total number of firms in the panel and $t_i = 1_i,\ldots,T_i$ denotes the firm specific time subscript representing the t^{th} appearance by firm i in the panel.[22] The error structure allows for firm specific effects with $u_{it_i} = \mu_i + v_{it_i}$, where μ_i and v_{it_i} are iid, $\mu_i \rightarrow N(0,\sigma^2_\mu)$ and $v_{it_i} \rightarrow N(0,\sigma^2_v)$. Finally, m_{it_i} represents the 'monitoring intensity' of firm i whilst W_{it_i} and Z_{it_i} represent vectors of compensation and firm environment characteristics respectively.

Following Leonard (1987), Gordon (1990, 1994) and Neal (1993), we proxy monitoring intensity via the ratio of supervisory to non-supervisory employees. 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 (1998)] 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.[23]

We incorporate a number of variables into our analysis to control for compensation and environmental factors within the firm. In particular, and given our objective of investigating the relationship between supervision, pay and employee sharing, we follow Blasi (1988) in controlling for the extent of the latter by including dummy variables denoting the presence of a particular sharing scheme and a variable denoting the ratio of the average profit sharing bonus to the average base salary per firm (BONUS%). Our data do not, unfortunately, discriminate between the number of workers covered by a profit sharing or

[22] It should be noted that the periods of observation are not necessarily the same for all companies. Similarly, the first and last period of eligibility of a company to the sample is not necessarily the first year (i.e. 1981) or the last year (i.e. 1991).

[23] One exception is Kruse (1992) who proxies monitoring by an employee reported measure of how often the supervisor checks his/her work.

ESOP scheme, nor the percentage of stock which is employee owned.[24] Full variable definitions and summary statistics for the explanatory variables are detailed in Tables III and IV below.

Table III

Table IV

Somewhat surprisingly there is no significant difference in the average rates of supervision across sharing and non-sharing firms. It is misleading, however, to read too much into this since there are significant differences across the two types of firms which may themselves be correlated with employee sharing and/or supervision. To control for such factors we turn to our econometric analysis.

V. Results

Our econometric analysis is rendered somewhat problematic by the unbalanced nature of the panel. Numerous approaches have been proposed to take account of the incomplete nature of sample groups [see Hsiao (1989), Verbeek and Nijman (1992) and Wansbeek and Kapteyn (1989) for surveys of this area]. It is appropriate to use the fixed effects estimator given that the Hausman Chi squared statistic indicates significant correlation between the individual effects and the explanatory variables. In addition, it is apparent that a potential issue of endogeneity may exist with respect to wages and, hence, in the empirical specifications that follow we adopt the Hausman and Taylor instruments for both base and total wages.[25]

Our results are presented in Tables V – VII following. As outlined previously, we present eight specifications, all of which appear to be generally well defined. In particular, assuming the underlying econometric model is correctly specified, the significance of the

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[24] Although often confused, profit sharing and ESOP's are, at least in principle, quite distinct. The latter pay benefits in company stock rather than in cash and the company's contribution need not be tied to profits. In practice, however, deferred profit sharing plans are de rigour and these are much more akin to ESOP's, especially when the deferred compensation is held in company stock [Blasi (1988)]. Nevertheless, the argument that tying the fortunes of capital and labour together might impact favourably upon firm performance has been applied to both schemes [Conte and Svejnar (1988)].

[25] That is, all the variables in Table V, except the employee sharing variables, taken in means and in deviation from mean [see Hausman and Taylor (1981)].

Hausman Chi-squared statistic confirms our use of the fixed effects approach with the exception of specification (viii), Table VII (see footnote 26 below).

