INTERNATIONAL ECONOMIC REVIEW
Vol. 35, No. 3, August 1994

THE CONTINGENT GOVERNANCE OF TEAMS: ANALYSIS OF INSTITUTIONAL COMPLEMENTARITY*

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The first purpose of this paper is to design a model of governance structure, called the contingent governance, which can control the free-riding problem in teams in the second-best manner. The second is to show, by a new method of comparative static analysis, that the effectiveness of the contingent governance may be enhanced by complementary institutional arrangements of the imperfect labor market and bank-centered financial system. The paper discusses the implications of such institutional complementarity for the dynamic change of the Japanese main bank system and financial system design of transitional economies.

1. INTRODUCTION

The purpose of this paper is twofold. The first is to design a model of governance structure which may be able to effectively control the free-riding problem in team production in the second-best manner. The second is to show, by a new method of comparative static analysis due to Meyer, Milgrom, and Roberts (1992), that the derived corporate governance cannot be introduced or maintained in either a piecemeal way or autonomous way, but its effectiveness must be supported by complementary institutional arrangements of the imperfect labor market and a unique monitoring agent (the bank). The paper refers to such phenomena as institutional complementarity and discusses its implications in the context of Japanese and transitional economies.

Contemporary production methods involve more or less a team characteristic in that interactions among the workers are so intense that individual contributions to the joint outcome are not necessarily discernable. As a result, a moral hazard problem may arise in which participating workers are induced to free ride on others' efforts. This paper starts with the recognition that solutions to the free-rider problem proposed by economists have not been entirely satisfactory, either because (1) perfect monitoring of an individual team member's effort is assumed (as in Alchian and Demsetz 1972), (2) the team monitor is made better off by the under performance of teams (as in Holmstrom 1982), or (3) no wealth constraint for team members is present (as in Holmstrom 1982, McAfee and McMillan 1991).

* Manuscript received February 1993; revised March 1994.

[1] An earlier version of this paper was presented at the Osaka University Semicentennial Symposium on "Economic Analysis of Japanese Firms and Markets: A New Microeconomic Paradigm," November 9–11, 1992 as well as seminars at Universities of Tokyo, Bologna, Louis Pasteur at Strasbourg, Ecole polytechnique and Stanford. I benefitted from discussions and comments by Olivier Compte, Bengt Holmstrom, Hideshi Itoh, Paul Milgrom, Paul Sheard and two anonymous referees. I also indebted to Hajime Miyazaki for detailed comments and editorial suggestions, to Brett McDonnel, Marco Darin and Ayako Yasuda for competent research assistance.

This paper proposes a second-best solution to the moral hazard problem which avoids the above-mentioned weaknesses of existing solutions. The second-best solution is achieved by designing a nexus of contracts—to be called *T-nexus*—among the workers (team members), the manager (a quasi-member of the team), general investors and an intermediary monitoring agent. This nexus specifies ex ante that the rights to ex post control of the team output and its continuation shifts between the internal manager and the monitoring agent, contingent upon the output state. The *T*-nexus defines a less hierarchical control structure of the firm than the conventional principal-agent model of the firm, which I call the contingent governance structure.

There is a close analogy between the present model, on the one hand, and the corporate governance structure and surrounding institutional framework that are observed in Japan, on the other. Especially, the team characteristic of production is relatively more prominent in Japanese organizations than elsewhere. The complementarity analysis that I conduct in this paper suggests that the co-emergence of the main bank system and the imperfect labor market in the high growth period of the Japanese economy was not accidental. These arrangements realized a system of complementary institutions that are effective in enhancing the productivity of team-oriented production. Also, the same analysis suggests that various developmental and historical conditions unique to transitional economies may make the introduction of a bank-oriented financial system, rather than securities-based financial system, more conducive to the smooth transition to market economies.

The organization of the paper is as follows: Section 2 motivates our study by briefly discussing the limitation of the principal-agent approach to the moral hazard problem in teams. Section 3 introduces a formal model of controlling teams and derives the *T*-nexus of contracts which defines the contingent governance structure. Section 4 is a comparative static analysis of the model and interprets results in terms of institutional complementarity. Section 5 discusses dynamic implications of institutional complementarity, using examples drawn from the Japanese main bank system and transitional economies. Section 6 concludes.

2. EXISTING SOLUTIONS TO MORAL HAZARD IN TEAMS

In the last two decades, considerable progress has been made in the theory of the firm from the contractual viewpoint. In the typical contractual approach, the organizational design of the firm is constrained by the twin conditions of individual rationality and incentive compatibility. Implicit in the individual rationality condition is the existence of alternative outside opportunities for agents. The incentive compatibility condition permits that any noncooperative outcome of an arbitrary organization can be replicated by a centralized two-tier structure, where agents are motivated to communicate their entire private information directly to the principal without interacting among agents themselves (the Revelation principle). Thus, according to the principal-agent approach, the essential feature of the firm can be captured as a two-tier hierarchy between the single principal and the perfectly

mobile and mutually autonomous agents: For example, between the owner and the manager, the supervisor and the subordinates, or the employer and the employees.

However, important aspects of the firm's organization are not captured by the above two presumptions of the principal agent theory: The firm may embody interactions (joint task responsibilities, mutual help, etc.) among agents which cannot be decomposable into individual efforts. It also internalizes multilayered structures in which hierarchical relationships are not exclusive but which also involve cross-functional lateral communications. The aspect of agent interactions has been conceptualized by economists as "teams" (Alchian and Demsetz 1972, Holmstrom 1982) or "partnerships" (Radner 1992).[2] In teams or partnerships, the many agents act together to produce a joint outcome (e.g., output or profit). This outcome can be observed by agents, but they cannot directly observe each other's actions, nor do they completely share each other's information. In a recent survey article, Radner claimed that "[i]n fact, most organizations combine aspects of both the partnership and principal-agent models. ... Unfortunately, I am not aware of significant progress on more comprehensive theoretical models of the firm that combines these two submodels in a systematic way" (Radner 1992, p. 1405).

The objective of this article is to explore the way in which a conspicuous presence of partnership/team elements in the internal structure of the firm modifies the nature of the hierarchical control by the stockholders (residual claimants). From a "law and economics" perspective, this paper may be viewed as an exercise on designing a corporate governance structure.

The contractual approach to the team nature of the firm was pioneered by Alchian and Demsetz (1972), who argued that the essential function of the firm lies in the hierarchical monitoring of "free-riding" among team members. The monitor would be motivated to monitor if she is entitled to realize the full benefits of monitoring. Therefore, in the Alchian-Demsetz theory, the team nature of the firm calls for the control and monitoring of the firm by the stockholders who act as residual claimants after contractual payments to the agents (the workers). Note that it is vital for their argument to presume the principal's perfect ability to observe the individual actions of team members, once properly motivated. The perfect observability assumption, however, renders the concept of teams almost meaningless.

