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Abstract

In the real world, there are various regulations concerned with the dismissal of employees. We consider the effects of dismissal regulations with a simple incomplete labor contract model. Under moral hazard, the existence of a regulation always increases wage level and decreases firms' profits. However, the regulation can improve social welfare if workers' outside option is sufficiently low. Furthermore, we will show that the regulation can enhance new hiring.

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1. Introduction

In the U.S., there is the principle of employment at-will, under which firms and workers can freely end the employment relationship at any time unless labor contracts specify the duration of employment. On the other hand, in European countries and Japan, since various employment protection regulations exist, firms cannot easily dismiss employees unilaterally. According to OECD (1999), although deregulation of labor markets since the 1980's chiefly affects short-term contracts and part timers, major change in the regulations for regular workers has disappeared from European countries and Japan. We consider the effect of employment protection regulations on wage, profit, social welfare, employment level, and wage adjustment through renegotiation by a simple, though crucial, labor contract model.

Numerous studies have focused on whether employment protection regulations cause a high unemployment rate in European countries. Intuitively one may believe that employment protection regulations discourage firms from employing workers since firms cannot easily dismiss employees. However, according to our results, this is not the case; the regulations may actually raise total employment. Bertola (1990) considered hiring and firing costs to show that employment protection regulations can have a positive effect on net employment level due to a firm's positive discount rate and the concavity of production function. If the discount rate is zero, the firm can identify the firing cost as part of the hiring cost. Hence, the existence of the firing cost leads to a high net hiring cost and thus decreases total employment level. However, under the firm's positive discount rate and the concavity of production function, the effect of decreasing unemployment due to the firing cost is more than that of decreasing employment due to the hiring cost, if the firing and hiring costs are almost equivalent. Marginal productivity of labor is lower in recessions than in booms. Hence, under the situation of equivalent firing and hiring costs, the positive effect of the firing cost on the employment level can exceed the negative effect of the hiring cost and resulting in a higher net total employment level. Bentolila and Bertola (1990) used a calibrated model with hiring and firing costs and analyzed the effects of the regulations on employment level. They showed employment protection regulations, denoted as a firing cost, discourage firms from dismissing employees more than from hiring workers. On the other hand, Hopenhayn and Rogerson (1993), using calibration similar to Bentolila and Bertola (1990), found that employment protection regulations negatively impacted employment level. The regulations affect hiring and firing in such a way as to induce effects on total employment opposite to that predicted by Bentolila and Bertola.

Saint-Paul (1995) introduces asymmetric job matching separation costs. If workers quit a firm spontaneously, job matching separations are costless. However, if the firm dismisses workers unilaterally, the firm must compensate the employee with some amount of severance pay. When the firm faces a declining state, the firm can choose to continue production or to stop production with a plant closing. If the severance pay is high, the firm is unwilling to dismiss workers and may wait for workers to spontaneously quit. Saint-Paul (1995) demonstrated two equilibria: high mobility and low unemployment, and low mobility and high unemployment. The equilibrium of high mobility and low unemployment, which dominates that of low mobility and high unemployment from the view of *ex ante* social welfare, is likely to disappear with high severance pay. Saint-Paul (1995) indicates that employment protection regulations can increase the unemployment level due to the asymmetric costs of job matching separation.

As these studies imply, the effect of employment protection regulations on total employment level is ambiguous since there are opposite predictions as to the net employment effects of firing costs. Employment protection regulations decrease both job creation and job destruction rates. There are also other reasons for this ambiguity. Bertola and Rogerson (1997) focused on the influence of wage setting institutions to show that relative wage compression is conducive to higher employer-initiated job matching separation. In European countries, unions have played significant roles in central wage bargaining so that wage differences across firms are likely to be small. Firms are willing to adjust employee numbers under the inflexibility of wage adjustment. Naturally, inflexibility of wage adjustment then leads to higher job turnover. On the other hand, there are strict employment protection regulations in European countries, which provide a low level of job matching separation. These opposite inputs affecting job turnover thus lead to ambiguity in predicting employment level. The U.S., on the other hand, has a high relative wage difference across firms and weak employment protection regulations. That is why job creation and job destruction rates are remarkably similar between European countries and the U.S. The difference in the effect of employment protection regulations on total employment level disappears between Europe and the U.S.

Empirical studies have introduced different results of the effect of employment protection regulations on total employment. Although Lazear (1990) has found that dismissal regulations restrict new hiring policies of firms in 22 developed countries, Bertola (1990) indicates that the influence of the regulations on unemployment and the employment level does not exist. Nickell (1997) finds a positive effect of the regulation on employment of male workers from 25 to 54 years of age.

In this paper, using a simple but actual labor contract model, we will look at

incentive problems as being another reason why employment protection regulations lead to ambiguity when predicting total employment level. Furthermore, we analyze the effects of employment protection regulations on a firm's profits, social welfare, and wage adjustment through renegotiation.

Effects of employment protection regulations differ sharply under symmetric versus asymmetric information on workers' actions. With the symmetric information, firms and workers take into account that regulations increase job security for employees, and thus a lower wage covers the workers' effort cost when making an initial contract. Hence, firms' profits under employment protection regulations can be higher than those without the regulations.

However, with asymmetric information, or the moral hazard case, the above statement must be modified. Typically, a worker's incentive would be the possibility of being dismissed in a recession. So with perfect job security for any state, workers would be unwilling to make efforts given a constant basic wage. Hence, high job security caused by employment protection regulations discourages workers' efforts. Under moral hazard with the regulations, firms must increase the basic wage in order to motivate and provide workers' incentives. Therefore, firms lose the free controllability of determining employment level and offer a higher wage level, which decreases firms' profits.