All Firms

It is apparent from Table V that for the 'all firm' sample, our results support the standard trade-off between wages and monitoring. In terms of employee sharing (specification ii), it would seem that it is the presence of an ESOP rather than a profit sharing scheme which asserts a significant negative effect on monitoring. Indeed, when we split total remuneration into a base and sharing component (specification iii), the latter is seen to exert no significant effect on monitoring.[26]

Table V

We 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), Kruse (1992), Bulow and Summers (1986)]. The positive and highly significant estimated coefficient on employment supports the hypothesis that large firms do indeed devote more resources to monitoring.

Expenditure on training also appears to exert a positive influence on monitoring. It might be the case that firms investing heavily in training are more inclined to monitor in order to ensure returns from the expansion of human capital. In all three specifications, our results suggest that turnover exerts a negative influence on monitoring. One explanation for this might be that as total exits rise those individuals ill suited to the task in hand may leave, thereby alleviating the need to monitor. It is also interesting to note that firms with relatively high proportions of female, young, part-time and old employees expend significantly fewer resources on monitoring. Given the limited employment opportunities available to the first three of these groups, the threat of unemployment alone may be sufficient to elicit effort. The decline in monitoring amongst firms employing a high proportion of 'old' workers might

[26] We are implicitly recording a zero bonus for non profit sharing firms in specification (iii).

reflect the reluctance of such workers to jeopardise losing the returns to their long-accumulated human capital investments.

Finally, our results indicate that despite being recorded as separate groups, there is a very strong correlation between the percentage of managerial staff and the supervisor-to-staff ratio. Indeed, this correlation will be seen to hold in every one of our eight specifications.

Sharing and Non-Sharing Firms

Turning to the dichotomy between 'sharing' and 'non-sharing' firms, the results presented in Table VI suggest that the influence of total pay on monitoring is less pronounced in 'sharing' than 'non-sharing' firms. This contradicts our a priori expectations and would seem counter-intuitive in terms of an instrumental efficiency wage setting. It could, however, represent a diminishing marginal utility of 'gifts' on the part of workers – i.e. workers in sharing firms obtain relatively less additional utility from high pay, and subsequently require relatively higher supervision, than their counterparts in non-sharing firms.

Table VI

Other results of interest include the proportion of foreign workers, which is positively related to monitoring within non-sharing, but not sharing, firms, and the firm size effect, which is insignificant in sharing firms yet significant and positive in non-sharing firms. Somewhat surprising, the rate of staff turnover is positively related to monitoring in sharing firms, but negatively so related in non-sharing firms. Finally, as per the 'all firm' sample, training expenditure is positively associated with monitoring in both types of establishment.

Profit Sharing and ESOP Firms

Given the significant differences between profit sharing and ESOP schemes, we distinguish between the type of sharing arrangements in Table VII. In all three specifications the trade-off between supervision and pay prevails, although the magnitude of this relationship is somewhat assuaged within profit sharing firms. In specification (vii), the bonus variable exhibits a positive coefficient, which would appear to contradict our a priori expectations. It could be that the incentive to free ride overrides any considerations of gifts and compels profit sharing firms to invest relatively more heavily in monitoring worker performance. Alternatively, it may be that supervisors are the main recipients of such bonuses.

Table VII

Other results of interest reflect the asymmetries between the two firm types, specifically the proportion of part-time employees is positively (negatively) related to monitoring in ESOP (profit-sharing firms) whilst turnover is positively (negatively) so related in profit-sharing (ESOP) firms.

To summarise, our results suggest that the relationship between remuneration and supervision depends crucially on whether firms have a stake in the performance of their firm. To be specific, the existence of employee involvement schemes such as profit sharing and ESOP arrangements appears to exert a moderating influence on the wage-monitoring trade-off. In addition, the results presented in Table VII suggest that the type of employee involvement scheme also affects this trade-off.

VI. Final Comments

This study utilises data from a panel of 127 French firms over the period 1981-1991 to ascertain the relationship between pay, supervision and employee sharing. Our results suggest an inverse relationship between supervision and pay across both sharing and non-sharing firms, although the trade-off is somewhat assuaged within the latter. In terms of specific sharing schemes, it appears that employee share ownership plans are relatively more successful in alleviating the need to monitor, with the rate of profit sharing impacting positively on the level supervision.