Holmstrom (1982) was able to dispense with the perfect observability assumption. He showed that if the principal can observe the joint outcome of team members and if she can exercise the threat of a severe penalty against an underperforming team, then an approximate first-best solution can be obtained. However, if this budget-breaking punishment is to be executed by the principal who derives higher utility from higher income, the principal may be better off if she lets the team fail to achieve its goal. Therefore, as Eswaran and Kotwal (1984) pointed out, there may be a risk of clandestine collusion between the principal and a single team member so that the latter shirks for the purpose of forcing the entire team to

[2] Another type of modelling horizontal interactions is that of side contracting in which agents who possess common private information (say on mutual effort levels) enter enforceable contracts among themselves. See Holmstrom and Milgrom (1990) and Itoh (1993). The team approach adopted below is different from the side contracting approach in that it assumes the imperfect observability of efforts even among agents.

fail, and sharing the resulting penalty between them. It is rather hard to imagine an institution of corporate governance in which the principal benefits from the failure of the team. Also, the team members must bear large penalties when the team fails. But, if there is a wealth constraint for the team members, the scheme may not be implementable.

McAfee and McMillan (1991) presented an alternative scheme of achieving the first best solution in teams. In the simplest version of their model without adverse selection, each team member puts up a large sum of money equivalent to the optimal joint output of the team less its reservation wages as a performance bond, before team production takes place. Each member recovers the total value of realized joint output (not a share thereof) so that she is motivated to work up to the optimal level. However, a third party must make up a large amount of deficit ex post at an optimal output level equivalent to the total value of members' reservation wages. It is not clear how the third party can be motivated to be engaged in such an arrangement ex ante. Also, the worker's wealth constraint may deter them from making a large upfront investment.

In the next section, I construct a nexus of contracts intended to control the free-riding problem in the second best manner. I follow the Holmstrom approach in allowing for an external agent only partially able to monitor, but resolve the difficulty associated with his approach at the cost of giving up the first best solution. An essential difference between the two models lies in ways in which the monitor breaks the budget of teams.

3. THE T-NEXUS OF CONTRACTS AND CONTINGENT GOVERNANCE

Suppose that the firm is a team composed of n homogenous workers and one manager. Team production takes place in a sequence of time periods. It requires a unit of one-period working capital. Let $\mathbf{a} = (a_1, \ldots, a_n)$ be a vector of effort supply per period of individual team members. Denote the value of team output per period by y and let $F(y, \mathbf{a})$ be the cumulative distribution function of y on the closed, finite support $[y_{\min}, y_{\max}]$ and conditional on a vector of efforts $\mathbf{a}$ undertaken by n workers. F is i.i.d. for all periods and symmetric and twice differentiable in $\mathbf{a}$. The probability density function associated with F will be denoted by $f(y, \mathbf{a})$. $E[\cdot]$ denotes the expectation operator with respect to y. For any symmetric $\mathbf{a}$ (i.e., $a_i = a$ for all i). let us denote the first and second partial derivatives with respect to a_i by simply attaching the subscript a and aa to the function (e.g., f_a and $E[y_{aa}]$).

We assume that the density function satisfies the monotone likelihood ratio property (MLRP), namely, $f_a(y, \mathbf{a})/f(y, \mathbf{a})$ is monotone increasing in y for every $\mathbf{a}$. We assume that the manager can observe the team output, but not an individual member effort supply. The monotonicity assumption implies, however, that the observed value of y serves as a good indicator of the level of workers efforts, as higher workers efforts reduce the probability of output in the lower tail while increasing that in the higher tail. We call the output satisfying $f_a(y, \mathbf{a}) = 0$ for some $\mathbf{a}$ the maximum likelihood output (MLO) for that $\mathbf{a}$.

The utility flow per period of the ith worker, when his earnings at the end of the

period is w_i and his effort during the same period is a_i, is given by the quasi-linear function

$$u^w(w_i, a_i) = \begin{cases} w_i - v(a_i) & \text{for } w_i \geq w_{\min} \\ -D & \text{for } w_i < w_{\min}, \end{cases}$$

where $v(\cdot)$ is a monotone increasing, continuously differentiable function and D is a sufficiently large number to make every contract suboptimal for which the condition $w(y) \geq w_{\min}$ does not hold for some y.

The manager's role in this model is to monitor a possible occurrence of free riding among the workers and to promote reciprocal behavior among the team workers in order to enhance the team productivity. She incurs the cost in doing so (e.g., making efforts in organizing QC movement, administering job rotations, promoting company spirits). Specifically, we assume that

$$\text{(RC)} \qquad da_j/da_i = H(c) \quad (\text{for all } j \neq i) \quad \text{where } 0 < H < 1,$$

da_j/da_i is the ith worker's conjecture as to how his own effort increment will be reciprocated by the jth worker. The (RC) equation indicates how this conjecture can be influenced by the manager's costly effort. Assume that the function $H(\cdot)$ is monotone increasing and continuously differentiable, but that it never reaches the value of one. If $da_j/da_i = 1$, the team is essentially a monolithic entity and the free-riding problem would disappear. That $H(\cdot)$ is bounded away from 1 implies that the manager is not omnipotent in controlling free riding of team members.

When the manager expends utility cost c for promoting cooperative behavior among workers during the production period and receives earnings equal to w_m at the end of the period, her utility flow per period is given by the linear function,

$$u^m(w_m, c) = w_m - c.$$

Suppose that all the workers are equally paid, i.e., $w_i = w$ for all i, and that the pay level for the manager is fixed at $w_m = kw$, where k is an exogenously fixed parameter.

It is possible that at the end of a period, the firm is "liquidated" if team output falls short of some critical value, $\underline{b}$, called the liquidation point. Since there is no fixed capital other than one-period working capital in this model, such liquidation simply means disbandment of the team. Namely, the n workers and the manager are discharged after receiving their contractual wages that are contingent on the realized output $w(y)$. Once discharged, the manager and individual workers find employment at other teams (firms), but may individually suffer from reductions kJ and J in the continuation values of employment respectively. As long as the team continues, the wage contracts remain stationary.

The representative worker maximizes the present value of expected current and future flows of utility subject to the constraint (RC). Because of the stationarity of the environments, he chooses the same effort level as far as he is kept in the team. The flow value to him of remaining in the team will then be constant at v. Therefore, his problem of choosing maximizes a_i in period t can be expressed as

$$v = \max_{a_i} (1 - \delta)(E[w(y(\mathbf{a}))] - v(a_i)) + \delta[(1 - F(\underline{b}, \mathbf{a}))v + F(\underline{b}, \mathbf{a})(v - J)]$$

subject to constraint (RC), where δ is the time discount factor. In the current period, the worker receives the wage w contingent on y and incurs effort cost $v(a_i)$. If he remains in the team with probability $(1 - F(\underline{b}, \mathbf{a}))$, he receives value v in the future. If he is discharged from the team, because the output level falls below $\underline{b}$ with probability $F(\underline{b}, \mathbf{a})$, he receives v less J in the future. The weights in the equation on the present and future payoffs are $1 - \delta$ and δ, respectively. This weighing expresses present values in equivalent flow terms v. The corresponding values as stock can be found by dividing through by $1 - \delta$.

Approximating $[1 + H(n - 1)]/(n + k)$ by H for large n, the solution is given by

$$\text{(WAC)} \qquad H\{E[w_a(y(\mathbf{a})] - \gamma(n + k)JF_a(\underline{b}, \mathbf{a})\} = (n + k)v_a,$$

after dropping the subscript i for the worker. In the equation $\gamma = \{\delta/(1 - \delta)\}$ is the value of an annuity paying 1 per period beginning at the end of the current period. I refer to this condition as the worker's incentive compatibility condition (WAC).

