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Employment Protection Regulations and New Hiring

by

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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 dismissal regulations always increases wage level and decreases firms' profits, however, the regulations can enhance total employment level and social welfare. Moreover, severance pay as the dismissal regulations does not work under moral hazard. Although following appropriate procedures like advance notice and negotiations with unions is social wasteful, the regulation like these can improve social welfare rather than severance pay.

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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 finish 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 in European countries and Japan.

Numerous studies have focused on whether employment protection regulations cause high unemployment rates 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, the regulations may actually raise total employment. We consider the effect of employment protection regulations on wage, profit, social welfare, and total employment level by a simple, though crucial, labor contract model. We will show that employment protection regulation can increase total employment level from the viewpoint of workers' incentive problem.

Effects of employment protection regulations differ sharply under symmetric versus asymmetric information on workers' actions. In the case of symmetric information, firms and workers take into account that regulations increase job security for employees, and thus a lower wage covers the workers' training cost. Hence, firms' profits under employment protection regulations can be higher than those without the regulations. Employment protection regulations play a significant role of commitment devices for job security. Workers expect that the regulations discourage firms from firing workers easily, and thus they agree low wage contracts.

In the case of asymmetric information, or the moral hazard case, the above statement must be modified. A worker's incentive is brought by the possibility of being dismissed in recessions. 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. 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.

However, employment protection regulations do not always decrease social

welfare and new hiring by firms in the moral hazard case. The regulations have an effect of increasing job security which can improve social welfare. Furthermore, new hiring under employment protection regulations can be more than that without the regulations. The threat of dismissal encourages workers to make efforts. Hence, the more workers firms employ, the higher will be the possibility of dismissal in recessions. 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. A contribution of this paper is to show that employment protection regulations can improve social welfare and total employment level by a simple incomplete contract theory.

Employment protection regulations make firms avoid dismissal policy as much as possible, and if dismissal cannot be avoided, the regulations require firms to follow appropriate procedures and/or provide severance pay to fired employees as sufficiently as possible. As the employment protection regulations, we can raise sufficient advance notice, severance pay and appropriate procedures like negotiations with unions or employees' representative organizations. We consider the difference between severance pay and following appropriate procedures. Although severance pay is just transfer from firms to fired workers, following appropriate procedures on dismissal policy like advance notice and negotiations with unions are social wasteful. Firms can fire employees unilaterally without any negotiations with unions if firms provide sufficient severance pay. You may think that severance pay is better than following appropriate procedures like negotiations with unions. In this paper, however, we will show that severance pay is irrelevant to social welfare and employment. Since severance pay is just transfer from firms to fired employees, severance pay discourages employees from making efforts. Firms have to raise wage to give workers incentives. This impact cancels the effects of severance pay to employment level and social welfare completely. Employment level and social welfare with severance pay are identical to those without the regulation. Although appropriate procedures like negotiations with employees' representative organizations are social wasteful, these procedures on dismissal policy can work as commitment devices for job security.

This paper is organized as follows: in chapter 2, the difference in employment protection regulations among 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; and conclusions are in chapter 5.

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 abuse of right of dismissal (Kaiko-ken Ranyo Hori) has been formulated by the accumulation of judicial precedents since the 1950's. 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. Even if some employees do damage to a firm, the firm cannot easily fire 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 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 massive layoff. Under these constraints, firms must curtail dismissals as much as possible in recessions. If firms attempt massive layoff, the following matters are required: (1) firms must first use all possible means to avoid dismissals such as shifting workers to other workshops and decreasing working hours; (2) firms must not choose 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 on plant closings or

massive layoff is, therefore, quite restrictive for dismissals in Japan. Also, restrictive constraints for massive layoff in plant closing are similarly observed in Germany.

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 %.

On the other hand, there is a trend on employment protection even in the U.S. 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 types of 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 1980’s. 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. Furthermore, 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 massive layoff. In 1991, the National Conference of Commissioners on Uniform State Law proposed the Model Employment Termination Act which requires 'just cause' for dismissals. Although there is less influence of the regulations in the U.S. than in continental European countries and Japan, the trend of employment protection is observed.

There are many studies on the effects of employment protection regulation. 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 on the future 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: one equilibrium of high mobility and low unemployment, and the other of 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.

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 also 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.[1] Nickell (1997) finds a positive effect of the regulation on employment of male workers from 25 to 54 years of age.