Employment protection regulations do not always decrease social welfare and new hiring by firms. The regulations have an effect of increasing job security which can improve social welfare. We will show that employment protection regulations improve social welfare when the outside option for workers is sufficiently low. Furthermore, new hiring under employment protection regulations can exceed that without the regulations. Under moral hazard, the threat of dismissal encourages workers to make efforts, and the more workers firms employ, the higher will be the possibility of dismissals in a recession. A large amount of new hiring stimulates the workers' survival race and motivates workers so that firms can decrease the wage level by hiring many workers, which can increase firms' profits.

In a recession, wage adjustment through renegotiation can increase the *ex post* welfare of firms and employees under contractual incompleteness. Without employment protection regulations, a lower wage and dismissal are always implemented in the renegotiation stage. However, increase of wage and dismissal can be realized as the result of wage adjustment under the renegotiation because the regulations lead to excess of job security from the viewpoint of *ex post* welfare.

This paper is organized as follows: in chapter 2, the difference in employment protection regulations between Europe, the U.S., and Japan is surveyed; the labor contract

model is provided in chapter 3; chapter 4 focuses on the effect of the regulations on total employment level; renegotiation for wage adjustment is analyzed in chapter 5; and conclusions in chapter 6.

2. Employment Protection Regulations

Emerson (1988) points out the importance of obstacles to the termination of employment contracts in European countries, in particular, France, Germany, Italy, Netherlands, Portugal, Spain, Austria, Belgium, Ireland, Norway, and Sweden. For example, in Germany, the dismissal restriction law strictly sets forth the conditions under which employees are dismissed. Abraham and Houseman (1993, p.18) describe the dismissal regulation in Germany as follows: "All dismissals in Germany must be socially justified. When a dismissal is legal, certain procedures must be followed. In an individual dismissal, the employer must give the worker advance notice of the dismissal. In a collective dismissal, the local labor force and the work council have some power to affect the timing and the terms of the layoff." In European countries there are various dismissal regulations similar to those in Germany. 'Just cause' on dismissal is required and firms cannot dismiss employees unilaterally.

Although, in Japan, free dismissal of employees with at least thirty days' notice or with one month's wage payment is allowed in labor law, there is actually a strict restriction on dismissal of employees. The doctrine of abusive dismissal (Kaiko-ken Ranyo Hori) has been formulated by the accumulation of judicial precedents since the 1950s (Sugeno (1997) and Yamakawa (1996)). The doctrine, which is based on the doctrine of an abuse of rights, established as a general doctrine in civil law, does not allow dismissal without objectively reasonable and just cause. Also, even if a firm has reasonable cause, an inappropriate dismissal, inconsistent with the social common sense, is prohibited under this doctrine. When some employees do damage to a firm, the firm cannot easily dismiss them as a punitive punishment under this doctrine. In Japan, (implicit) long-term employment contracts have frequently been made, and hence dismissed workers often have difficulty in a job search. Courts have often concluded that punitive dismissals are too severe for workers, while still judging that the behavior of the workers is immoral and improper.

There are also restrictive constraints for dismissals in plant closings or mass layoffs. Under these constraints, firms must curtail dismissals as much as possible in recessions. If firms attempt to dismiss workers, the following is required: (1) firms must

first use all possible means to avoid the dismissals such as shifting workers to other workshops and decreasing working hours; (2) firms must not participate in irrational behaviors such as increasing new hiring; (3) firms must choose the dismissed among employees reasonably and fairly; and (4) firms must follow the appropriate procedures specified in labor law and through industrial promises. The doctrine is, therefore, quite restrictive for dismissals.

In the U.S., the common law doctrine of employment at-will is dominant in many states. Union members are often protected from unilateral dismissals since the labor agreements between firms and unions usually stipulate on important employment conditions such as dismissals, transfers, and grievance and arbitration procedures. However, most workers are not under the protection of labor agreements in unionized firms because the union membership rate in the U.S. is about only 10 %. As Krueger (1991) and Grenig (1991) indicate, the modification of employment at-will in the U.S. is a recent occurrence. In most states the exceptions to employment at-will have been allowed in court. There are three exceptions: public policy exception, implied contract exception, and good faith exception. State legislation which specifies 'just cause' as a requirement for dismissal has been proposed in ten states since the 1980s. Although only Montana passed a broad law to protect at-will employees from unjust dismissal, Krueger (1991) suggests the trend of employment protection is strengthened. Worker Adjustment and Retraining Notification Act (WARN) which was passed as a federal law in 1988 obliges firms employing over 100 full-time workers to give notice to employees at least sixty days before a plant closing and mass layoff. In 1991, the National Conference of Commissioners on Uniform State Law proposed the Model Employment Termination Act which requires 'just cause' for dismissals.

3. The Basic Model

We consider a very simple employment contract which specifies only a basic wage level. Matters on job security do not exist at all. Labor contracts are incomplete due to huge transaction costs, and thus firms and workers cannot make contracts contingent on the state. Actually, as is often observed, in the real world, (long-term) labor contracts describe only wage level and do not explicitly specify how long to continue the employment relationship. In Japan, as Sugeno (1997) and Yamakawa (1996) state, the labor standard law prohibits firms from making explicit long-term contracts beyond one year as a protection for workers based on the idea that workers are weaker than firms in

an industrial relationship.[1] Hence, labor law does not allow explicit long-term contracts by which workers are bound to a particular firm.[2] In the U.S., if firms and workers intend to keep the industrial relationship beyond one year, formal employment contracts are required in order to prevent fraud. Though in reality, few of these contracts are really formal. This basic model is thus relevant to actual labor contracts.

Timing of decision by workers and the firm is as follows:

① The firm has a labor pool N and offers a verifiable wage level w to workers.

② Risk neutral workers determine whether to accept or reject the offer and whether to make efforts or not. If rejected, there is no more contract negotiation.

③ When workers accept the wage offer, then Nature chooses a state: a boom or a recession. The state is observable.

④ The firm chooses an optimal real employment level. Dismissed workers receive the outside option $\overline{w}$. On the other hand, the retained employees in the firm receive the wage level specified in the labor contract.