General investors who supply one-period working capital are risk neutral and require expected returns at least equal to R^I per period. They cannot observe the output of the firm. Their observation is limited to the court-verifiable event of liquidation. Therefore, their return can be made contingent only on the liquidation or survival of the firm. Denoting the share of general investors by $s^I(y)$,

$$s^I(y) = \begin{cases} \bar{s}^I \geq 0 \text{ for all } y > \underline{b} \text{ and} \\ \underline{s}^I \geq 0 \text{ for all } y \leq \underline{b} \end{cases}$$

for some constant $\bar{s}^I$ and $\underline{s}^I$. General investors' participation constraint (IPC) is

$$\text{(IPC)} \qquad (1 - F(\underline{b}, \mathbf{a}))\bar{s}^I + F(\underline{b}, \mathbf{a})\underline{s}^I \geq R^I.$$

Suppose that there exists an intermediary agent who can observe the realized output of the firm at a cost, and who is entitled to take over control of the firm and to liquidate the team if the firm's output falls short of $\underline{b}$. I refer to this agent function as ex post monitoring and the agent as EP-monitor. The EP-monitor expects returns to the ex post monitoring service equal M. However his ex post revenue $s^{\mathrm{EP}}(y)$ may be contingent upon the output of the firm. Particularly, I do not exclude the possibility that the ex post revenue may become negative for some y. The participation constraint for the EP-monitor (EPMC) then becomes

$$\text{(EPMC)} \qquad E[s^{\mathrm{EP}}(y)] \geq M.$$

Since I have assumed transferable utility for each agent, an efficient set of contracts must maximize the sum of the individual expected utilities. We call the share scheme $\langle w(\cdot), s^I(\cdot), s^{\mathrm{EP}}(\cdot)\rangle$ the T-nexus of contracts ($T \equiv$ team-controlling), if it constitutes a solution to the following constrained maximization problem of joint surplus:

$$\max_{w(\cdot),\, s^I(\cdot),\, s^{EP}(\cdot),\, \mathbf{a},\, c} \{E[y] - nv(a) - (n+k)\gamma JF(\underline{b}, \mathbf{a}) - c)$$

subject to (WAC), (IPC), (EPMC), $H = H(c)$, and $w \geq w_{\min}$.

Since liquidation imposes the dead-weight loss of employment value $(n + k)\gamma J$ on the internal members (manager and workers) of the firm not enjoyable by other agents, there may arise a possibility of renegotiation between them and the EP-monitor in the event of y falling in the liquidation region $L = [y_{\min}, \underline{b}]$. I assume that renegotiation does not involve general investors because they are numerous and cannot effectively organize themselves. The EP-monitor commitment to liquidate the firm in the event of y falling in L becomes renegotiation proof if (RNP)

$$\text{(RNP)} \qquad \Delta s^{EP}(y) \geq (n + k)\gamma J \text{ for all } y \in L$$

where $\Delta s^{EP}(y)$ denotes the surplus the EP-monitor can obtain by liquidating the poor-performance firm rather than rescuing it at y. We call a T-nexus satisfying this condition (RNP) a renegotiation-proof T-nexus. The following proposition shows the existence and form of such a nexus.

PROPOSITION 1. *Provided that $R^I > \gamma(n + k)J$, there exist a unique $\bar{b}$ and nondegenerate intervals $[\underline{b}, \bar{b}]$ and $[\underline{s}^I, \bar{s}^I]$ for which a renegotiation-proof T-nexus of contracts is given as follows:*

(1)

$$s^I(y) = \bar{s}^I;\ w(y) = (y - \bar{s}^I)/(n + k);\quad s^{EP}(y) = 0 \text{ for } y \in T = (\bar{b}, y_{\max}]$$

$$s^I(y) = \bar{s}^I;\ w(y) = w_{\min};\ s^{EP}(y) = y - \bar{s}^I - (n + k)w_{\min} \text{ for } y \in E = (\underline{b}, \bar{b}]$$

$$s^I(y) = \underline{s}^I;\ w(y) = w_{\min};\ s^{EP}(y) = y - \underline{s}^I - (n + k)w_{\min} \text{ for } y \in L = [y_{\min}, \underline{b}].$$

PROOF. Efficiency requires that

$$\text{(E)} \qquad y = s^I(y) + s^{EP}(y) + w(y) \text{ for all } y.$$

Let η, μ, λ and $\xi(y)$ be Lagrangian multipliers for (WAC), (IPC), (EPMC) and (E) respectively. It is easily seen that $\xi(y)$ is constant over y and identically equal to λ and μ. Pointwise differentiation of the Lagrangian function with respect to w yields $-\eta H(c) f_a(y, \mathbf{a})/f(y, \mathbf{a}) + \lambda$, which is an increasing function of y by the MLRP. Therefore, $w(y) = w_{\min}$ for $y \in [y_{\min}, \bar{b}]$ and $= \max_{s^I, s^{EP}}[y - s^I(y) - s^{EP}(y)]$ for $y \in (\bar{b}, y_{\max}]$, where $\bar{b}$ satisfies $\eta H(c) f_a(\bar{b}, \mathbf{a})/f(\bar{b}, \mathbf{a}) + \lambda = 0$. Noting $\mu = \lambda$, differentiation of the Lagrangian function with respect to $\underline{b}$ yields $(n + k)\gamma J[1 + \eta H(c) f_a(\underline{b}, \mathbf{a})/f(\underline{b}, \mathbf{a})] = 0$. By the MLRP, it implies that $\underline{b} < \bar{b}$. For the value of $\underline{b}$ (in terms λ, η, c, $\mathbf{a}$) satisfying this condition, let

$$\text{(IPC*)} \qquad s^I(y) = \begin{cases} \underline{s}^I = \{R^I - (n + k)\gamma J[1 - F(\underline{b}, \mathbf{a})]\}/F(\underline{b}, \mathbf{a}) & \text{for } y \leq b \\ \bar{s}^I \equiv \underline{s}^I + (n + k)\gamma J & \text{for } y > \underline{b}. \end{cases}$$

Set the value of $\bar{b}$ (in terms of λ, η, c, $\mathbf{a}$) to satisfy that $E_{y<\bar{b}}[y - s^I(y) - w_{\min}] = M$.

