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Job Transfer and Influence Activities

Abstracts

We consider the relationship between workers' performance measurement errors and the duration of job assignments when workers can engage in influence activities. Job transfer plays a significant role in preventing workers' influence activities for private benefits. We show that the difficulty of measuring workers' performance leads to frequent job transfers. This result is consistent with the jobs of bank employee, journalist, bureaucrat, and others whose private job performances are difficult to observe.

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1. Introduction

The merits of specialization have been discussed since the time of Adam Smith. The well known story of the production of pins described in The Wealth of Nations implies that specialization and the division of labor enhance skills accumulation. In addition, the human capital theory supports the accumulation of skills. However, there are also the demerits of specialization. The benefits of job transfer or rotation, as opposed to specialization, have also been observed and considered.

A reason for the need to rotate workers between workshops is to decrease the workers' opportunities for graft and stealing. If workers have been assigned to a particular job or workshop for a long time, they are likely to devise opportunities for lining their own pockets which are specific to that job or workshop. The more discretionary power workers have at a particular workshop, the more opportunities they have for private activities other than their regular work activities. Milgrom (1988) called these private activities, influence activities. The influence activities are different from the regular work and cannot be controlled directly by firm managers.

Examples of influence activities include urging supervisors to treat themselves unjustly and abuse of authority. If workers' private activities are illegal such as corruption and bribes, they are severely punished in courts, but private activities that are not observed or verifiable go unpunished. When the influence activities are not crimes, firms must design appropriate incentive schemes to discourage employees from these influence activities. Tirole (1986) considers collusion problems using a three level hierarchy model (a principals-supervisors-agents model) and suggests that job transfer plays a significant role in preventing collusive actions between supervisors and agents.

We consider the relationship between performance measurement errors and the duration of job assignments under the effects of influence activity. As an example, we can look at workers with financial type jobs such as bank employees. Financial transactions in banks include making loans which sometimes requires subjective decisions and evaluations involving collateral such as real estate owned by potential borrowers, or decisions and evaluations on potential investment outcomes. Usually, employees in banks must follow the standards and rules described in the manuals, but this often leaves room for discretionary decisions by employees. If bank employees have been working at the same location for a long time they are likely to be familiar with borrowers such as firm managers needing investment funds or individuals looking for a home mortgage. This familiarity may lead employees to give their close customers preferential treatment. It is difficult to verify such actions and punish these employees.

To collect information, journalists often cultivate contacts at public facilities or institutions such as police stations and government offices. Naturally, information is easier to obtain through friendly persons at these public places. However, a journalist's ethics, like a bank employee's, may be compromised when his work involves people he knows through long-term relationships. A journalist may distort the facts or pretend to be unaware of unjust or illegal activities in order to protect a friend or receive a bribe.

To prevent these influence activities more incentive payment schemes should be offered for the performance of workers' regular jobs. High-powered incentive payment schemes encourage workers to focus their efforts on their regular jobs rather than on influence activities. However, as Baker (1992) shows, when it is difficult to measure workers' performances the firm cannot use incentive payment schemes effectively. In this circumstance, frequent job transfers are very useful. We consider the relationship between the accuracy of measuring workers' performance and the timing of job transfers. It will be shown that difficulty in measuring performance leads to the use of frequent job transfer. Frequent job transfer is caused by the difficulty of offering high-powered incentive payment schemes. Jobs like bank employee, journalist, and bureaucrat have this performance measurement difficulty and job transfer is frequently observed. On the other hand, taxi drivers, whose production is easy to measure, rarely experience mandatory job transfers.

Although we consider the effect of job transfer from the viewpoint of performance measurement and influence activities, there are numerous studies on job transfer or rotation that describe the many benefits for workers and firms.

First, as Jovanovich (1979) points out, job transfer or rotation is helpful when determining the suitability of workers for certain jobs. A firm can observe the performance of each worker within each workshop and then assign the most appropriate jobs according to workers' skills and characteristics.

Second, job rotation can remove public shocks. As Holmstrom (1982) indicates, job rotation removes the perceived luck involved with the assignment of jobs, equalizing the circumstances of workers, and thereby revealing workers' abilities and efforts level. Hence, job rotation enhances the merits of relative payment schemes, such as tournaments, which Lazear and Rosen (1981), Green and Stokey (1983), and Nalebuff and Stiglitz (1983) analyze.