The effort level is discrete and the cost of providing efforts is c. The firm cannot observe whether workers have provided efforts or not. Providing efforts is not only necessary for learning skills essential to the firm but also for influencing the states of the firm. Efforts provided by *all* employees enhance the occurrence of a good state. Two states, a boom and a recession, exist: $\overline{\theta} > \underline{\theta} > 0$. A boom allows the realization of full employment, but the firm cannot use labor inputs greater than its own labor pool N since outside workers have not learned the essential skills. On the other hand, a recession is so severe that the firm unwilling or unable to maintain full employment. If all workers provide efforts, the probability of a boom is $\overline{p}$. Otherwise, the probability of a boom is $\underline{p}$: $\overline{p} > \underline{p}$. At this time, it makes sense to consider the labor pool N exogenously given, and normalize it to 1. Decision on the labor pool will be taken up later.

The firm's profit is given by

$$\pi(\theta) = \theta f(L) - wL \qquad \theta \in \{\underline{\theta}, \overline{\theta}\},$$

where L $(\leq N = 1)$ is the real employment level and the production function f is strictly concave.

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[1] The amendment of the labor standard law in 1998 allows that workers with special knowledge which is essential to the job, such as development of new technology or the setting up or shutting down of a business, and elder workers over age sixty may make contracts for three years at most.

[2] Basic wage should be specified on labor contracts. If no specific wage were described, firms might pay an insufficient wage since the firms could not be punished in court.

For the convenience of later discussion, consider the first best contract. Social welfare W:

$$W \equiv \bar{p}\bar{\theta}f(L(\bar{\theta}))+(1-\bar{p})\underline{\theta}f(L(\underline{\theta}))+(1-\bar{p})(1-L(\underline{\theta}))\bar{w}-c.$$

Clearly, the maximum of social welfare is induced by the employment level:

$$L_{FB}(\bar{\theta})=1 \quad and \quad L_{FB}(\underline{\theta})=\min\left\{(f')^{-1}\left(\frac{\bar{w}}{\underline{\theta}}\right), 1\right\}.$$

A benchmark

Here, as a benchmark analysis, consider that no incentive problem exists. First, consider the case without employment protection regulations. From the assumption on the firm's state and employment level,

$$L(\bar{\theta})=1 \quad and \quad L(\underline{\theta})=L^* \equiv (f')^{-1}\left(\frac{w}{\underline{\theta}}\right)<1. \qquad ...(1)$$

Individual rationality with no incentive problem is given by

$$U=\bar{p}w+(1-\bar{p})\left\{wL^*+\bar{w}(1-L^*)\right\}-c \geq \bar{w}. \qquad ...(2)$$

Next, consider the case with employment protection regulations. The regulations force the firm to maintain the employment level as high as possible, that is, the regulations induce a high employment level L_R wherein the firm's profit is zero, $\pi_R(\underline{\theta})=\underline{\theta}f(L_R)-w_RL_R=0$, where L_R *or* w_R is employment or wage level, respectively. Since we assume that full employment is realized in a boom but is not maintained in a recession, it holds that

$$L_R(\bar{\theta})=1 \quad and \quad L(\underline{\theta})=L_R^*<1, \qquad ...(3)$$

where L_R^* satisfies $\underline{\theta}f(L_R^*)-w_RL_R^*=0$. Under the regulations, individual rationality is

$$U_R=\bar{p}w_R+(1-\bar{p})\left\{wL_R^*+\bar{w}(1-L_R^*)\right\}-c \geq \bar{w}. \qquad ...(4)$$

Since the firm's profit is a decreasing function of wage level, individual rationality, both with the regulation (2) and without (4) are binding. We can show $w > w_R$ under the no incentive problem case. Suppose that w and w_R are equal. Under w=w_R, the dismissal regulation leads to high job security: $L^* < L_R^*$ (figure 1). Hence, the following inequality holds:

$$U(w)<U_R(w) \quad \text{for any positive } w. \qquad ...(5)$$

See figure 2. L^* *and* L_R^* are decreasing functions of wage level. Note that the curves of U_R and U are not always expressed like this. However, if w is sufficiently low, the expected utility of workers who have made efforts is negative even if high employment stability is realized. On the other hand, a very high wage lowers job security, so that workers' expected utility is negative. Inequality (5) indicates that the curve U_R is upper to the curve U for any positive wage. The firm chooses the lowest wage level among

multiple solutions of (2) and (4) since a low wage increases the firm's profit. As figure 2 suggests, it is obtained that $w > w_R$. Since $L^* < L_R^*$ holds under $w = w_R$, it is clearly obtained that $L^* < L_R^*$ under $w > w_R$.

Next, compare social welfare with and without the dismissal regulation:

$$W = \bar{p}\bar{\theta}f(1) + (1-\bar{p})\underline{\theta}f(L^*) + (1-\bar{p})(1-L^*)\bar{w} - c$$

or

$$W_R = \bar{p}\bar{\theta}f(1) + (1-\bar{p})\underline{\theta}f(L_R^*) + (1-\bar{p})(1-L_R^*)\bar{w} - c$$

Clearly, using $L^* < L_R^*$, social welfare under the dismissal regulation can exceed that without the regulation:

$$W_R - W = (1-\bar{p})\left\{\underline{\theta}\left(f(L_R^*) - f(L^*)\right) - \bar{w}(L_R^* - L^*)\right\} \quad ...(6)$$

The dismissal regulation improves social welfare if the outside option $\bar{w}$ is sufficiently low. Since $w > \bar{w}$ holds, without the regulation employment level in a recession is less than the first best level: $L_{FB}(\underline{\theta}) \equiv (f')^{-1}\left(\frac{\bar{w}}{\underline{\theta}}\right) > (f')^{-1}\left(\frac{w}{\underline{\theta}}\right) \equiv L^*$. Since the regulation increases employment level in a recession, the regulation has an effect of improving social welfare. On the other hand, the regulation may lead to an excess employment level in the recession to the first best level, which is a negative effect on social welfare. When $\bar{w}$ is sufficiently low, the former positive effect will exceed the latter negative one.