The optimal value of c is determined by $H(c) = \eta H'(c)v_a$ and that of $\mathbf{a}$ by (WAC*). Two additional conditions for determining λ and η are given by

$$E[y_a] - (n + k)\gamma J F_a(\underline{b}\ \mathbf{a}) + \eta\{H(c)[E[y_{aa}] - E_{(L \cup E)}[y_{aa}]$$

$$+ w_{\min} F_{aa}(\bar{b}, \mathbf{a}) + \bar{s}^I F_{aa}(\bar{b}, \mathbf{a}) - (n + k)\gamma J F_{aa}(\underline{b}, \mathbf{a})] - v_{aa}\}$$

$$+ \lambda\{E[y_a(L \cup E)] - w_{\min} F_a(\bar{b}, \mathbf{a}) - \bar{s}^I F_a(\bar{b}, \mathbf{a})\} = nv_a;$$

$$\eta H(c)[1 - F_a(\bar{b}, \mathbf{a})] = \mu[1 - F(\underline{b}, \mathbf{a})].$$

By the specification of $s^I(y)$ above, (RNP) is seen to be satisfied. □

The T-nexus of contracts defines the basic structure of governance regarding both the disposition of team output and the continuation of the team after the end of a production period. Since the governance scheme is contingent on the output state, I call the scheme contingent governance. See Figure 1. It divides the entire domain of output $[y_{\min}, y_{\max}]$ into three regions: $L = [y_{\min}, \underline{b}]$, $E = (\underline{b}, \bar{b}]$ and $T = (\bar{b}, y_{\max}]$. If the output falls in the highest region T, called the team control region, the internal members of the firm will become residual claimants after a fixed payment to general investors. The EP-monitor does not receive any return in that region. If the output falls short of $\bar{b}$, the right to control output shifts to the EP-monitor in a manner reminiscent of a debt-contract model due to Aghion and Bolton (1992). In this event, the EP-monitor pays the workers and the manager only their minimum allowable levels $w_{\min}$ and $kw_{\min}$ respectively. If the output falls in the lowest region L, called the liquidation region, the EP-monitor liquidates the firm after making the same contractual payments. Then each of the internal members will suffer from a decrease in employment value equivalent to γJ or $k\gamma J$. The intermediate region E is called the external intervention region, in which case the team will survive to the next period. Specifically, the lower end of E where the residual income of the EP-monitor $s^{\mathrm{EP}}(y) = y - s^I(y) - (n + k)w_{\min}$ becomes negative is called the rescue region and denoted by E^*. We call $\underline{b}$ the liquidation point and $\bar{b}$ the control-transfer point.

The T-nexus of contracts combines the feature of sharing among team members in the upper region T, that of income insurance in the intermediate rescue region E^*, and that of penalties akin to the efficiency wage model in the lowest region L. If team output is to be shared among team members not only on the region T, but on the entire region, the team member would equate its marginal cost of effort to its share of the marginal team output time H rather than the marginal team output. Free riding would ensue.

In the event of output falling short of the break even point $y = s^I(y) + (n + k)w_{\min}$, the team members assured of the minimum income $w_{\min}$ because of the budget-breaking (ex post, refinancing) by the EP-monitor. However, the threat of the reduction of employment continuation value in the event of occurrence of output falling on the L region would mitigate the moral hazard effect of the income insurance and limit the actual incidence of the dead weight loss. Note that the reduction of employment value in that event is constant in our model rather than to

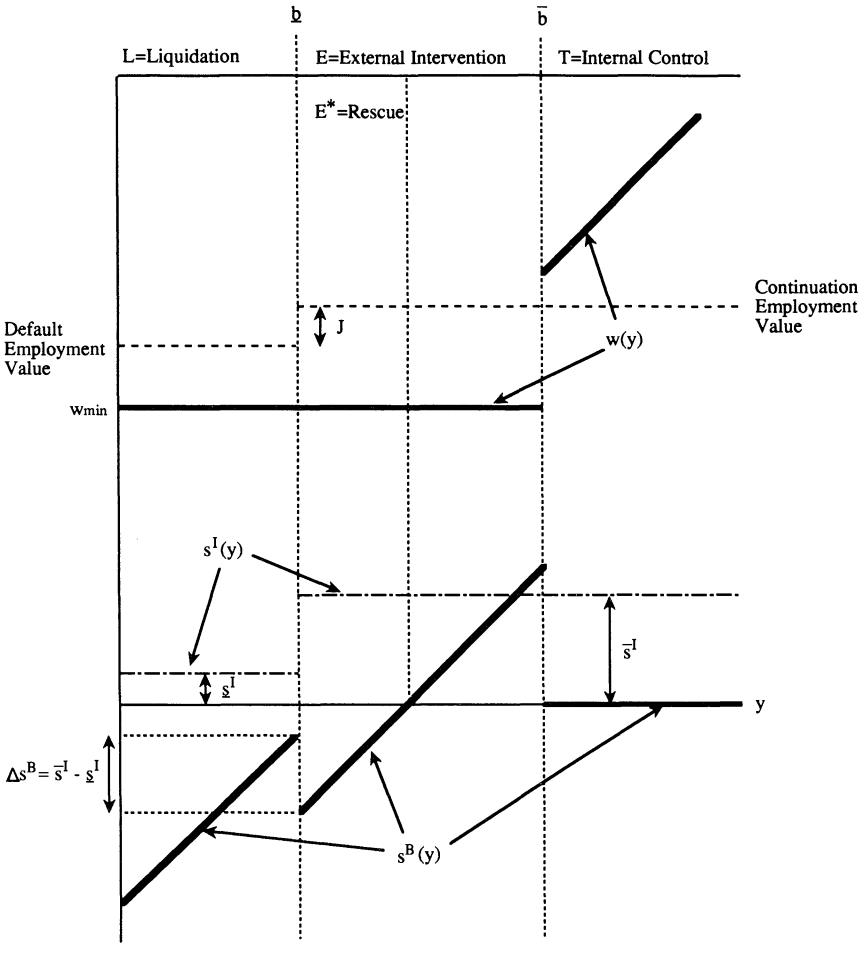

FIGURE 1

T-NEXUS OF CONTRACTS

an exogenously set default value as in the usual efficient wage model. The present scheme may be interpreted as follows: There is a ranking of teams according to their productivity levels represented by expected optimal output levels. If a team is disbanded, then its members can find jobs only at lower ranked teams.[3]

The idea of breaking the budget of the team ex post by a third party for resolving the free-riding problem of teams was first proposed by Holmstrom (1982) and the paper essentially inherits his idea. The difference is, however, that budget breaking

[3] This "demotion" scheme has better incentive impact than the standard efficiency wage model. In the standard efficiency wage model, if a team of workers increases team efforts, they expect to be rewarded with higher income. But at the same time, higher effort supply has the effect that the occurrence of low output due to pure bad luck penalizes team members more harshly, because the gap between the expected output level and the default income level is widened. This possibility partially offsets the incentive effect of higher expected income.

occurs in the form of transfer of penalty higher than team output from the team members to the monitor in Holmstrom model, while it is in the form of income insurance by the EP-monitor in our model. Penalty in our model comes in the form of dead-weight loss in employment continuation values due to the dissolution of teams. In contrast to Holmstrom scheme, the T-nexus can achieve only the second-best outcome. However, the EP-monitor cannot expect higher returns ex ante by inducing lower team effort, thus the T-nexus may be superior to the Holmstrom scheme from the implementation point of view. There are two reasons for it: first, lower effort supply by team members would increase the likelihood of output in the lower regions E^* and L, which in turn would reduce the expected income of the EP-monitor as a residual claimant. Second, the dead weight loss on the liquidation region L is not enjoyable by the EP-monitor. Even if so, the presence of general investors who claim higher returns in the event of firm's continuation helps make credible the EP-monitor's commitment to liquidation.[4]