Third, job transfer or rotation gives workers the opportunity to learn multiskills and multivisions. Koike (1991) mentions that job rotation in Japanese firms generates the opportunity for workers to learn different skills to appropriately deal with unexpected trouble or accidents refered to by Koike as 'unusual operations'. Aoki (1988)

states that learning multiskills and horizontal information processing can play an essential role in Japanese firms. Ichniowski, Shaw, and Prennushi (1997) have found that innovative changes in human resource management such as team work, flexible job assignments, employment security, or job rotation also improves the productivity of the finishing line in the U.S. steel industry. Osterman (1994) and Ichniowski, Kochan, Levine, Olson, and Strauss (1996) point out this trend of innovative changes in human resource management in the U.S.

The merits of job transfer or rotation are significant not only for production workers but also for employees considered as manager candidates. In U.S. and Japanese firms qualified workers who are expected to be promoted as managers are required to have a broad view of the entire firm. As Koike (1993) states, these workers have experienced various sections of production through job transfer or rotation, effectively learning many aspects of the company.

Furthermore, multiskilled workers will cooperate with labor-saving technological change in cases where singly skilled workers will not. Job rotation can yield a smoothing of technological change (Carmichael and MacLeod (1993)). Eguchi (2002) shows that training of generalists, workers with multiskills, can soften a trainer's dilemma when choosing between training and promotion. Job rotation also avoids the dullness caused by monotonous jobs (Cosgel and Miceli (1999)).

Aoki (1986) analyzes horizontal and vertical firm structures and shows that the firms with horizontal information processing can improve profit under moderate stochastic shocks. Although Aoki (1986) pays much attention to information sharing among employees, information sharing is very relevant to general skills. Itoh (1987) shows that training generalists improves firms' profits under moderate stochastic shock but that the training of specialists dominates under drastic shocks or very stable states. Lindbeck and Snower (2000) point out that multiskill accumulation is more beneficial than specialized skill accumulation when technological and informational task complementarities are large.

Fourth, job transfer or rotation alleviates the ratchet effect, the tendency for performance standards to increase after a period of good performance, which appears under adverse selection and the absence of a long term commitment. As Weitzman (1980) and Laffont and Tirole (1988) show, principals can immediately exploit any information revealed by agents, and thus agents are very reluctant to reveal any information on their workshops. Ickes and Samuelson (1987) point out that job transfer or rotation can be a useful device for solving the ratchet effect problem. If workers are transferred to a new section in the next period, they have no incentive for concealing

information like productivity in their present workshops and plants.

There are these numerous studies on job transfer or rotation, though, we will explicitly point out a relationship between frequency of job transfer and influence activities in this paper.

2. The Model

A firm offers a linear payment scheme contract to workers every period. Workers have two actions, regular work and the influence activity. Workers receive a reward according to their performance of regular work. Then the firm determines whether to move workers to another job or to retain them at the same workshop. The above behaviors of the firm and workers every period are definitely but sufficiently repeated. Definite repeat leads to the second best contract in each period.

Denote measurement of workers' efforts as y, workers' efforts level as μ; and the measurement error as ε. A firm manager observes the outcome of workers' actions with the measurement error: $y = \mu + \varepsilon$. The measurement error follows the normal distribution with zero mean and a positive variance: $\varepsilon \sim N(0, \sigma^2)$. Following the analysis of Holmstrom and Milgrom (1987), the firm chooses a linear payment scheme based on the measurement of workers' performance: $w = ay + b$, where w is the total reward for a worker and a and b are coefficients the firm optimizes. Workers also have another opportunity to obtain a private benefit B. We call this action the influence activity. The firm cannot directly control the influence activity, and this influence activity causes loss to the firm through two paths. One is direct damage to the firm: workers' influence activity decreases the firm's profit, though the firm's damage caused by the influence activity is unverifiable. The other is the indirect opportunity cost when workers' efforts that should be devoted to the regular work are replaced by efforts devoted to the influence activity. The cost of workers' actions is given by $c = c(\mu + i)$, $c' > 0$, *and* $c'' > 0$, where i is the level of the influence activity. This cost function implies that the regular work and the influence activity are substitutive for workers. Furthermore, the private benefit of the influence activity increases as time t passes: $B = ti$. This implies that workers who have been assigned to a particular job for a long time have a greater control over the influence activity.