3. The Basic Model

We consider a simple employment contract which specifies only a basic wage level. Matters on job security are not specified 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, the labor standard law prohibits firms from making explicit long-term contracts beyond one year from the viewpoint of protection for workers based on the idea that workers are weaker than firms.[2] Hence, labor law does not allow explicit long-term contracts by which workers are bound to a particular firm.[3] In the U.S., if firms and workers intend to keep the industrial

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[1] Lazear (1990) has not focused on case law, but only on formal law. Hence, Japan belongs to countries that is easy to fire workers since, according to matters in Japanese labor law, firm managers are accepted to fire their employees free. However, as we mentioned, actually, there is a severe employment regulation based on accumulation of judicial precedents in Japan. There is possibility that Lazear (1990) overevaluates the negative effect of the regulation on total employment level.

[2] 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.

[3] Basic wage should be specified on labor contracts. If wage were not specified, firms might pay an insufficient wage since the firms could not be punished in court.

relationship beyond one year, formal employment contracts are required in order to prevent fraud. However, it is observed that few of these contracts are formal in the real world. This basic model is thus relevant to actual labor contracts.

Timing of decision by workers and a 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, the game is over.

③ When workers accept the wage offer, then Nature chooses the firm's state: a good state or a bad one. The state is unverifiable. The firm observes its own state, but employees cannot.

④ The firm chooses an optimal real employment level. Dismissed workers receive the outside option $\overline{w} = 0$. On the other hand, the retained employees in the firm receive the wage level specified in the labor contract.

The setting on the outside option $\overline{w} = 0$ is for simplicity and is not crucial to our results. 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. The good (bad) state is denoted as $\overline{\theta}$ ($\underline{\theta}$): $\overline{\theta} > \underline{\theta} > 0$. As we show later, the good state 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, the bad state is so severe that the firm is unwilling or unable to maintain full employment.

Workers and the third parties (court, etc.) cannot observe the firm's state. Hence, any employment contract contingent on the state cannot be made. If all workers provide efforts, the probability of the good state is $\overline{p}$. Otherwise, the probability of the good state 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 N will be taken up in chapter 4.

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. For the convenience of later discussion, we consider the first best allocation.

Social welfare W is given by

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

Clearly, the maximum of social welfare is induced by full employment under any state:

$$L_{FB}(\bar{\theta}) = L_{FB}(\underline{\theta}) = 1.$$

A benchmark

Here, as a benchmark analysis, consider that no incentive problem exists. As we mentioned previously, we consider the case with the following assumption.

Assumption

In the good state, full employment is realized: $L(\bar{\theta}) = N$.

As we show as proposition 3 and 4 later, the firm is willing to have labor pool at the level that full employment is realized in the good state. These cases are optimal for the firm.

First, we 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 in the case of no incentive problem is given by

$$U = \bar{p}w + (1-\bar{p})wL^* - c \geq 0. \qquad ...(2)$$

Next, we consider the case with employment protection regulations. Under the regulation, the firm is required to provide sufficient advance notice on dismissal announcement and treat fired employees in accordance with appropriate procedures specified by labor law. It takes some cost to dismiss employees. Hence, we assume that the firm dismisses a worker at a firing cost z. The firing cost z is social wasteful and is not transfer to dismissed workers like severance pay.[4] The firm's profit under the

[4] If the firing cost z means only severance pay for fired employees, the first best allocation is

regulation is given by $\pi_R(\theta) = \theta f(L_R) - w_R L_R - z(1 - L_R)$, where L_R *or* w_R is employment or wage level under the regulation, respectively.[5] Since we assume that full employment is realized in the good state, it holds that

$$L_R(\bar{\theta}) = 1 \quad and \quad L(\underline{\theta}) = L_R^* \equiv \min\left\{(f')^{-1}\left(\frac{w_R - z}{\underline{\theta}}\right), 1\right\}. \qquad ...(3)$$

If the regulation is severe: $z \geq w_R$, $L_R^* = 1$ holds. Under the regulation, individual rationality is

$$U_R = \bar{p} w_R + (1 - \bar{p}) w_R L_R^* - c \geq 0. \qquad ...(4)$$

Since the firm's profit is a decreasing function of wage level, individual rationality (2) and (4) are binding. We can show $w > w_R$ under the no incentive problem case. Suppose that *w* and w_R are equal. If $w=w_R$ holds, the dismissal regulation leads to higher job security: $L^* < L_R^*$ since $L_R^* \equiv (f')^{-1}\left(\frac{w - z}{\underline{\theta}}\right) > (f')^{-1}\left(\frac{w}{\underline{\theta}}\right) \equiv L^*$. Hence, the following inequality holds:

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

L^* *and* L_R^* are decreasing functions of wage level. See figure 1. 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 of U_R is upper to the curve of *U* for any positive wage. The firm chooses the lowest wage level among multiple solutions of (2) and (4) since decline of wage increases the firm's profit and the functions $U_R(w)$ and $U(w)$ are continuous with respect to *w*. As figure 1 suggests, it is obtained that $w > w_R$. Since $L^* < L_R^*$ holds under $w = w_R$, it is clearly obtained that

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realized in the case of no incentive problem. However, as we show later in proposition 2, severance pay does not work at all in the moral hazard case.