Since (2) and (4) are binding,

$$\Pi_R = W_R - \bar{w}, \quad \Pi = W - \bar{w}.$$

Hence, $\Pi_R > \Pi$ holds if $W_R > W$, and vice versa. The regulation increases the firm's profit if social welfare is improved by the regulation. Although the firm loses *ex post* free controllability of employment level under the regulation, the firm can lower the wage level. Thus, the *ex ante* expected profit of the firm can increase.

Moral hazard case

Here we have the case in which the firm cannot observe employees' efforts level. First, consider the case without the dismissal regulation. Incentive compatibility under moral hazard is given by

$$U = \bar{p}w + (1-\bar{p})(wL^* + \bar{w}(1-L^*)) - c \geq \underline{p}w + (1-\underline{p})(wL^* + \bar{w}(1-L^*)). \quad ...(7)$$

The right hand of incentive compatibility (7) is the workers' expected utility when workers shirk. Hence, (7) is replaced as follows:

$$I(w) \equiv (w-\bar{w})(1-L^*) \geq \frac{c}{\Delta} \quad ...(7)'$$

where $\Delta \equiv \bar{p} - \underline{p}$.

Next, consider the dismissal regulation case. Under the dismissal regulation,

incentive compatibility under moral hazard is similarly given by

$$I_R(w_R) \equiv (w_R - \overline{w})(1 - L_R^*) \geq \frac{c}{\Delta}. \qquad ...(8)$$

Since the firm's profit is a decreasing function of wage level, (7)' and (8) are binding. We will show $w < w_R$ under moral hazard.

Suppose that w and w_R are identical. Under $w=w_R$, in the same manner as the no incentive problem case, the dismissal regulation leads to high job security: $L^* < L_R^*$. Hence, the following inequality holds under $w=w_R$:

$$I(w) = (w - \overline{w})(1 - L^*) > (w - \overline{w})(1 - L_R^*) = I_R(w). \qquad ...(9)$$

See figure 3. L^* *and* L_R^* are decreasing functions with respect to wage, and thereby $I(w)$ *and* $I_R(w)$ are increasing functions of w. Since (7)' and (8) are always binding, it is obtained that $w < w_R$. ...(10)

By providing a high effort level, workers can increase the probability of a boom, and thus they are likely to stay employed at the firm and receive a wage higher than their outside option. Hence, workers are willing to make efforts even when there is no explicit punishment for shirking.[3] Thus, the dismissal regulation weakens workers' motivation. The firm must pay a higher wage to encourage workers to make efforts since the regulation gives employees high job security.

Since (7)' and (8) are binding, $L^* < L_R^*$ is obtained from (10). Hence, the effect of the dismissal regulation on social welfare is similar to the no incentive problem case; the regulation can improve social welfare when $\overline{w}$ is sufficiently low. However, we will show that profit of the firm under the regulation is less than for the firm without the regulation. Clearly, the following inequalities hold for any state $\theta \in \{\overline{\theta}, \underline{\theta}\}$:

$$\begin{aligned} \pi_R(\theta) &\equiv \theta f(L_R) - w_R L_R \\ &< \theta f(L_R) - w L_R \qquad (\because w_R > w) \\ &< \theta f(L) - wL \equiv \pi(\theta). \end{aligned}$$

The last inequality is obtained from the viewpoint that L is the optimal employment level of the firm given w. Therefore, the dismissal regulation always decreases profit of the firm: $\Pi_R < \Pi$. High job security and a high payment decrease the profits of firms.

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[3] This result is similar to the efficiency wage model (for example, Shapiro and Stiglitz (1984) or Bulow and Summers (1986)) at the point that a payment higher than the outside option encourages employees to provide efforts. However, in the efficiency wage model, monitoring of employees plays a significant role in having the incentive scheme work since monitoring is essential when dismissal is the punishment for shirking. In our model, it is not necessary to monitor employees in the firm. The firm's right of control in the dismissal of employees works as the incentive scheme.

In summary, the dismissal regulation weakens workers' motivation and decreases the firm's profit under moral hazard even if the regulation improves social welfare. This result is contrary to the no incentive problem case, where the dismissal regulation can increase the firm's profit.

4. New Hiring

Next, we consider the influence of the dismissal regulation on new hiring by analyzing the optimal labor pool size *N*. First, we consider the case without the regulation. Suppose that the firm has an initial labor pool as follows:

$$N > (f')^{-1}\left(\frac{w}{\overline{\theta}}\right). \qquad ...(11)$$

This implies that some employees are dismissed even in a boom. Workers' incentive compatibility is

$$I(w) \equiv \frac{w-\overline{w}}{N}\left\{L(\overline{\theta}) - L^*\right\} \geq \frac{c}{\Delta}, \qquad ...(7)''$$

where $L(\overline{\theta}) \equiv \min\left\{N, (f')^{-1}\left(\frac{w}{\overline{\theta}}\right)\right\} = (f')^{-1}\left(\frac{w}{\overline{\theta}}\right)$ and $L^* = (f')^{-1}\left(\frac{w}{\underline{\theta}}\right)$. As mentioned previously, (7)" is binding since a lower wage raises profit. On the equilibrium, as figure 3 implies, the following condition holds given *N*:

$$\frac{d\left[(w-\overline{w})\left\{L(\overline{\theta}) - L^*\right\}\right]}{dw} \geq 0. \qquad ...(12)$$

Unless (12) is satisfied, the firm can raise its profit by wage decline given *N* while the incentive compatibility of workers holds. Hence, from assumption (11), the decrease of the initial labor pool makes wage decline possible so that the firm can improve profit. Therefore, $N \leq (f')^{-1}\left(\frac{w}{\overline{\theta}}\right)$ holds on the equilibrium. Thus, it is obtained that $L(\overline{\theta}) = N \leq (f')^{-1}\left(\frac{w}{\overline{\theta}}\right)$.