The utility function of workers is exponential: $u = -e^{-r(w+B-c)}$, where r is a constant and denotes the degree of the constant absolute risk aversion. The expected utility of workers is given as a certainty equivalence:

$$U \equiv \int -e^{-r(w+B-c)}\phi(\varepsilon)d\varepsilon = -\exp\left(-r\left(a\mu + b + ti - c(\mu + i) - \frac{r}{2}a^2\sigma^2\right)\right),$$

where the distribution function of the error is denoted by $\phi(\varepsilon)$. Workers' outside option is given by $\overline{w}$, and hence their reservation utility is $\overline{U} \equiv -e^{-r\overline{w}}$.

Workers optimize the levels of two actions: the regular work and the influence activity. They are willing to perform the regular work if more incentive pay is offered. If $a \geq t$, workers devote all their efforts to the regular work.[1] Otherwise, workers concentrate on the influence activity.

The firm's profit is given by $\pi = y - w - B + \delta$, where δ is a kind of a macro shock the firm faces and its expectation value is zero: $E(\delta) = 0$. The firm maximizes the expected profit in a period subject to the workers' incentive problem and individual rationality: $E\pi \equiv \int (y - w - B)\phi(\varepsilon)d\varepsilon$. Since the firm is willing to offer $U = \overline{U}$ to maximize profit, it holds on the equilibrium that

$$b = -a\mu - B + c + \frac{r}{2}a^2\sigma^2 + \overline{w}. \qquad \ldots(1)$$

Workers always get the same expected utility level as the outside option on the equilibrium. Using (1), the expected profit in a period is replaced by

$$E\pi = \mu - c - \frac{r}{2}a^2\sigma^2 - \overline{w}.$$

Note that the firm cannot conjecture the level of the influence activity from the firm's profit level because of the existence of a macro shock. Thus, the firm has no option when workers choose the influence activity. Moreover, as we mention later, the cost of dismissal as punishment for the influence activity borne by the firm, and hence the firm is unwilling to dismiss employees.

First, we consider the case where workers have no option of any influence activities. In this case, workers choose the efforts level as follows: $\mu = (c')^{-1}(a)$. Under this constraint, the firm offers the payment scheme:[2]

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[1] Under $a=t$, these two actions are indifferent for workers. For simplicity, in this case we assume that workers devote all efforts to the regular work.

[2] The second order condition is assumed to be satisfied. For example, if $c(\mu + i) = (\mu + i)^2$, the

$$a = a^* \equiv \left\{1 + r\sigma^2 \left(\frac{\partial \mu}{\partial a}\right)^{-1}\right\}^{-1}. \qquad \text{...(2)}$$

Because the constraint on the influence activity is not crucial for the firm under $t \le a^*$, it holds that $\mu = (c')^{-1}(a^*)$ and $i = 0$. However, under $t > a^*$, the firm must offer a more high-powered incentive payment scheme to discourage workers from engaging in the influence activity. Hence, the firm offers $a = t$. Workers' efforts level is $\mu = (c')^{-1}(t)$ and $i = 0$. As time passes, the influence activity becomes more and more attractive for workers, and hence the firm must offer a more high-powered incentive payment scheme (figure 1):

$$a = \begin{cases} a^* & under \quad t \le a^* \\ t & under \quad t > a^* \end{cases}. \qquad \text{...(3)}$$

The firm's profit decreases as time goes by under $t > a^*$ (figure 2):

$$E\pi(t) = \begin{cases} \pi^* \equiv (c')^{-1}(a^*) - c\left((c')^{-1}(a^*)\right) - \frac{r}{2} a^{*2} \sigma^2 - \overline{w} & under \quad t \le a^* \\ (c')^{-1}(t) - c\left((c')^{-1}(t)\right) - \frac{r}{2} t^2 \sigma^2 - \overline{w} & under \quad t > a\text{-}^* \end{cases}.$$

As time goes by, the piece rate leaves away from the second best level $a=a^*$, which leads to the decline of the firm's profit.

Next, we consider the timing of the job transfer. A worker is assigned to a job. His private benefit from the influence activity on the job becomes attractive for him as time passes. Hence, the firm needs to offer a more high-powered incentive payment scheme to these workers on the job for a prolonged time. The necessity of a higher powered incentive payment scheme leads to a decrease of the firm's profit. Thus, the firm is willing to shift the worker from his present job to any other job in order to decrease the worker's control over the influence activity at the job. The firm determines the optimal duration of the job assignment for workers. Denote the duration of the job assignment as T. We assume that the firm incurs the shift cost of having a worker moved from one job to another or dismissed. The shift cost per worker F is a constant.