[5] For simplicity, we assume that the firm can finance wage and the dismissal cost in the recession. Unless the firm can finance funds in the financial market, the effect of the employment protection regulation will decrease. However, our results are not influenced well.

$L^* < L_R^*$ under $w > w_R$.

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

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

or

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

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

$$W_R - W = (1-\bar{p})\{\underline{\theta}f(L_R^*) - f(L^*)\} - (1-L_R^*)z \qquad ...(6)$$

The dismissal regulation can improve social welfare if it holds that $\underline{\theta}f(L_R^*) - f(L^*)\} > (1-L_R^*)z$. Employment level without the regulation in the bad state is less than the first best level: $L_{FB}(\underline{\theta}) = 1 > (f')^{-1}\left(\frac{w}{\underline{\theta}}\right) \equiv L^*$. Since the regulation increases employment level in the bad state, the regulation has an effect of improving social welfare. On the other hand, the regulation yields social wasteful cost. If the negative effect of the regulation is small, the former positive effect can exceed the latter negative one.

Since (2) and (4) are binding, it holds that $\Pi_R = W_R$ *and* $\Pi = W$. Hence, $\Pi_R > \Pi$ holds if and only 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. The employment protection regulation plays a significant role as a commitment device for job security.

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

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

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

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

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

Next, consider the dismissal regulation case. Under the dismissal regulation, incentive compatibility under moral hazard is similarly given by

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

These incentive compatibility (7)' and (8) are binding on the equilibrium.

If full employment is realized in the bad state due to the regulation, incentive compatibility (8) is not satisfied. Hence, to satisfy incentive compatibility (8), the firm must offer high wage and thus the profit is decreasing with respect to *z*. In the other words, the firm must offer the wage level such that dismissal appears in the bad state. Thus, the employment level in the recession is given by

$$\underline{\theta} f'(L_R^*) - w_R + z = 0. \qquad \ldots(9)$$

Differentiating (9), it is obtained that

$$\frac{dL_R^*}{dw_R} = -\frac{dL_R^*}{dz} = \frac{1}{\underline{\theta} f''(L_R^*)} < 0 \qquad \ldots(10)$$

Since the firm must satisfy incentive compatibility (8), we differentiate (8) with respect to w_R and *z*:

$$\left(1-L_R^* - w_R \frac{\partial L_R^*}{\partial w_R}\right) dw_R - w_R \frac{\partial L_R^*}{\partial z} dz = 0.$$

From (10) and $L_R^* < 1$,

$$\frac{dw_R}{dz} > 0. \qquad \ldots(11)$$

Clearly, z=0 implies no regulation case. Hence, from (11), the dismissal regulation increases wage:

$$w < w_R . \qquad ...(12)$$

In the regulation case, the firm's expected profit is given by

$$\Pi_R = \bar{p}(\bar{\theta} f(1) - w_R) + (1-\bar{p})(\underline{\theta} f(L_R^*) - w_R L_R^* - (1-L_R^*)z) .$$

Differentiating Π_R with respect to z, from the envelope theorem and (11),

$$\frac{\partial \Pi_R}{\partial z} = -(\bar{p} + (1-\bar{p}) L_R^* \frac{\partial w_R}{\partial z} - (1-\bar{p})(1-L_R^*) < 0 . \qquad \ldots(13)$$

Since z=0 means no regulation case, it holds that

$$\Pi_R < \Pi . \qquad ...(14)$$

The dismissal regulation always decreases the firm's profit. This result is contrary to the no incentive problem case, where the dismissal regulation can increase the firm's profit. By providing a high effort level, workers can increase the probability of the good state, 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.[6] 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. Therefore, the dismissal regulation decreases the firm's profit.

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[6] 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.

Since (7)' and (8) are binding: $w(1-L^*) = w_R(1-L_R^*) = \frac{c}{\Delta}$, it is obtained from (12) that

$$L^* < L_R^*. \qquad \ldots(15)$$

Hence, the effect of the dismissal regulation on social welfare is similar to the no incentive problem case; the regulation can improve social welfare. Although the dismissal regulation weakens workers' motivation and decreases the firm's profit under moral hazard, the regulation can improve social welfare. We will summarizes the above result as a proposition:

Proposition 1

When labor pool with the dismissal regulation is equivalent to that without the dismissal regulation in the moral hazard case: $N = N_R$, the following results are obtained:

[1] $w < w_R$

[2] $L^* < L_R^*$

[3] $\Pi > \Pi_R$.