Next, suppose that the optimal initial labor pool is given by

$$N < (f')^{-1}\left(\frac{w}{\overline{\theta}}\right). \qquad ..(13)$$

In this case, $L(\overline{\theta}) = N$. Differentiate (7)",

$$\left\{1 - \frac{L^*}{N} - \frac{w-\overline{w}}{N}\frac{\partial L^*}{\partial w}\right\}dw + \frac{(w-\overline{w})L^*}{N^2}dN = 0.$$

Using $\frac{\partial L^*}{\partial w} < 0$ and $L^* < N$, it holds that

$$\frac{dw}{dN} < 0 . \qquad ...(14)$$

Furthermore, using the envelope theorem, the first order condition on the initial labor pool is positive from (13) and (14):

$$\frac{d\Pi}{dN} = \overline{p}(\overline{\theta} f'(N) - w) - \frac{dw}{dN}\{\overline{p}N + (1-\overline{p})L^*\} > 0 .$$

Hence, the initial employment level given by (13) is not optimal. Therefore, on the equilibrium, the firm determines the optimal initial labor pool as follows:

$$N = N^* \equiv (f')^{-1}\left(\frac{w}{\overline{\theta}}\right). \qquad ...(15)$$

An increase of the labor pool N given the wage level raises the dismissal rate for employees, and thus decreases workers' expected wage in a recession. On the other hand, it does not influence the expected wage in a boom if full employment is realized. Thus, as (14) indicates, since the increase of N motivates workers, the firm can decline the wage level and raise profit.

Next, we consider the effect on new hiring when there is a dismissal regulation case. The dismissal regulation always leads to zero profit if the firm dismisses some workers. Hence, the firm is willing to maintain full employment and obtain a positive profit in a boom. Incentive compatibility is

$$I_R(w) \equiv (w_R - \overline{w})\left\{1 - \frac{L_R^*}{N_R}\right\} \geq \frac{c}{\Delta}.$$

Differentiate this,

$$\left\{1 - \frac{L_R^*}{N_R} - \frac{w_R - \overline{w}}{N_R}\frac{\partial L_R^*}{\partial w_R}\right\} dw_R + \frac{(w_R - \overline{w})L_R^*}{N_R{}^2} dN_R = 0 .$$

Hence, it is obtained that $\frac{dw_R}{dN_R} < 0 .$ ...(16)

Using the first order condition on the initial labor pool;

$$\frac{\partial \Pi_R}{\partial N_R} = \overline{p}\left\{\overline{\theta} f'(N_R^*) - w_R\right\} - \frac{\partial w_R}{\partial N_R}\overline{p}N_R^* = 0 ,$$

it holds on the optimal initial labor pool N_R* under the dismissal regulation that

$$\overline{\theta} f'(N_R^*) - w_R < 0 . \qquad ...(17)$$

Inequality (17) implies that the firm under the regulation is willing to hire excess workers when considering the firm's *ex post* profit maximization in a boom. This is contrary to the no regulation case, where the optimal employment level in a boom is realized as shown in (15).

Suppose that the initial hiring level without the dismissal regulation is equivalent to the optimal initial hiring level with the dismissal regulation: $N = N_R^*$. Although we obtain from (10),

$$\overline{\theta} f'(N_R^*) - w_R < \overline{\theta} f'(N_R^*) - w,$$

the right hand of this inequality may be positive or negative, that is, the optimal hiring level under the regulation may or may not exceed that without the regulation.

If $\overline{\theta} f'(N_R^*) - w_R = 0$ holds instead of (17), then

$$0 = \overline{\theta} f'(N_R^*) - w_R < \overline{\theta} f'(N_R^*) - w$$

leads to $N_R^* < N^*$. Since the dismissal regulation discourages employees from making efforts, firms have to offer a higher wage to motivate them. The regulation increases wage as an employment cost, and thus provides the decline in the hiring level as the above inequality shows. On the other hand, as we have stated, an increased employment pool provides a higher dismissal risk for employees. Hence, by increasing the hiring level, employees are encouraged to make efforts and firms can decrease wage. The regulation induces opposing effects on the hiring level. Thus, the effect of employment protection regulations on new hiring is ambiguous. Although the firm seems to restrict the number of new hires due to the dismissal regulation, the new hiring under the dismissal regulation can exceed new hiring without the regulation.

We give an example to show that new hiring under the dismissal regulation can be higher than without the regulation.

An example

Under $\overline{w} = 0$, $c = \overline{p} = \frac{1}{2}$, $\underline{p} = 0$, $\underline{\theta} = 1$, $\overline{\theta} = 2$, *and* $f(L) = -\frac{1}{2}L^2 + 1.689L$, it is obtained that $w = 1.404$, $w_R = 1.518$, $N = 0.987$, *and* $N_R = 1$.

It would be short-sighted to conclude that the dismissal regulation, like employment protection laws, discourages firms from employing new workers.

5. Wage Adjustment through Renegotiation

Since the firm and the workers cannot make contracts contingent on the state, renegotiation may improve welfare after a state is observed. When a renegotiation offer is not accepted, the wage specified in the original contract is paid and the real employment level L^* *or* L_R^* is chosen as we have shown in the previous section. The new wage offer in the renegotiation stage is denoted as $\tilde{w}$. If the renegotiated offer is accepted, it would be "the renegotiation offer":

$$(w - \overline{w})L^* \leq (\tilde{w} - \overline{w})\tilde{L}, \qquad \text{...(18)}$$

where $\tilde{L}$ is the new employment level in the renegotiation stage given $\tilde{w}$. Inequality (18) indicates that the newly offered expected wage is more than, or at least equivalent to, the original expected wage.