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second order condition clearly holds.

If the firm shifts a worker to any other job, the firm loses the profit per employee in the period T as opportunity cost: $E\pi(T)$. On the other hand, job transfer provides a new profit level. The assignment of a job at the new workshop yields a new average profit. This is an average benefit for the firm on a job transfer. Hence, on the equilibrium, this benefit is equivalent to the cost of job transfer:

$$\pi(T) = \frac{\int_0^T E\pi(t)dt - F}{T} \equiv A\Pi. \qquad \ldots(4)$$

If the left hand is greater than the right hand, the firm can increase its profit by putting off the timing of job transfer, and *vice versa*. Clearly, from a simple calculation, the left and right hands cross at the maximum point of the right hand side (figure 2). We can show the relationship between timing of job transfer and performance measurement as follows:

Proposition

When there is large variance of measurement, job transfer is likely to be observed: $\frac{dT}{d\sigma^2} < 0$.

Proof is easy. Differentiating (4) with respect to T and σ^2, and using the envelope theorem,

$$T\frac{\partial E\pi(T)}{\partial T}dT - \left\{T\frac{rT^2}{2} - \int_0^T \frac{ra^2}{2}dt\right\}d\sigma^2 = 0.$$

Using (3), it is obvious that $\left\{T\frac{rT^2}{2} - \int_0^T \frac{ra^2}{2}dt\right\} > 0$. Hence, by $\frac{\partial E\pi(T)}{\partial T} < 0$, it holds that $\frac{dT}{d\sigma^2} < 0$.

This proposition indicates that the larger the variance in measuring workers' performance, the shorter the duration will be of a particular job assignment. The difficulty in measuring workers' performance leads to less incentive payment schemes, which in turn, induces workers to concentrate on the influence activity on the job. Hence, the firm is willing to shift workers from one job to another and job transfer is frequently observed. Clearly, if the shift cost F is large, the duration of a particular job assignment is long.

Frequent job transfers are experienced by journalists and bureaucrats, for example, whose work performances are difficult to measure. It is difficult to evaluate a journalist's performance since the amount, length or volume of a journalist's report or news manuscript is inappropriate for evaluating a work's value. Also a journalist may happen to be in the right place at the right time, or get a 'scoop' for an important story. From this, his reputation will appreciate, maybe earning a bonus or winning the Pulitzer prize. However, few journalists get these chances in their daily work. Most stories in the newspaper and on TV may be important, but are not necessarily dramatic, and are achieved through quiet and steady work making it hard to give proper incentives to journalists. The same argument can be applied to bureaucrats whose jobs are likely to yield market failures. Naturally, evaluating bureaucrats based on monetary units such as profit would be difficult, and then they face frequent job transfer very often.

3. Conclusion and Discussion

Skill accumulation is not considered explicitly in this paper. Usually, if workers have been assigned to a job for a long time, they will learn the necessary skills and the merits of specialization occur. It is intuitive to consider the effect of job specific skill accumulation. Now, suppose $y = \alpha(t)\mu + \varepsilon$, where $\alpha(t)$ represents workers' job specific skills. We consider a simple skill accumulation case: $\alpha(t) = \alpha t$. When the positive effect of skill accumulation exceeds the negative effect of the influence activities ($\alpha \geq i$), firms are unlikely to choose frequent job transfer or rotation. If the influence activities greatly affect the firm's profit and are extremely detrimental to the firm ($\alpha < i$), the firm will sacrifice the benefit of accumulating skills through specialization and division of labor. To keep our model on the relationship between job transfer and influence activities simple, we did not consider a skill accumulation case.

Our analysis has much to do with the multitask principal agency model. Holmstrom and Milgrom (1991) consider the job design problem, or how various tasks are assigned to employees. According to the mulitask principal agency theory, observable tasks and unobservable ones should not be assigned to the same worker. If the same worker is offered both the observable and unobservable tasks, he will either pay more attention to the observable tasks or will shirk both. The reason for this is straightforward. The principal can give incentives for the observable tasks, but cannot induce workers to provide efforts toward the unobservable tasks since they cannot be measured. Hence, if workers receive incentive pay on the observable tasks, all their

efforts will be devoted to these observable tasks. On the other hand, if they are offered constant payment schemes, the effort level for the observable tasks is inefficient, even though workers are now engaged in the unobservable tasks also. Therefore, it is optimal to separate these tasks assignment, and assign them to different workers.