Moreover, the effect of the dismissal regulation on social welfare is ambiguous. The regulation can improve social welfare.

We have considered the case that dismissal cost is social wasteful. If dismissal cost means just severance pay, can our result be changed? Severance pay is just transfer from firms to fired workers, and thus does not yield welfare loss. However, this answer is no under the incentive problem. When fired workers get severance pay z, incentive compatibility is given by

$$\begin{aligned}&\left[\bar{p} + (1-\bar{p})L_R^*\right]w_R + (1-\bar{p})(1-L_R^*)z - c \\ &\qquad \geq \left[\underline{p} + (1-\underline{p})L_R^*\right]w_R + (1-\underline{p})(1-L_R^*)z\end{aligned}$$

This condition is replaced by

$$(1-L_R^*)(w_R - z) \geq \frac{c}{\Delta}. \qquad \text{...(16)}$$

This inequality implies that the firm must increase wage with respect to severance pay. In this model, dismissal plays a role of giving incentives to workers. Hence, severance pay discourages workers from making efforts, and then the firm has to increase wage moreover. Therefore, the firm is unwilling to offer any severance pay spontaneously on making contracts with workers.

How is the result on severance pay changed if firms must provide severance pay by the dismissal regulation on firing employees? In this case, also, the answer is negative: severance pay is irrelevant to employment level and social welfare.

Proposition 2

Severance pay does not influence employment level and social welfare. Employment level and social welfare with severance pay are identical to those without the regulation.

Proof is in Appendix. Incentive compatibility holds on the equilibrium: $(1-L^*)w = (1-L_R^*)(w_R - z) = \frac{c}{\Delta}$. Employment level in the bad state is given by $L = (f')^{-1}\left(\frac{w}{\underline{\theta}}\right)$ and $L_R^* = (f')^{-1}\left(\frac{w_R - z}{\underline{\theta}}\right)$. Hence, $w = w_R - z$ holds when incentive compatibility is binding, and thereby employment level is equivalent. Therefore, severance pay does not influence to social welfare. Severance pay increases not only job security but also income in the bad state, and thus severance pay discourages workers form making efforts. Although following the appropriate procedures like negotiations with unions is social wasteful, it does not have less effects of discouraging workers than severance pay. Social wasteful dismissal cost like following the appropriate procedures on dismissal can work in the moral hazard case.

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.

Proposition 3

The optimal labor pool without the dismissal regulation satisfies the following condition: $N^* = (f')^{-1}\left(\frac{w(N^*)}{\bar{\theta}}\right)$.

Proof is in Appendix. This proposition indicate that the firm are willing to have labor pool equivalent to the optimal employment level in the good state. Wage is a function of labor pool and wage is determined at the level which incentive compatibility is binding given N:

$$I(w) \equiv \frac{w}{N}\left[L(\bar{\theta}) - L^*\right] = \frac{c}{\Delta}. \qquad \text{...(7)"}$$

If it holds on the equilibrium that

$$N > (f')^{-1}\left(\frac{w(N)}{\bar{\theta}}\right) = L(\bar{\theta}), \qquad \text{...(17)}$$

some workers are fired even in the good state. In this case, decrease of N makes more decline of wage possible from (7)", and thus it improves the firm's expected profit. Hence, this situation like (17) is not optimal for the firm.

If it holds on the equilibrium that

$$L(\bar{\theta}) = N < (f')^{-1}\left(\frac{w(N)}{\bar{\theta}}\right), \qquad \text{...(18)}$$

full employment is realized in the good state. In this case, increase of the labor pool N given w raises the dismissal rate for employees in the bad state, and thus decreases workers' expected wage in the bad state. On the other hand, it does not influence the expected wage in the good state since full employment is realized. Thus, since the increase of N motivates workers under (18), the firm can decline the wage level and raise profit. Therefore, optimal labor pool is determined as proposition 3 shows.

Next, we consider the effect on new hiring in the dismissal regulation case. As the same manner as the case without the regulation, the following proposition holds.

Proposition 4

The optimal labor pool with the dismissal regulation satisfies the following condition: $N_R^* \le (f')^{-1}\left(\frac{w_R(N_R^*)-z}{\bar{\theta}}\right)$.