Note that renegotiation occurs only in a recession. In a boom, renegotiation does not occur since full employment is realized leaving no room for renegotiation to improve social welfare. Because the firm cannot decrease wage in order to increase employment, the firm has no incentive for renegotiation. However, if the firm's state is severe, renegotiation might increase the firm's profit.

First, we consider the case with no regulation. In this case, renegotiation always decreases wage level and increases employment level in a recession. If an increased wage level is realized in the renegotiation, then the firm' s profit is decreased as follows:

$$\tilde{\pi}(\underline{\theta}) \equiv \underline{\theta} f(\tilde{L}) - \tilde{w}\tilde{L} < \underline{\theta} f(\tilde{L}) - w\tilde{L} \qquad (\because \tilde{w} > w)$$
$$< \underline{\theta} f(L^*) - wL^* \equiv \pi(\underline{\theta}) .$$

This last inequality is introduced from the viewpoint that L^* is the optimal employment level of the firm given w. Hence, the firm is unwilling to offer an increased wage in the renegotiation stage. Furthermore, (18) is always binding since the firm can raise its profit by providing the lower wage offer in the renegotiation stage.

Next, we consider the case with the regulation in effect. Incentive compatibility for the renegotiation offer is similarly given by

$$(w_R - \overline{w}) L_R^* \leq (\tilde{w}_R - \overline{w}) \tilde{L}_R . \qquad \text{...(18)'}$$

If full employment is enforceable by renegotiation, (18)' is always binding since the firm is willing to offer the new low wage:

$$\tilde{w}_R = (w_R - \overline{w}) L_R^* + \overline{w} .$$

Renegotiation leads to a lower wage and a higher employment level than in the original employment contract. However, if full employment is not enforceable in the renegotiation stage, effects of renegotiation will be more complex.

The employment protection regulation leads to zero profit in a recession. After all, if full employment is not enforceable in the renegotiation stage, the firm makes no profit. Hence, the firm is indifferent to any renegotiation offer. We assume that the *ex post* utility of the worker is maximized under zero profit of the firm in the renegotiation stage. Thus, (18)' is not binding, that is, the *ex post* utility during a recession is more than that observed in the initial contracts.

On making the initial contracts, workers and the firm anticipate the result of renegotiation, which means the basic wage level is affected by the possibility of renegotiation. Because renegotiation can improve the utility of workers in a recession, the possibility of renegotiation discourages workers' motivation. Hence, the firm has to offer

a higher wage when making the initial contract in order to induce workers to make efforts, which means the anticipation of renegotiation decreases the firm's profit. On the other hand, in the no regulation case, the existence of renegotiation has no influence on determining the initial wage level since incentive compatibility for renegotiation (18) is always binding.

Furthermore, renegotiation under the regulation may lead to a paradoxical case, where renegotiation yields a high wage and low employment level. In figure 4, A is implemented by the original contracts, but renegotiation leads to B. This paradox does not occur without the regulation. The paradoxical case occurs because the regulation can lead to a higher employment level than the first best level. If $L_{FB}(\underline{\theta}) \equiv (f')^{-1}\left(\frac{\overline{w}}{\underline{\theta}}\right) < L_R^*$, wage adjustment through renegotiation raises wage level and decreases employment level. Under the no renegotiation scenario, since it always holds that $L(\underline{\theta}) \equiv (f')^{-1}\left(\frac{w}{\underline{\theta}}\right) < L_{FB}(\underline{\theta})$, renegotiation leads to a higher employment level and lower wage than in the original contract.

In the real world, renegotiation is not seen as decreasing employment. The regulation under which firms must keep their employment levels as high as possible in a recession may actually limit workers' chances of improving their *ex post* utility.

6. Conclusion and Discussion

We have considered effects of the dismissal regulation with an actual incomplete labor contract model. Our model is very simple compared to the calibrated models. The dismissal regulation discourages employees from making efforts which is not beneficial for firms. Under moral hazard, the existence of regulations like employment protection laws always increases wage level and decreases firms' profits. Furthermore, the regulations can raise the total employment level because an increased number of employees decreases the survival rate for an individual employee, and thus motivates employees. To the contrary, under the no incentive problem, the regulation always decreases wage level and can increase firms' profits. Furthermore, social welfare can be improved by the dismissal regulations regardless of incentive problems. Employment protection regulations can have both negative and positive effects.

Unions have a large stake in the dismissal regulation. Under this regulation, firms usually must negotiate with unions prior to dismissing employees. It has frequently

been stated that the dismissal regulation strengthens the power of unions. Certainly, if the firm cannot dismiss employees freely, the bargaining power of unions may be strengthened. According to the insider-outsider theory (Lindbeck and Snower (1988)), unions might be more willing to increase wage under the regulation than without the regulation. As Blanchard and Summers (1987) show as hysteresis, the continuous actions of unions for an increase of wage yield low employment and a high unemployment level for an extended time. Thus, numerous discussions and analyses on deregulation of labor markets have appeared since the late 1980s. Indeed, in Europe, as OECD (1994) points out, the collective bargaining coverage rates are very high at about 80%. For example, the coverage rates of Germany and France are 90% and 92%, respectively, whereas the collective bargaining coverage rate in the U.S. is small at 18%.

However, it seems that the dismissal regulation does not always make unions more aggressive. In Japan, where there are strict regulations on dismissals, the collective bargaining coverage rate is a small 23%. Empirical studies have found that the wage effect of unions is insignificant or negative in Japan (Tachibanaki and Noda (1993), Tsuru and Rebitzer (1995), and Brunello (1992)). Therefore, although our model does not involve the effect of the dismissal regulation on collective bargaining, which is similar to the models of Bertola (1990), Bentolila and Bertola (1990), and Hopenhayn and Rogerson (1993), our analysis focusing on the effects of the regulation is appropriate and effective.