In our model, the influence activities are based on the regular job, and therefore the firm cannot separate the two activities. Hence, the degree of performance measurement error for the regular job is crucial. The firm sacrifices the merits of specialization and division of labor and makes employees rotate among several workshops. We have shown explicitly with a simple model that a large performance measurement error leads to frequent job transfer. Our result is consistent with the real world experience.

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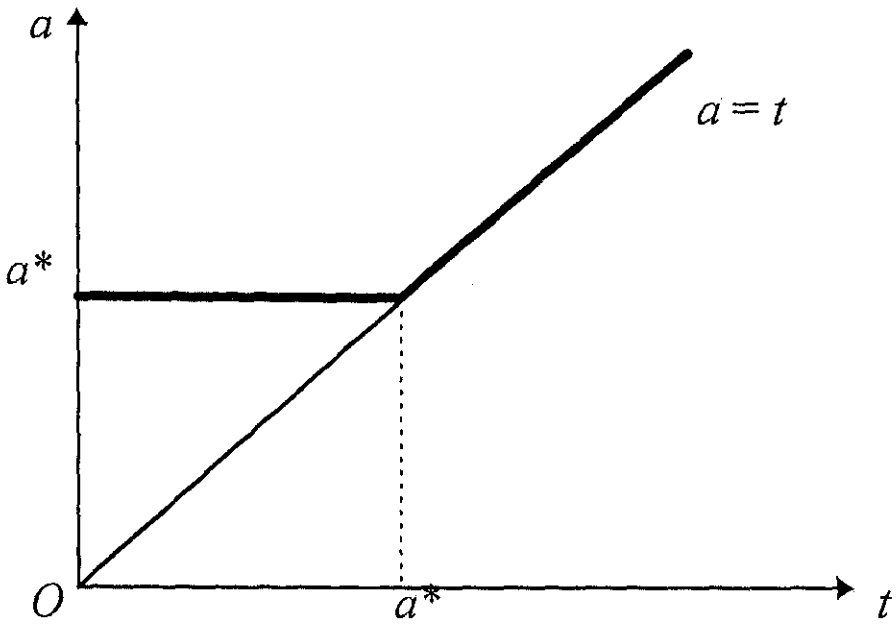

Figure 1

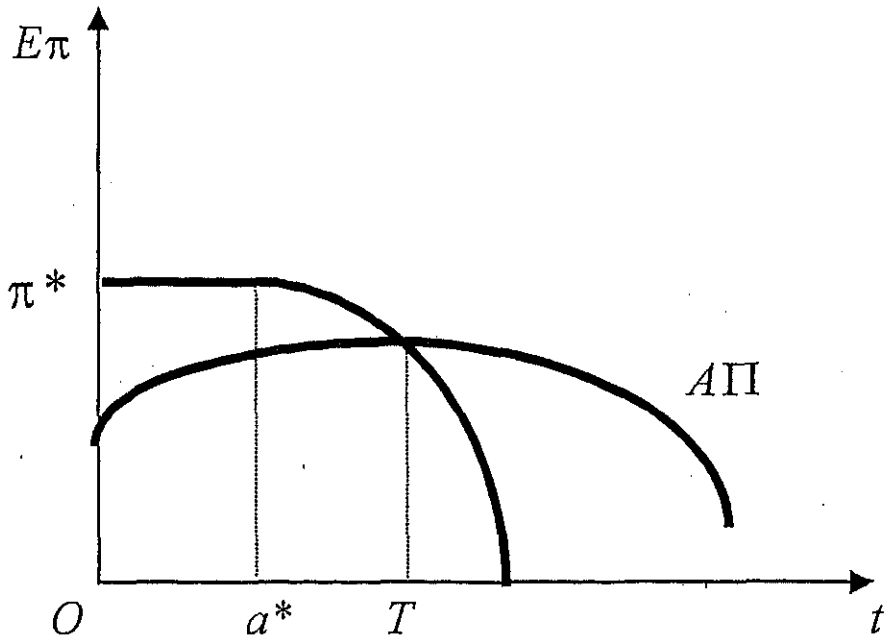

Figure 2