Proof is in Appendix. Note that $N_R^* < (f')^{-1}\left(\frac{w_R(N_R)-z}{\bar{\theta}}\right)$ can be realized in the case with the dismissal regulation. This is different from the case without the dismissal regulation. We consider the case that

$$N_R < (f')^{-1}\left(\frac{w_R(N_R)-z}{\bar{\theta}}\right) \qquad ...(19)$$

holds on the equilibrium. We have shown in proposition 3 that this case is not optimal in the no dismissal regulation case. With the regulation, however, this case can be optimal for the firm. Differentiating (8) with respect to w_R and N_R,

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

From $\frac{\partial L_R^*}{\partial w_R}<0$ and $L_R^* < N_R$, it holds that

$$\frac{dw_R}{dN_R}<0. \qquad ...(20)$$

We consider the first order condition on the initial labor pool N_R in the case of (19). We differentiate $\Pi_R = \bar{p}(\bar{\theta}f(N_R)-w_R N_R)+(1-\bar{p})\{\underline{\theta}f(L_R^*)-w_R L_R^*-z(N_R-L_R^*)\}$ with respect to N_R, using the envelope theorem,

$$\frac{d\Pi_R}{dN_R}=\bar{p}(\bar{\theta}f'(N_R)-w_R+z)-\frac{dw_R}{dN_R}\{\bar{p}N_R+(1-\bar{p})L_R^*\}-z. \qquad ...(21)$$

The first and second terms in (21) are positive from (19) and (20), however, the third one is negative. Hence, (21) is not always positive for any N in the case of (19). Without

the dismissal regulation, it always holds that $\frac{d\Pi}{dN} > 0$ for any N in the case of (18). To the contrary, with the regulation, (19) can be optimal for the firm. In the case of (19), as (20) implies, increase of N_R leads to decline of w_R, which is a positive factor on profit. On the other hand, increase of N_R raises employment cost due to the dismissal regulation. This is a negative factor.

Next, we consider the case that total employment with the dismissal regulation is more than that without the regulation. If the firm's labor pool N is given, wage is determined at the minimum level that incentive compatibility holds, and thus wage is uniquely determined. Then, real employment level is uniquely determined by the wage level because of strict concavity of production function. Hence, real employment level in the good state is specified by a level of labor pool.

First, we consider the relationship between real employment in the good state and labor pool without the dismissal regulation. For simple notation, we define the firm's willingness to employ in the good state as

$$\bar{L}^* \equiv (f')^{-1}\left(\frac{w(N)}{\bar{\theta}}\right). \qquad ...(22)$$

This is the real employment level in the good state that the firm is willing to employ given w and N if possible. Differentiating (22), it is obtained that

$$\frac{d\bar{L}^*}{dN} = \frac{dw/dN}{\bar{\theta} f''(\bar{L}^*)}. \qquad ...(23)$$

The sign of (23) is dependent on the sign of dw/dN. In the case of (17), as it is shown in proof of proposition 3, decrease of N leads to decline of wage level while incentive compatibility (7)" holds: $dw/dN > 0$. Hence, it holds that

$$\frac{d\bar{L}^*}{dN} < 0 \quad \text{in the case of (17).} \qquad ...(24)$$

On the other hand, in the case of (18), as (A3) indicates in proof of proposition 3, it holds that $dw/dN < 0$. Therefore, it holds that

$$\frac{d\bar{L}^*}{dN} > 0 \quad \text{in the case of (18).} \qquad ...(25)$$

From (24) and (25), the curve of (22) is represented like figure 2. Point A means the optimal labor pool N^* for the firm on the equilibrium.

Similarly, we consider the firm's willingness to employ in the good state with the dismissal regulation:

$$\bar{L}_R^* \equiv (f')^{-1}\left(\frac{w_R(N_R)-z}{\bar{\theta}}\right). \qquad ...(26)$$

Differentiating (26),

$$\frac{d\bar{L}_R^*}{dN_R} = \frac{dw_R/dN_R}{\bar{\theta}f''(\bar{L}_R^*)}. \qquad ...(27)$$

The sign of (27) depends on the sign of dw_R/dN_R. From proof of proposition 4 and (20), it holds that

$$dw_R/dN_R < 0 \quad if \quad \bar{L}_R^* \equiv (f')^{-1}\left(\frac{w_R(N_R)-z}{\bar{\theta}}\right) < N_R \qquad ...(28)$$

and

$$dw_R/dN_R > 0 \quad if \quad \bar{L}_R^* > N_R. \qquad ...(29)$$

Using (28) and (29), the curve of (26) is drawn like that of (22). Moreover, from proposition 1[2], $w_R - z < w$ holds given $N = N_R$. Using this inequality, it is obtained that

$$\bar{L}_R^*(N) = (f')^{-1}\left(\frac{w_R(N)-z}{\bar{\theta}}\right) > (f')^{-1}\left(\frac{w(N)}{\bar{\theta}}\right) = \bar{L}^*(N) \quad \text{for any } N. \qquad ...(30)$$

From (30), the curves of (22) and (26) are drawn like figure 2. As proposition 4 indicates, optimal labor pool with the dismissal regulation is given by $N_R^* \le \bar{L}_R^*(N_R^*) \equiv (f')^{-1}\left(\frac{w_R(N_R^*)-z}{\bar{\theta}}\right)$, and thus the optimal labor pool on the equilibrium is on the bold line of the curve of (26). As figure 2 suggests, optimal labor pool with the dismissal regulation can be more or less than that without the regulation.