References

Abraham, Katharine, and Susan Houseman, (1993) "Job Security in America: Lessons from Germany", *The Brooking Institution*, Washington, D.C.

Bentolila, Samuel, and Giuseppe Bertola, (1990) "Firing Costs and Labor Demand: How Bad is Eurosclerosis?", *Review of Economic Studies*, 57, 381-402.

Bertola, Giuseppe, (1990) "Job Security, Employment and Wages", *European Economic Review*, 34, 851-879.

----------, and Richard Rogerson, (1997) "Institutions and Labor Reallocation", *European Economic Review*, 41, 1147-1171.

Blanchard, Oliver J. and Lawrence H. Summers (1987) "Hysteresis in Unemployment", *European Economic Review*, 31, 288-295.

Brunello, Giorgio, (1992) "The Effect of Unions on Firm Performance in Japanese Manufacturing", *Industrial and labor Relations Review*, 45, 471-487.

Bulow, Jeremy, and Lawrence Summers, (1986) "A Theory of Dual Labor Markets with Application to Industrial Policy, Discrimination, and Keynesian Unemployment", *Journal of Labor Economics*, 4, 376-414.

Emerson, Michael, (1988) "Regulation or Deregulation of the Labor Market: Policy Regimes for the Recruitment and Dismissal of Employees in the Industrialised Countries", *European Economic Review*, 32, 775-817.

Grenig, Jay F. (1991) "The Dismissal of Employees in the United States", *International Labor Review*, 130, 569-581.

Hopenhayn, Hugo, and Richard Rogerson (1993) "Job Turnover and Policy Evaluation: A General Equilibrium Analysis", *Journal of Political Economy* 101, 915-938.

Krueger, Alan, (1991) "The Evolution of Unjust-dismissal Legislation in the United States", *Industrial and Labor Relations Review*, 44, 644-660.

Lazear, Edward, (1990) "Job Security Provisions and Employment", *Quarterly Journal of Economics*, 105, 699-726.

Lindbeck, Assar and Dennis Snower (1988) "The Insider-Outsider Theory of Employment and Unemployment", *MIT Press*

Nakakubo, Hiroya, (1995) "American Labor Law" ("America Rodo-Ho", in Japanese), *Kobundo,* Tokyo.

Nickell, Stephen (1997) "Unemployment and Labor Market Rigidities: Europe versus North America", *Journal of Economic Perspective*, 11, 55-74.

OECD (1994) "OECD Employment Outlook", OECD

---------- (1999) "OECD Employment Outlook", OECD

Saint-Paul, Gilles, (1995) "The High Unemployment Trap", *Quarterly Journal of Economics*, 110, 527-550.

Shapiro, Carl, and Joseph Stiglitz, **(1984)** "Equilibrium Unemployment as a Discipline Device", *American Economic Review*, 74, 433-444.

Tachibanaki, Toshiaki and Tomohiko Noda, "Wage, Environment of Workshop, and Unions" ("Chingin, Rodo Jyoken to Rodo Kumiai" in Japanese), in Tachibanaki, Toshiaki, eds., "Economics of Unions" ("Rodo Kumiai no Keizaigaku" in Japanese) (Tokyo: *Toyo-Keizai Shinpo*, 1993).

Tsuru, Tsuyoshi and Rebitzer James B., (1995) "The Limits of Enterprise Unionism: Prospects for Continuing Union Decline in Japan", *British Journal of Industrial Relations*, 33, 459-492.

Sugeno, Kazuo, **(1997)** "Laws of Industrial Relations" ("Koyo syakai no Ho", in Japanese), *Yuhikaku*, Tokyo.

Yamakawa, Ryuichi, **(1996)** "Law of Employment Relations", ("Koyo Kankei Ho", in Japanese), *Shinsei-sya*, Tokyo.