Some caution is, however, warranted. Although introspection would suggest otherwise, we are unable to dismiss the possibility that it is supervision, or some other factor, which drives employee sharing. It may be the case, for example, that ESOP firms are able to economise 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 ESOP being but one of many such by-products.

Appendix

Table I
Introduction and Abolition of Sharing Schemes
Number of Firms

	1982	1984	1984	1985	1986	1987	1988	1989	1990	1991
Introduced PS	0	1	1	1	4	2	3	14	6	1
Abolished PS	1	0	0	0	1	0	0	3	5	6
Introduced ESOP	0	1	1	1	2	1	2	2	4	1
Abolished ESOP	0	0	1	2	0	0	0	1	3	1

Table II
Sectoral Distribution of Firms
Number of Firms

		Eng/Cap	Agric	Energy	IntGds	MtrVeh	Telecom	Transp	Services	Total
81	PS	0	0	0	2	0	0	1	0	3
	ESOP	4	0	1	1	1	0	0	0	7
	NO	19	9	3	16	5	5	9	3	69
82	PS	0	0	0	2	0	0	0	0	2
	ESOP	4	0	1	1	0	0	0	0	6
	NO	21	9	3	17	5	5	11	3	74
83	PS	0	1	0	2	0	0	1	0	4
	ESOP	5	0	1	1	0	0	0	0	7
	NO	21	9	3	18	6	7	12	4	80
84	PS	1	1	0	1	0	0	0	0	3
	ESOP	3	0	1	3	1	0	0	0	8
	NO	13	6	3	11	6	4	7	0	50
85	PS	1	1	0	2	0	0	1	0	5
	ESOP	3	0	1	3	0	0	1	0	8
	NO	22	9	3	16	8	7	12	4	81
86	PS	2	1	0	3	0	0	2	1	9
	ESOP	4	0	1	4	1	0	1	0	11
	NO	22	8	3	17	7	8	11	3	79
87	PS	1	2	0	4	0	0	2	1	10
	ESOP	3	1	1	3	0	0	1	0	9
	NO	18	7	3	11	5	8	9	2	63
88	PS	4	2	0	5	0	0	2	1	14
	ESOP	7	1	1	4	1	0	2	0	16
	NO	19	9	3	17	6	9	11	2	76
89	PS	6	2	1	7	2	2	6	0	26
	ESOP	6	1	2	3	1	0	3	0	16
	NO	14	8	2	13	5	7	10	5	64
90	PS	7	3	2	8	1	2	3	0	26
	ESOP	8	0	1	2	2	0	2	0	15
	NO	12	6	2	11	5	6	10	5	57
91	PS	4	2	2	5	2	2	3	0	20
	ESOP	8	0	1	2	2	0	1	0	14
	NO	12	6	2	12	7	5	7	5	56

Notes:
(i) Figures denote the number of firms operating a particular sharing scheme where PS = profit sharing scheme; ESOP = employee share ownership scheme; NO = no sharing scheme.
(ii) Sample used: 127 firms and 961 observations.
(iii) Since a firm may have both sharing schemes, the total number of firms within a particular sector/year is not necessarily the sum of PS, ESOP and NO.