The effect of the regulation on total employment level is ambiguous. We summarize this discussion as a proposition:

Proposition 5

Total employment level with the dismissal regulation can be more than that without the regulation. The effect of the dismissal regulation to total employment level is ambiguous.

Since the dismissal regulation discourages employees from making efforts, firms have to offer a higher wage to motivate them. The regulation leads to increase employment cost, and thus provides the decline in the hiring level. On the other hand, as we have stated, an increased employment pool provides a higher dismissal risk for employees in the bad state. Hence, by increasing the hiring level, employees are encouraged to make efforts and firms can decrease wage. The regulation induces opposite effects on the hiring level. If the latter positive effect can be more than the former negative one, the effect of employment protection regulations on new hiring is positive. 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. It would be short-sighted to conclude that the dismissal regulation, like employment protection laws, discourages firms from employing new workers.

5. 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. However, 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.

We have considered the cost that workers cannot observe the firm's state. If the

firm's state θ is observed by employees, wage adjustment in the bad state is efficient and realizes the first best. In the bad state, the firm is willing to offer decreasing wage and dismissal. Since an employee's utility in the bad state is $wL^*(\underline{\theta})$, the firm must offer new wage $\tilde{w}$ satisfying $\tilde{w}N \geq wL^*$. The minimum of new wage is given by $\tilde{w} = \frac{wL^*}{N}$. Employees' utility brought by wage adjustment is equivalent to that without wage adjustment, and thus wage adjustment in the bad state leads to the first best. In this situation, employment protection regulations are not necessary.

However, if employees cannot observe the firm's state, wage adjustment plays no significant role. The firm is willing to decrease wage regardless of the state. The firm has an incentive of announcing that the firm's state is bad and wage cut is necessary even if the state is good. For employees, acceptance of wage adjustment in the bad state does not change their utility, though, acceptance of wage adjustment in the good state always leads to decline of employees' utility. Hence, employees are unwilling to accept new wage offer, and then wage adjustment does not work. Therefore, in this situation, employment protection regulations can play a significant role of improving social welfare and total employment level.

In the real world, unions have a large stake in the dismissal regulation. Under this regulation, firms usually 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 can be appropriate and effective. Eguchi (2002) shows the significance of unions as commitment devices on job security. When unions pay more attention to job security rather than increase of wage, the firm's profit and social welfare can be improved under the contractual incompleteness. As we have pointed out in this paper, the similar things can be applied to the analysis on the employment protection regulations. The regulations can improve and increase employment level. It would be myopic to conclude that the regulation decreases employment level and social welfare.

Appendix

Proof of proposition 2

Since the firm is willing to offer the lowest wage that satisfies incentive compatibility, (7)' and (16) are binding:

$$w\left(1-\frac{L^*}{N}\right)=(w_R-z)\left(1-\frac{L_R^*}{N}\right)=\frac{c}{\Delta}. \qquad \text{...(A1)}$$

Suppose that $w<w_R-z$ on the equilibrium. In this case, $L^*>L_R^*$ holds, and hence it is obtained that $w\left(1-\frac{L^*}{N}\right)<(w_R-z)\left(1-\frac{L_R^*}{N}\right)$. Since this contradicts (A1), $w\geq w_R-z$ holds.

Next, suppose that $w>w_R-z$ on the equilibrium. In this case, $L^*<L_R^*$ holds, and hence it is similarly obtained that $w\left(1-\frac{L^*}{N}\right)>(w_R-z)\left(1-\frac{L_R^*}{N}\right)$. This also contradicts (A1). Therefore, it holds that $w=w_R-z$. This result leads to $L^*=L_R^*$. Since severance pay *z* is just transfer, social welfare with severance pay is given by

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

Using $L^*=L_R^*$, $W=W_R$ holds.■

Proof of proposition 3

Suppose that the firm has an initial labor pool as follows:

$$N > (f')^{-1}\left(\frac{w(N)}{\bar{\theta}}\right) = L(\bar{\theta}) . \qquad \text{...(17)}$$