4. COMPARATIVE STATICS AND INSTITUTIONAL COMPLEMENTARITY

This section formulates the model of a game, between the manager of the firm and the representative worker which mimics the solution of the T-nexus of contracts as formulated in the former section. Its purpose is to develop a useful framework for analyzing how (best) pure strategy equilibrium of the game reacts to changes in parametric values of the model. To make the model tractable, we assume in this section that $R^I = 0$ and $s^I = 0$, which amounts to neglecting the renegotiation proof problem. The manager's strategy is to choose a level c that promotes worker cooperation and to design a T-nexus of contracts $\langle w(\cdot), s^{\mathrm{EP}} \rangle$ that maximizes the organizational surplus:

$$\theta(\hat{\mathbf{a}}) = E[y(\hat{\mathbf{a}})] - \alpha F(\underline{b}, \hat{\mathbf{a}}) - nv(\hat{a}) - c - M$$

subject to (EPMC). From the formula (1) of the T-nexus of contracts with $s^I = 0$, the manager actually can choose only $\bar{b}$ and $\underline{b}$ in addition to c. For $y \leq \bar{b}$ $s^{\mathrm{EP}}(y) = y - (n + k)w_{\min}$ and $w(y) \equiv w_{\min}$; otherwise $s^{\mathrm{EP}}(y) \equiv 0$ and $w(y) = y$.

The representative worker's strategy is to choose a (which amounts to choosing a vector of symmetric effort $\mathbf{a}$) to maximize his net utility,

$$\{E[y] - E_{L \cup E}[y] + (n + k)w_{\min}F(\bar{b}, \mathbf{a}) - \alpha F(\underline{b}, \mathbf{a})\} - v(a)$$

where $\alpha = \gamma(n + k)J$.

We assume that the admissible strategy domain of $\mathbf{a}$ is restricted to a certain closed interval $\mathsf{A} = [\mathbf{a}_{\min}, \mathbf{a}_{\max}]$ (to be specified below) and that of c to a certain closed interval $\mathsf{C} = [c_{\min}, c_{\max}]$. The admissible strategy domain of $\underline{b}$ is given by

[4] The possibility of lower cost bearings in the event of liquidation may provide adverse incentives for the EP-monitor to evade a loss by liquidating the firm when the output is in the lower end of E^*: the situation analogous to the error of Type I in statistical inference. I discuss this issue in (Aoki 1994) and suggest that such morally hazardous behavior of the EP-monitor may be controlled in a context of repeated games among investors (banks) which reciprocally delegate ex post monitoring within a certain regulatory framework.

$\mathsf{L} = [y_{\min}, (n + k)w_{\min}]$ and that of $\bar{b}$ by $\mathsf{B} = [b|E_{L\cup E}[y(\mathbf{a})] - (n + k)w_{\min}F(b, \mathbf{a}) = M, \mathbf{a} \in \mathsf{A}]$. We assume that $f_a(\underline{b}, \mathbf{a}) < 0$ for any $\underline{b}$ in L and $\mathbf{a}$ in A and refer to this condition as the MLRP ($\underline{b}$). Roughly speaking, it implies that team productivity is sufficiently high so that for any admissible effort of the representative worker, liquidation occurs only when output is lower than the maximum likelihood output (MLO).

Define the marginal net utility function ϕ of the representative worker with respect to his own choice variable a by

$$\phi = H(c)\{E[y_a] - E_{L\cup E}[y_a] + (n + k)w_{\min}F_a(\bar{b}, \mathbf{a}) - \alpha F_a(\underline{b}, \mathbf{a})\} - v_a(a).$$

Informed of the manager's strategies, $\langle \bar{b}, \underline{b}, c\rangle$, the representative worker chooses a so as to satisfy $\phi = 0$. Straightforward calculation shows that

$$\partial\phi/\partial c = H'(c)\{E[y_a] - E_{L\cup E}[y_a] + (n + k)w_{\min}F_a(\bar{b}, \mathbf{a}) - \alpha F_a(\underline{b}, \mathbf{a})\} > 0$$

$$\partial\phi/\partial\bar{b} = -H(c)\{\bar{b} - (n + k)w_{\min}\}f_a(\bar{b}, \mathbf{a})$$

$$\partial\phi/\partial\underline{b} = -H(c)\alpha f_a(\underline{b}, \mathbf{a}) \geq 0 \qquad (> 0 \text{ if } \alpha > 0).$$

An increase in the manager's effort to promote cooperative behavior and a wider liquidation interval raise the marginal return to the worker of incremental effort. In this sense, manager's effort and ex post controllability are complementary to workers efforts. The effect of changes in $\bar{b}$ is negatively related to the sign of $f_a(\bar{b}, \mathbf{a})$. By the MLRP, given any symmetrical $\mathbf{a}$ there is the MLO $b^*(\mathbf{a})$ such that $\partial\phi/\partial\bar{b} > 0$ if $\bar{b} < b^*(\mathbf{a})$ and $\partial\phi/\partial\bar{b} < 0$ if $\bar{b} > b^*(\mathbf{a})$. If and only if the latter condition holds, the EP-monitor would assume the residual claimant position at the MLO.

The worker's choice of effort cannot be directly observed by the manager. Suppose, however, the manager forms some conjectural level of worker's individual effort $\hat{a}$ as a continuously differentiable function of her own choice $\langle \bar{b}, \underline{b}, c\rangle$. Because of the complementarity between $\langle \underline{b}, c\rangle$ and a, it is assumed that the manager forms "rational" expectations that $\hat{a}_{\underline{b}} \geq 0$, $\hat{a}_c > 0$, with second derivatives being of negligible lower order. It is also assumed that $\hat{a}_{\bar{b}} > 0$ or < 0 depending upon $\bar{b} < b^*(\hat{\mathbf{a}})$ or $> b^*(\hat{\mathbf{a}})$, with the same assumption regarding the second derivatives. Note that $\hat{a}_a = 0$ because of the unobservability of effort. Given a conjectural level $\hat{a}$, the maximization of the organizational surplus by the manager with respect to $\langle \bar{b}, \underline{b}, c\rangle$ is accomplished by setting all the following functions equal to zero:

$$\hat{\psi} = M - E_{L\cup E}[y(\hat{\mathbf{a}})] + (n + k)w_{\min}F(\bar{b}, \hat{\mathbf{a}}),$$

$$\hat{\pi} = \partial\theta/\partial\underline{b} = n\{E[y_a(\hat{\mathbf{a}})] - \alpha F_a(\underline{b}, \hat{\mathbf{a}}) - \hat{v}_a\}\hat{a}_{\underline{b}} - \alpha f(\underline{b}, \hat{\mathbf{a}}),$$

$$\hat{\varphi} = \partial\theta/\partial c = n\{E[y_a(\hat{\mathbf{a}})] - \alpha F_a(\underline{b}, \hat{\mathbf{a}}) - \hat{v}_a\}\hat{a}_c - 1.$$

From the rational expectation assumption and the MLRP($\underline{b}$), it is routine to check that $\hat{\pi}$ (the conjectural value of marginal organizational surplus with respect to the liquidation point) increases if $\hat{a}$ and c increase, and increases (respectively

decreases) if $\bar{b}$ increases from a value less (respectively greater) than the MLO $b^*(\hat{\mathbf{a}})$. But, $\hat{\varphi}$ (the conjectural value of marginal organizational surplus with respect to the manager's effort) is insensitive to changes in all the variables.