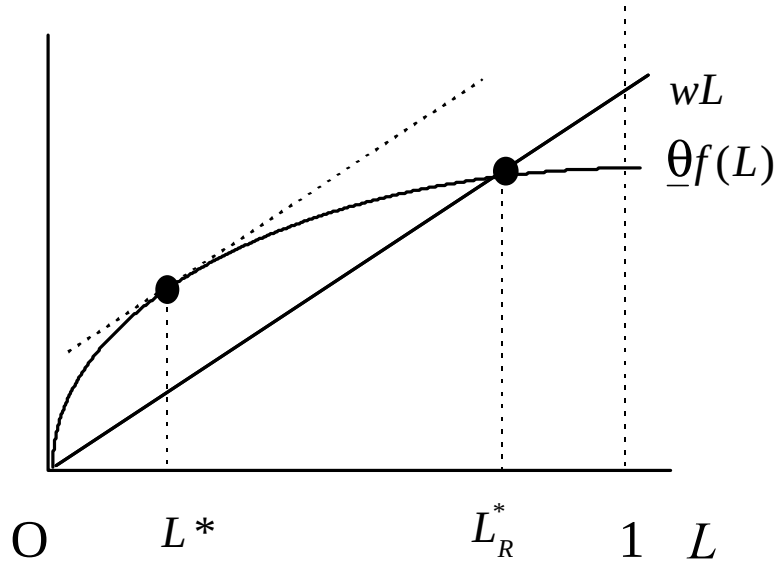

Figure 1

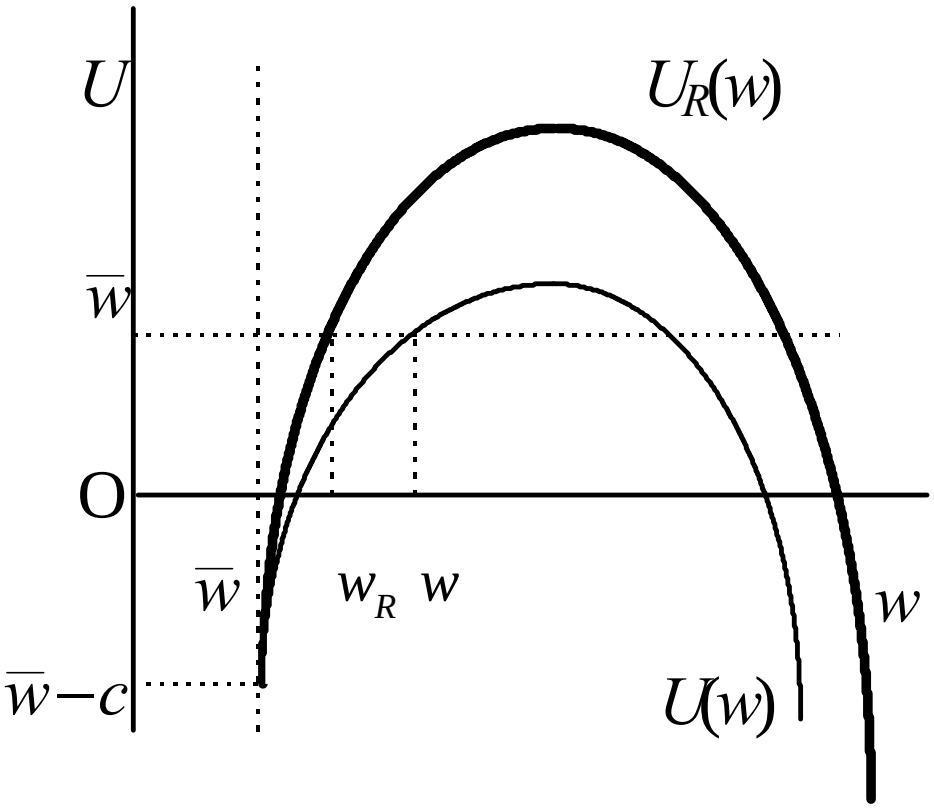

Figure 2

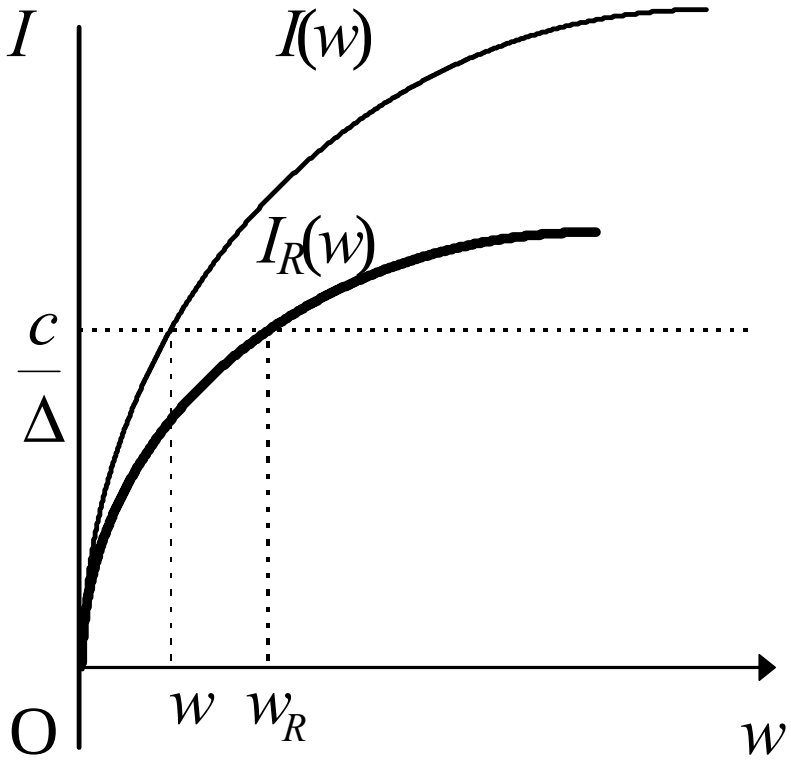

Figure 3

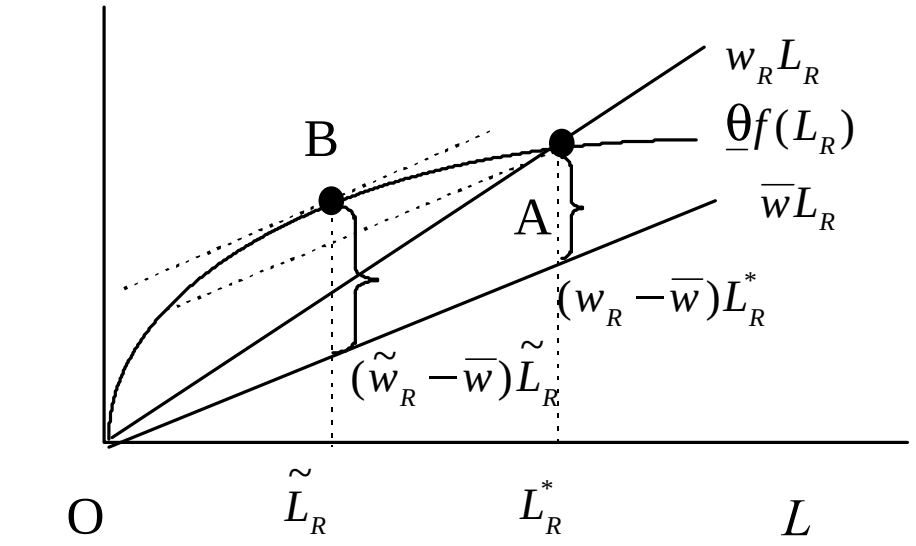
$w_R L_R$
$\underline{\theta} f(L_R)$
$\overline{w} L_R$
B
A
$(w_R - \overline{w}) L_R^*$
$(\tilde{w}_R - \overline{w}) \tilde{L}_R$
O
$\tilde{L}_R$
L_R^*
L

Figure 4