Note that wage depends on labor pool N. The right hand of (17) means the actual employment level in the good state the firm is willing to employ under the labor pool N. We will show that this case is not optimal for the firm. This implies that some employees are dismissed even in the good state. Workers' incentive compatibility is given by

$$I(w) \equiv \frac{w}{N}\left[L(\bar{\theta}) - L^*\right] \geq \frac{c}{\Delta}, \qquad \text{...(7)"}$$

where $L(\bar{\theta}) \equiv \min\left\{N, (f')^{-1}\left(\frac{w(N)}{\bar{\theta}}\right)\right\} = (f')^{-1}\left(\frac{w(N)}{\bar{\theta}}\right)$ holds from (17). $w(N)$ is determined at the level which (7)" holds as an equality. As mentioned previously, (7)" is binding since a lower wage raises profit. On the equilibrium, the following condition holds given N:

$$\frac{d\left[w\left[L(\bar{\theta}) - L^*\right]\right]}{dw} \geq 0 . \qquad \text{...(A2)}$$

Unless (A2) is satisfied, the firm can raise its profit by further wage decline given N while the incentive compatibility of workers holds. Hence, from assumption (17), the decrease of the initial labor pool makes wage decline possible so that the firm can improve profit. Therefore, (17) is not optimal, and thus $L(\bar{\theta}) = N \leq (f')^{-1}\left(\frac{w(N)}{\bar{\theta}}\right)$ holds on the equilibrium.

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

$$N < (f')^{-1}\left(\frac{w(N)}{\bar{\theta}}\right) . \qquad \text{...(18)}$$

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

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

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

$$\frac{dw}{dN}<0. \qquad \text{...(A3)}$$

Furthermore, the first order condition on the initial labor pool is positive from (18), (A3), and the envelope theorem:

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

Hence, the initial employment level given by (18) is not optimal. Therefore, on the equilibrium, the following condition on the optimal initial labor pool N^* holds:

$$N^*=(f')^{-1}\left(\frac{w(N^*)}{\bar{\theta}}\right). \blacksquare$$

Proof of proposition 4

We can prove this proposition by the same way of proposition 3. We consider the case such that

$$N_R>(f')^{-1}\left(\frac{w_R(N_R)-z}{\bar{\theta}}\right) \qquad \text{...(A4)}$$

holds on the equilibrium. In this case, incentive compatibility with the dismissal regulation is given by

$$I_R(w)\equiv\frac{w_R}{N_R}\left(L_R(\bar{\theta})-L_R^*\right)\geq\frac{c}{\Delta},$$

where $L_R(\bar{\theta}) \equiv \min\left\{N_R, (f')^{-1}\left(\frac{w_R(N_R)-z}{\bar{\theta}}\right)\right\} = (f')^{-1}\left(\frac{w_R(N_R)-z}{\bar{\theta}}\right)$. As the similar manner to proposition 3, decrease of N_R leads to decline of w_R, and thus improves the firm's profit. Hence, the condition (A4) does not hold on the equilibrium because the firm can increase profit by decreasing labor pool N_R.■

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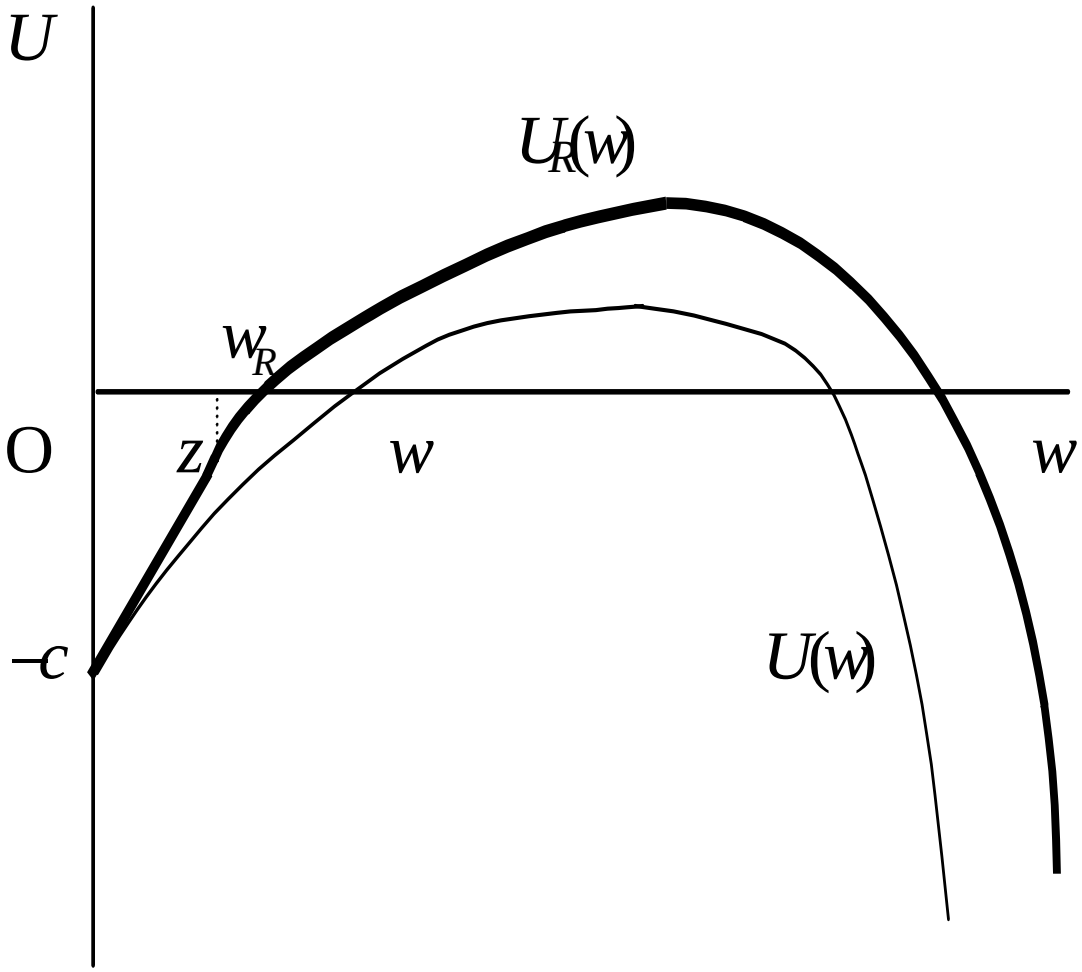