The function $\hat{\psi}$ represents the conjectural value of deficit (surplus, if negative) of EP-monitor ex post revenue relative to the expected return M. The directions of its changes with respect to changes in $\hat{\mathbf{a}}$, $\bar{b}$, $\underline{b}$ and c are not determinate except that $\bar{b}$, $\underline{b}$ and c have the same effects as $\hat{\mathbf{a}}$ by the rational expectation assumption. Noting $\partial\hat{\psi}/\partial\hat{a} = -E_{L\cup E}[\{y(\hat{\mathbf{a}}) - (n+k)w_{\min}\}f_a(y, \hat{\mathbf{a}})/f(y, \hat{\mathbf{a}})]$ and recalling the MLRP, however, we can identify the following three important regimes.

Regime (WC). $f_a(\bar{b}, \hat{\mathbf{a}}) < 0$ and $\partial\hat{\psi}/\partial\hat{a} > 0$ for all $\hat{\mathbf{a}}$ in A^n. At the MLO for any admissible effort choice of $\mathbf{a}$, the EP-monitor would not intervene. Further, the manager conjectures that a marginal increase in worker effort level would lead to a reduction of her expected revenue. This regime will be referred to as *weak external controllability*.

Regime (SC). $f_a(\bar{b}, \hat{\mathbf{a}}) > 0$ and $\partial\hat{\psi}/\partial\hat{a} < 0$ for all $\hat{\mathbf{a}}$ in A^n. This corresponds to the case in which the EP-monitor's expected return M is relatively high so that its contingent control extends to a higher output region and the EP-monitor intervenes even at the MLO. An increase in worker effort would contribute ceteris paribus to an increase in her expected revenue. This regime will be referred to as *strong external controllability*.

Regime (QSB). $f_a(\bar{b}, \hat{\mathbf{a}}) < 0$ and $\partial\hat{\psi}/\partial\hat{a} < 0$ for all $\hat{\mathbf{a}}$ in A^n. This regime corresponds to the case in which the productivity level of the team is so low that the probability of the EP-monitor's insurance function is high. A marginal increase in worker effort contributes ceteris paribus to a reduction of the EP-monitor's loss as in the Regime (W). As the EP-monitor requires low return, she does not intervene at MLOs and a marginal increase in worker effort would lead to a higher probability of team autonomy. This case will be referred to as the regime of *quasi-soft budget constraint*, as the EP-monitor soften the budget constraint of the team, yet committed to liquidation in the worst case.

These three regimes do not exhaust all possibilities; a mixture of these regimes could occur, depending on the range of the admissible domain A. But attention to these three pure regimes suffices for understanding the basic nature of comparative statics involved in contingent governance.

We shall focus on the properties of pure strategy equilibria of the model. A pure strategy equilibrium consists of strategy combinations for which the following conditions are met: (1) the worker's choice $\mathbf{a}^*$ is optimal given the manager's choice $\langle \bar{b}^*, \underline{b}^*, c^* \rangle$; (2) The manager's choice $\langle \bar{b}^*, \underline{b}^*, c^* \rangle$ is optimal given her conjecture $\hat{\mathbf{a}}$; (3) the manager's conjecture is correct, that is $\hat{\mathbf{a}} = \mathbf{a}^*$.

PROPOSITION 2. *There exists at least one pure strategy equilibrium. In regime (WC) and (QSB) (alternatively, in regime (SC)), among the equilibria there exists one with the highest effort by the worker* $\mathbf{a}^*$*, the highest [alternatively, the lowest]*

control transfer point $\bar{b}^*$, the highest liquidation point $\underline{b}^*$ and the highest effort by the manager c^*.

PROOF. For regime (WC) define $\langle \phi, \psi, \pi, \varphi \rangle$ by substituting $\hat{\mathbf{a}} = \mathbf{a}$ into $\langle \phi, \hat{\psi}, \hat{\pi}, \hat{\varphi} \rangle$ (for regime (QSB) and (SC) $\langle \phi, -\hat{\psi}, \hat{\pi}, \hat{\varphi} \rangle$). Define a map T that takes any point in the closed domain $\chi = \mathsf{A} \times \mathsf{L} \times \mathsf{B} \times \mathsf{C}$ into another such point in the same domain as follows: each component of $\langle \mathbf{a}, \bar{b}, \underline{b}, c \rangle$ is determined by the conditions $\phi = 0$, $\psi = 0$, $\pi = 0$, and $\varphi = 0$ respectively. By construction, any fixed point of T is an equilibrium of the model. By the earlier comparative statics, T is a nondecreasing function of its four arguments in regime (WC) and (QSB). Hence, by Tarski's Fixed Point Theorem, it has a fixed point that is the largest in every component. Substitute $-\bar{b}$ for $\bar{b}$ in the case of regime (SC). □

We call the equilibrium characterized in Proposition 2 the "high equilibrium." Now, using the following lemma due to Meyer, Milgrom and Roberts (1992), we can derive a few interesting comparative static results about this equilibrium. Note that neither in the proof of the existence of equilibrium above nor in the following comparative statics, is any convexity assumption made. The only essential assumption is the ILRP of the density function f.

LEMMA. *(Meyer, Milgrom and Roberts). Let $T_v(x)$ be a function from an interval χ into itself and suppose that T is nondecreasing in both x and the real parameter v. Let $x^*(v)$ be the largest fixed point of T_v. Then $x^*(v)$ is nondecreasing in v.*

As an application of this lemma, we first examine the effects of a change in the EP-monitor's expected return M on the strategic variables of the internal members of the firm.

PROPOSITION 3. *In regime (WC), an increase in the EP-monitor's expected return M (equivalently her bargaining power) alters the high equilibrium as follows. It leads to higher manager and worker effort c^* and $\mathbf{a}^*$ as well as stronger EP-monitor control (larger $\bar{b}^*$ and $\underline{b}^*$). In other regimes, the same condition leads to lower manager and worker effort as well as a lower liquidation point $\underline{b}^*$. The control transfer point $\bar{b}^*$ decreases in the regime (QSB), but increase in the regime (SC). (In what follows terms like "lower" and "weaker" are understood to mean weak inequality.)*

PROOF. Since $\partial\psi/\partial M = 1$ and other elements of T are insensitive to a change in M for regime (WC), one can apply the lemma with $v = M$. Set $v = -M$ for regime (QSB) and (SC). □

In all the cases, the direct effect of an increase in M is to raise the control transfer point $\bar{b}$. In regime (WC) (respectively (SC)), it has positive (respectively negative) incentive effects on $\mathbf{a}$ and c through the positive (respectively negative) complementary relationship of $\bar{b}$ with $\mathbf{a}$ and c. In regime (QSB) the effect of a change in M is slightly more complicated. Raising the control transfer point has initially a positive incentive effect as in regime (WC). But it will have an indirect effect of

decreasing the EP-monitor's revenue because of increasing autonomy of teams, which needs to be counterbalanced by a decrease in her controllability. The second effect is greater and responsible for decreases in $\mathbf{a}$ and c.