Table III Variable List and Definitions[27]	
VARIABLE	DEFINITION
BONUS	Average profit share bonus per firm
BONUS%	(BONUS/BASEWAGE)*100%
EMPLOYMENT	Total employment
ESOPONLY	ESOP dummy variable = 1 if ESOP scheme is present and profit sharing scheme is not present
FEMALE	Percentage of female employees within the work force
BASEWAGE	Average (base) salary per firm
FOREIGN	Percentage of foreign employees within the work force
MANAGE[28]	Percentage of managerial staff within the work force
OLD	Percentage of employees over age-50 within the work force
PARTIME	Percentage of part-time employees within the work force
PROFITSHARE ONLY	Profit sharing dummy variable = 1 if profit sharing scheme is present and ESOP scheme is not present
PROFITSHARE & ESOP	Employee sharing dummy variable = 1 if both profit sharing and ESOP scheme are present
SUPERVISION	Ratio of supervisory to non-supervisory employees
TOTALWAGE	Fixed wage + bonus
TRAINEXP	Expenditure on training per employee
TURNOVER	0.5*[total entries (i.e. hiring) + total exits (i.e. firing and quits)]
YOUNG	Percentage of employees under age-35 within the work force

[27] All monetary variables have been deflated by the GDP price index, base 1980. This deflator is taken from 'The Accounts of the Nation'.
[28] Note that managerial staff are distinct from both supervisory and non-supervisory employees.

Table IV
Descriptive Statistics

Variable	Min	Max	Mean	Sub-Sample Means			Sub-Sample Means		
				PS	Non-PS	T-Stat	ESOP	Non-ESOP	T-Stat
BONUS%	5.00	20.00	5.40	-	-	-	-	-	-
EMPLOYMENT	303	102902	5286	4539	5387	1.42	8290	4797	3.00[c]
FEMALE	24.00	90.60	26.60	30.80	26.10	3.06[c]	29.40	26.20	2.36[b]
FIXED WAGE	28.00	172.50	79.18	80.00	79.07	0.44	82.74	78.68	1.99[b]
FOREIGN	0	88.60	7.40	5.60	7.60	3.59[c]	6.60	7.60	1.47
MANAGE	2.52	97.00	13.40	13.50	13.30	0.28	13.80	13.30	0.63
OLD	0	53.50	18.70	19.90	18.60	2.50[b]	18.45	18.77	0.68
PARTIME	0	51.20	3.20	5.10	2.90	4.09[c]	5.90	2.70	5.66[c]
SUPERVISE	0.07	14.00	2.19	2.02	2.21	0.71	2.12	2.21	0.31
TOTAL WAGE	28.00	172.50	79.69	83.93	79.07	2.32[b]	84.39	79.02	2.64[c]
TRAINEXP	0	34.37	2.47	2.99	2.40	1.86[a]	2.36	2.49	0.50
TURNOVER	0.01	1.46	0.174	0.20	0.17	1.67[a]	0.15	0.18	1.61[a]
YOUNG	6.00	86.00	36.40	33.21	36.84	3.66[c]	36.50	36.40	0.12

Notes:

1. PS = Firms operating a profit sharing scheme; ESOP = firms operating an employee share ownership scheme.
2. [a] Significant at 10 percent level; [b] Significant at 5 percent level; [c] Significant at 1 percent level. The absolute value of the T-statistics refers to the significance of the differential between the sharing and non-sharing sub-sample means.

Table V: All Firms Dependent Variable: SUPERVISE Fixed Effects Estimation						
Specification	(i)		(ii)		(iii)	
Variable	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat
FOREIGN	0.596	1.241	0.610	1.270	0.580	1.211
LOG EMPLOYMENT	0.388	4.490	0.404	4.635	0.390	4.530
LOG TOTAL WAGE	-2.575	-6.460	-2.559	-6.314	-	-
LOG FIXED WAGE	-	-	-	-	-2.753	-6.687
BONUS% [29]	-	-	-	-	0.005	1.131
LOG TRAINEXP	0.680	7.815	0.685	7.844	0.671	7.827
MANAGE	4.945	8.639	4.992	8.710	4.920	8.603
FEMALE	-2.388	-4.425	-2.463	-4.521	-2.557	-4.692
PARTTIME	-2.800	-2.600	-2.604	-2.400	-2.869	-2.666
YOUNG	-0.621	-1.956	-0.609	-1.906	-0.545	-1.704
OLD	-1.780	-4.086	-1.742	-3.987	-1.774	-4.076
TURNOVER	-0.463	-2.067	-0.413	-1.825	-0.478	-2.137
PROFITSHARE ONLY	-	-	0.002	0.072	-	-
ESOP ONLY	-	-	-0.197	-1.716	-	-
PROFITSHARE AND ESOP	-	-	-0.022	-0.180	-	-
Hausman Chi Squared Statistic	153.488		153.992		158.163	
R^2	0.243		0.244		0.245	
F Statistic	31.922		24.805		29.341	
Number of Firms	127					
Number of Observations	961					