Figure 1

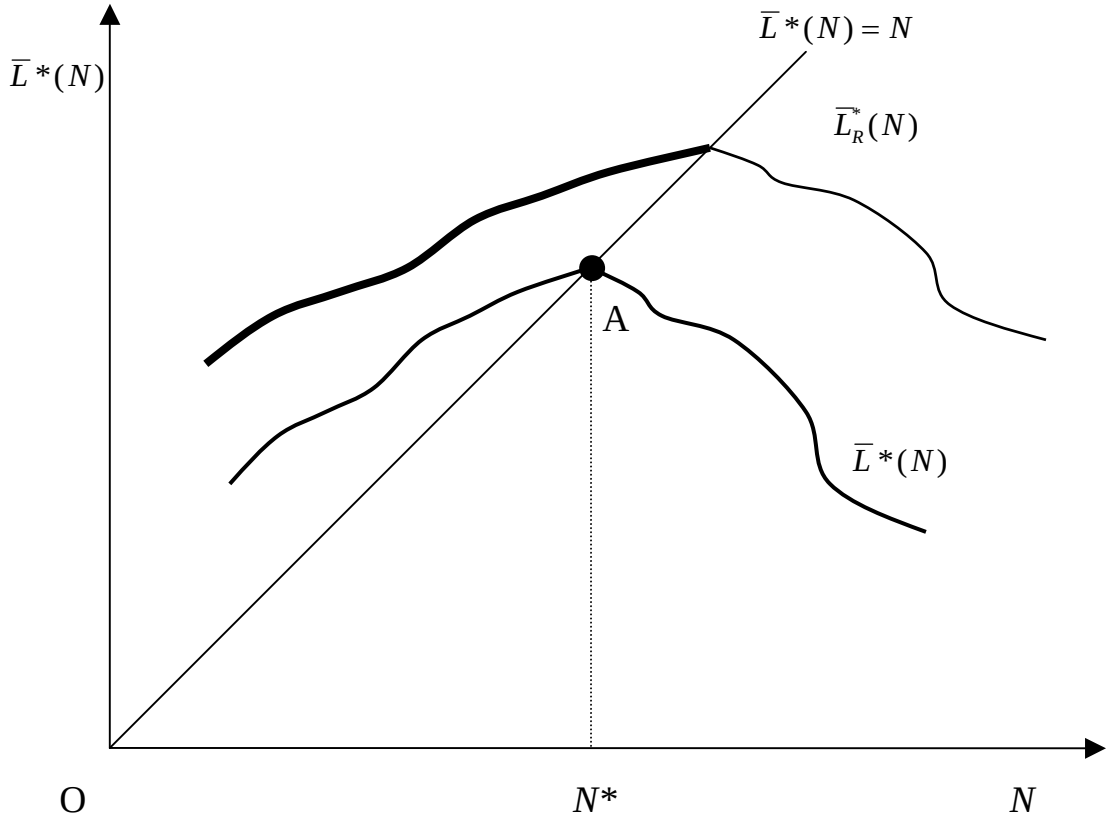

Figure 2