In order to examine the effect of a change in $\alpha = \gamma(n + k)J$, we need an additional assumption:

$$nF_a(\underline{b}, \hat{\mathbf{a}})\hat{a}_{\underline{b}} + f(\underline{b}, \hat{\mathbf{a}}) < 0 \qquad \text{for any } \hat{\mathbf{a}},$$

which implies that the worker's fear of liquidation is so strong that the manager expects that an increase in the liquidation region L (higher $\underline{b}$) will decrease the probability of an actual occurrence of liquidation through its incentive effect on the workers. We call this condition the SFL (strong fear of liquidation) condition. The following proposition may be interpreted as showing an "institutional complementarity" between the EP-monitor's ex-post monitoring and the imperfection of the labor market. In short, the labor market imperfections can enhance the incentive effect of ex post monitoring.

PROPOSITION 4. *Under the SFL conditions, an increase in the imperfection of the labor market and/or an increase in the time horizon of the worker alters the high equilibrium in such a way that the worker effort* $\mathbf{a}^*$ *and manager effort* c^* *increase and the EP-monitor's control becomes stronger (higher* $\bar{b}^*$ *and* $\underline{b}^*$*). In regime (SC),* $\bar{b}^*$ *decreases, however.*

PROOF. It holds that $\partial\phi/\partial\alpha = -H(c)F_a(\underline{b}, \hat{\mathbf{a}})\hat{a}_{\underline{b}} > 0$; $\partial\psi/\partial\alpha = 0$; $\partial\pi/\partial\alpha = -nf_a(\underline{b}, \hat{a})\hat{a}_{\underline{b}} - f(\underline{b}, \hat{\mathbf{a}}) > 0$; $\partial\varphi/\partial\alpha = -nf_a(\underline{b}, \hat{\mathbf{a}})\hat{a}_c \geq 0$. Set $v = \alpha$ and apply the lemma. □

The next comparative static result is concerned with team productivity. Let the distribution function F of y be parametrized by P representing team productivity level. We assume that the distribution corresponding to a higher P dominates that corresponding to a lower P in the sense of strict first-order stochastic dominance.

PROPOSITION 5. *In regime (WC) and (QSB), an increase in productivity of team production alters the high equilibrium as follows: it leads to higher manager effort* c^**, higher worker effort* $\mathbf{a}^*$*, higher liquidation point* $\underline{b}^*$ *and higher control transfer point* $\bar{b}^*$*. In regime (SC), it lowers the control transfer point* $\bar{b}^*$*.*

PROOF. This proof is routine and so is omitted. □

PROPOSITION 6. *In regime (SC) and (QSB), a parametric decrease in the worker's minimum wage* $w_{\min}$ *leads to higher manager and worker effort* c^* *and* $\mathbf{a}^*$*, and a higher liquidation point* $\underline{b}^*$*. The control transfer point* $\bar{b}^*$ *becomes higher for regime (QSB), but lower for regime (SC). In regime (WC), the result is ambiguous.*

PROOF. This proof is routine and hence omitted. □

The proposition may be interpreted as suggesting that an economic recession can possibly stimulate team incentives if it results in the lower minimum wage. The lower guaranteed wage will ease ceteris paribus the EP-monitor's loss-bearing

burden, which will have the indirect effect of enhancing worker effort (compare Proposition 3), augmenting the direct effect of the less likely prospect of EP-monitor's control.

5. DYNAMICS OF REGIME SWITCHING: INSTITUTIONAL APPLICATIONS

In the previous section we distinguished three regimes: weak external control by the EP-monitor (WC), strong external control (SC) and quasi-soft budget constraint (QSB); and saw that comparative static response of endogenous variables of the model to changes in exogenous parameters could be qualitatively different among those regimes. This section applies the results for interpreting two cases of regime switching: one drawn from the Japanese main bank system and the other from the transitional economies.

A. *The Japanese Main Bank System: Case of (SC) → (WC).* The model presented in this paper provides insights into the workings of the Japanese main bank system by endogenously deriving some of its important features. The Japanese main bank system had its heyday during the post-war high growth period spanning about two decades between the early 1950s and the mid-1970s. During this period, most Japanese corporations relied on bank borrowing as their major external funding source. In so doing, they developed diversified debt relationships with multiple banks and other financial institutions. However, they maintained a unique long-term relationship with single long-term or commercial banks from among many lending institutions, enforced by mutual stockholding. These banks, called the main banks, not only normally supplied the largest, although not dominant, shares of credits to their client firms, but it also assumed exclusive responsibility for monitoring them (see Aoki et al. 1994 for a comprehensive description of the main bank system).

Although the financing aspect of the main bank has been subsumed under the guise of general investors in the above model, stylized facts regarding the ex post monitoring role of the main bank are strikingly similar to the function of the EP-monitor in the model. When the financial state of the client firm was excellent, the main bank did not exercise overt control over the firm despite its position as a major stockholder. When the financial state of the client firm became less than excellent but better than distressed, the main bank was able to extract higher revenues from it by taking advantage of its stronger bargaining position (e.g., by requiring the firm to hold higher compensating balances, sending its own employees as well-paid managing directors). If the main bank found the problem of financially distressed firms only temporary, it was willing to rescue them even at short-run costs, since it did not need to fear that a recuperated firm would extricate itself from the main bank control in the future. Finally, the main bank liquidated the worst performing firms. Contrary to the often-held myth, the main bank had never made benevolent rescue operations as a rule. To do so would have invited serious moral hazard behavior of client firms.

If there is a well developed market for securitization of loan contracts, there is no guarantee that the initial lender and claim holders at the maturity of the debt

contract are identical. If loan contracts are freely traded, the initial lender cannot make a credible promise (or threat) that it will intervene/rescue ex post in the manner prescribed by the model. In a securities-based financial system, disperse claim holders are limited in their individual capacity to intervene in the management of financially distressed firms. Their incentives to intervene ex post are further weakened by the fear of losing the priority of claims in the event of bankruptcy (the doctrine of equitable subordination) or by the fear of not being able to recoup returns to rescue operations because of the lack of long-term relationships. Consequently, a resolution of a financially distressed firm may be most likely to be handled by formal bankruptcy procedures, if not by a take-over. The standard modelling of debt contracts in the form of fixed payment obligation combined with bankruptcy risk (e.g., Diamond 1982) appears to capture the essence of ex post monitoring by creditors in such a situation.

Why did the main bank relations and the associated contingent governance structure emerge in Japan? Certainly government regulations and the developmental and historical conditions prevailing at the genesis of the system must be responsible (e.g., the low accumulation of market-oriented monitoring resources. For more detailed discussion of this issue, see Aoki 1994). However, I would submit that the evolution of the contingent governance structure in Japan supported by the main bank system could not be understood merely as due to Japan's late development. As I discussed elsewhere (e.g., Aoki 1988), the Japanese firm has developed a type of internal organization which facilitate lateral coordination among different task units on the basis of information sharing, joint responsibilities, and help. These cross-functional interactions permit firms to gain comparative advantage in certain manufacturing industries by quickly adapting to continually changing technological and market environments, if not under stationary or radically changing environments. One possible consequence of the development of such an internal organization has been the manifestation of strong team nature. If so, our model suggests that the contingent governance has provided a most appropriate ex post monitoring device.