29 The intuition for entering the wage and bonus variables in this form is as follows: $w^{ps} = w^b + b = w^b(1+q) \rightarrow \log w^{ps} = \log w^b + q$ where $q = (b/w^b)$ [see Wadhwani and Wall (1990)].

Table VI: Sharing/Non Sharing Dichotomy Dependent Variable: SUPERVISE Fixed Effects Estimation				
Specification	(iv) Sharing Firms (PS & /or ESOP)		(v) Non Sharing Firms	
Variable	Coeff	T Stat	Coeff	T Stat
FOREIGN	0.133	0.744	2.540	1.818
LOG EMPLOYMENT	-0.054	-0.480	0.438	4.205
LOG TOTAL WAGE	-2.274	-5.728	-2.764	-5.489
LOG FIXED WAGE	-	-	-	-
BONUS%	-	-	-	-
LOG TRAINEXP	0.399	4.811	0.785	6.623
MANAGE	9.206	9.153	4.095	6.105
FEMALE	0.572	1.390	-3.279	-4.599
PARTIME	-1.886	-1.896	-2.118	-1.512
YOUNG	0.400	1.166	-0.706	-1.838
OLD	-0.150	-0.406	-2.307	-3.962
TURNOVER	0.442	2.188	-0.623	-2.156
Hausman Chi Squared Statistic	21.577		136.470	
R^2	0.547		0.241	
F Statistic	23.689		24.115	
Number of Firms	34		103	
Number of Observations	188		728	

Table VII
Profit Sharing/ESOP Dichotomy
Dependent Variable: SUPERVISE
Fixed Effects Estimation

Specification	(vi) Profit Sharing Only		(vii) Profit Sharing Only		(viii) ESOP Only	
Variable	Coeff	T Stat	Coeff	T Stat	Coeff	T Stat
FOREIGN	0.794	0.910	1.142	1.337	0.107	0.807
LOG EMPLOYMENT	0.067	0.391	0.237	1.362	-0.055	-0.492
LOG WAGE	-1.563	-3.799	–	–	-2.656	-7.342
LOG BASE WAGE	–	–	-1.455	-3.885	–	–
BONUS%	–	–	0.066	3.037	–	–
LOG TRAINEXP	0.020	0.196	0.053	-0.558	0.977	9.707
MANAGE	13.519	7.293	14.240	7.795	5.506	6.544
FEMALE	-0.492	-0.408	-1.077	-0.912	0.298	0.925
PARTIME	-2.735	-2.424	-2.120	-2.047	2.833	1.969
YOUNG	0.078	0.226	0.295	0.878	2.098	5.178
OLD	0.029	0.060	0.053	0.116	-0.091	-0.271
TURNOVER	1.012	4.325	0.956	4.213	-0.844	-2.939
Hausman Chi Squared Statistic	18.228		15.400[30]		–[31]	
R^2	0.435		0.473		0.775	
F Statistic	8.996		9.484		37.534	
Number of Firms	23				15	
Number of Observations	104				106	

[30] The magnitude of the Hausman Chi Squared Statistic suggests use of the random effects model in the case of this specification. For consistency, the results from the fixed effects estimation are presented which do not differ significantly from those derived from the random effects model (available from the authors on request).
[31] Given the small sample size, the Hausman Chi Squared statistic cannot be calculated.

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