Further, Japanese firms have been ranked by banks according to public policy priority, long-term reputations, market shares, and subordinate positions of supplier/dealers to major manufacturers, etc. One important consequence of such corporate ranking is that the probability of upward mobility of workers across firms has been very low. When massive discharges of workers becomes inevitable because of a corporate failure, their relocation often became the responsibility of the main bank executing the task of reorganization or liquidation. In this case, the separated workers were most likely to be placed at lower ranking firms to which the main bank could exercise strong influence. The mechanism of downward outplacing of workers has strengthened the incentive effectiveness of the contingent governance structure vis-à-vis workers and mangers (compare Proposition 4).

The degree of incentive impacts of the main bank system has began to be placed under test since the mid-1970s. In the heyday of the main bank system, because of the limit of self-financing capacity of firms and the regulations protecting the banking industry, the main bank's expected income was relatively high. In terms of the model, this period may be considered to correspond to the regime (SC). Under

this regime, the weakening of EP-monitor's bargaining power would provide higher incentives for the manager and the workers of the firm (compare Proposition 3). An internal accumulation of financial resources by the firm could lead to a reduction of firm's dependence on bank loans, which in turn could lead to still higher accumulation by the firm through higher efforts of the internal members, generating a virtuous cycle.

However, when the EP-monitor's bargaining power declines beyond a certain threshold point, the regime would switch to (WC) and the virtuous cycle would cease operating. In fact, after the mid-1970s the main bank's bargaining power has considerably declined because of the deregulation of securities market and less reliance of the firm on bank lending. Even in the regime (WC), however, the bank's control may still increase vis-à-vis a client firm in the case of temporary financial distress (compare Proposition 3).

B. *The Transitional Economy: Case of (QSB) → (SC).* Another interesting application of the model is for designing a financial system which can act as a vehicle for transforming centrally planned economies to market economies. Let us refer to those economies simply as transitional economies. The following discussion may also be applicable in a large extent to developing economies which have yet to develop sound financial market infrastructure.

It is now widely recognized that one of major causes of the failure of excentrally planned economies was the so-called "soft-budgeting constraint" (Kornai 1980); the inability of the state planning authority and the state mono-bank to credibly commit not to refinance badly performing firms. Such inability may have stemmed either from political reasons (e.g., bureaucrat-manager collusion, authority's concern with massive unemployment, etc.) or economic reasons (e.g., once big investment is made, refinancing may become ex post efficient, even if the firm has been poorly performing. See Dewatripont and Maskin 1990). Whatever reasons may be true, such inability had caused tremendous moral hazard problems: it became the best strategy for the manager and workers to shirk, once they formed the rational expectation of the soft budget constraint.

Because of the crucial role that the state banks played in causing the soft credits and other bureaucratic problems, there remain tremendous reputation and credibility problems with the state banks or their successor institutions in transitional economies. Their reputations are so bad that many critics prompt to propose the introduction of an entirely new financial system, i.e., a securities-based financial system to those economies. But I submit that such a view may be short sighted and that a patient and innovative reform of the banking sector may be more conducive to the transformation. There are several reasons for this argument, some of which may be directly suggested by the preceding model analysis.

If ex post monitoring of the firm is to be primarily performed by the market for corporate control (take-over), all firms must be converted into publicly-held joint companies. However, the net asset position of many existing firms is low because of heavy debts from the past. Residual claimant status for those firms is not attractive for new investors. If an active equity market does not develop quickly, it is doubtful that efficient ex post monitoring can be performed by the threat of

take-over. Moreover, in economies under transformation, there may be a variety of corporate forms ranging from cooperatives, publicly-held joint-stock companies, worker controlled firms, partnerships, etc. The contingent governance structure is compatible with diverse corporate forms, because its essence lies in ex ante specification of the ex post transfer of control rights from any type of insiders, accompanied by credible threat of liquidation through debt contracting. The bank contracts akin to the *T*-nexus probably would probably provide an effective and implementable monitoring mechanism, particularly when the socialist legacy is so strong that the assets of ex-state owned firms are de facto or de jure (as in Russia) captured by the manager and workers.

The low net-asset position of most firms in transitional economies may make the quasi-soft budgeting regime (QSB) the most relevant. In this regime, the EP-monitor is better not to extend its ex post control excessively in order to elicit a firm's incentives (compare Proposition 4). Banks in the transformation period may have to frequently absorb losses by the firm although they still have to impose the credible threat of liquidation on worst performing firms. This may leave the possibility that banks in the transition period may have to receive public support (e.g., in the form of rediscounting of eligible bills and securities by the central bank), although the banking sector and the fiscal sector needs to be clearly demarcated so that the bank's accountability and responsibility are not to be obscured. The shortage of jobs that occur in this phase of transformation, however, strengthens the incentive impact of possible losses in employment continuation values and hence strengthens the effectiveness of the threats of bank's ex post intervention (compare Proposition 4).

Once the initial stabilization is achieved, however, the banking sector must become autonomous so that the banks themselves are not to be subject to own soft-budget constraint. Banks then will have to be viable on their incomes from client firms. Such a system would be likely to resemble our theoretical construct of the regime (SC) where the EP-monitor exercises relatively strong external control. As we discuss above in relation to the Japanese experience, the regime may provide better incentives for the firm to accumulate its own financial resources, if other favorable conditions also hold. If the transitional economies can successfully make the transition to such a regime, they may hopefully take off for the virtuous cycle of growth.

6. CONCLUDING SUMMARY

This paper investigated the second-best solution for the moral hazard problems of teams. It indicated that complementary institutional arrangements are necessary for controlling internal moral hazard problems. These institutions may include the imperfect labor markets and the contingent governance structure. In the latter, an external EP-monitor must be able to credibly commit ex ante to a menu of ex post control contingent on observed team output. The paper has conducted comparative statics analysis. The comparative statics of different regimes were then applied to interpretations of dynamics of the Japanese main bank system and financial system design of transitional economies.

The discussions are intended to shed insight into the issue of bank-oriented financial system versus the securities-based financial system. It was suggested that the choice of a financial system ought to depend upon nonfinancial factors including the internal organization and property rights arrangements of the firm, the competitiveness of the labor market, and the historical path and development stage of the economy. Specifically, it was pointed out that the emergence of the main bank system in Japan was related to the strongly "team" nature of the internal organization, while the team oriented organizations were incentive wise supported by the main bank system and the imperfect labor market. There were mutually reinforcing effects.

On the other hand, in the Western economy where the principal-agent aspect manifests itself stronger than the team aspect within the internal organization, the competitive markets for corporate control and specialized jobs seems to form alternative complementary institutional arrangements. Neither the Western nor Japanese system seems to have an absolute advantage, but only a comparative advantage determined by market and technological conditions of industries (see Aoki 1993 for a detailed discussion). The paper suggested however that various conditions existing in transitional economies, especially the legacy of socialist planned economies, may make the development of a bank oriented financial system more conducive to their smooth transition to market economies.

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