Would Shareholders in Firms with Japanese Governance Mechanisms Benefit from the Use of Annual Incentive Plans?

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Abstract

This paper studies the economic consequences of choosing two different types of executive compensation contracts. The analysis is based on a two-period agency model in which compensation contracts are subject to renegotiation; compensation is paid based on the agent's earnings report (e.g., a performance-based contract) or a non-verifiable measure within the firm (e.g., a conventional implicit contract). According to the analysis, conventional implicit contracts can dominate performance-based contracts if the non-verifiable measure is sufficiently informative so that the agent's earnings report is not significantly considered during renegotiation. However, if the agent has strong bargaining power, the performance-based contract is optimal. The theoretical findings have implications for empirical compensation research. First, the firms' compensation policy may not serve as a useful test for identifying profitable firms. Second, the combination of the compensation policy and the ownership structure is likely to be associated with the level of executive compensation.

> The recent dismissal of the British chief executive of Olympus has once again drawn the attention of European media to peculiarities in corporate governance in Japan. Accounting practices and lack of transparency have aroused particular concern. (Cortazzi 2011, 15)

1. Introduction

This paper studies the economic consequences of the choice of two different types of executive compensation contracts and examines whether shareholders in firms with Japanese governance mechanisms would benefit from the use of annual incentive plans. Japanese governance mechanisms are usually characterized as bank- and relationship-oriented, while Anglo-Saxon governance mechanisms are perceived as market-oriented. There are pros and cons of Japanese governance mechanisms. According to some observers, Japanese governance mechanisms give internal management autonomy, and management's degree of freedom from bank control has a close positive correlation with the level of corporate profit (e.g., Aoki 1990). In contrast, others view the lack of transparency as one of the major obstacles to investment (e.g., Schulz 2004; Jones 2011). Obviously, the internal management autonomy is a double-edged blade. As Jones (2012, 12) comments,

> ...[it may result in] corporate decisions that are incomprehensible to outsiders. This tendency can sometimes manifest itself in a course of systematic lying to outside shareholders through falsified accounts or other deliberate misinformation. ...Corporate scandals like Olympus are thus seized upon as yet another example of bad "Japanese-style" management systems.

Implementation of performance-based compensation contracts is expected to provide a major improvement in transparency. Currently, performance-based compensation is exempted from Japanese corporate

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65

taxation by Corporate Tax Act No. 34. Until this act was passed, the Japanese executive compensation system was starkly different from those of western counterparts. Even a reasonable allowance for salaries, which is tax deductible under Section 162 of the U.S. Internal Revenue Code, for instance, was not allowed as a deduction under Japanese corporate tax law. The amendment made the Japanese executive compensation system more easily understandable to people in western countries and allowed tax deductibility of performance-based compensation, regular period compensation (e.g., salary), and pre-determined compensation.[1] It is fair to say that performance-based compensation is exempted from corporate taxation in order to encourage firms to change their discretionary bonus contract practice to a performance-based one that appears more market-oriented.

Somewhat ironically, discretionary bonuses continued to be used considerably after the introduction of the current terms of Corporate Tax Act No. 34. According to the Tokyo Stock Exchange (TSE), 87.1% of TSE-listed companies responded that they have initiatives to offer incentives (Tokyo Stock Exchange 2011). Performance-based compensation was introduced in 19.7% of the TSE-listed companies, and stock option plans and "others" were introduced in 31.4% and 45.2% of the TSE-listed companies, respectively. Out of 1,038 companies that selected "others", 50.4% referred to either "remuneration" or "bonus" in their supplementary explanation of initiatives. This suggests that each year, several firms revised the salary component of their executive compensation on the basis of the performance of the previous period, although some of the salary component may be regarded as a discretionary bonus.

Several Japanese firms continue using an opaque bonus contract practice, contrary to what authorities might have expected. However, Japanese firms have typically used rank hierarchy as a primary incentive device (Aoki 1990). Therefore, rewards might not be paid on the basis of performance measures, but instead are paid on the basis of rank (Shirai and Inoue 2010). Thus, it is not obvious that a performance-based contract improves Japanese executives' work incentives. In other words, it is not known whether a performance-based contract reduces moral hazard problems in Japanese governance mechanisms because these mechanisms may already motivate executives to work hard.

The empirical evidence on the impact of the firms' choice of executive compensation contract is ambiguous. Kaplan (1994) studies top executive compensation and its relationship with firm performance in the largest Japanese and U.S. companies, and finds that the relationship between executive compensation and performance in Japan and the U.S. are statistically similar, although the corporate governance mechanisms in those countries are considered significantly different from each other. These results are supported by Kato (1997) and Basu et al. (2007). They identify that CEOs of keiretsu earn less than those of independent firms, and keiretsu could play a role as an effective Japanese governance mechanism. On the other hand, Core et al. (1999) find that U.S. firms with weaker governance mechanisms had greater agency problems. Finally, Basu et al. (2007) find that Japanese firms with weaker governance mechanisms, in particular firms with higher insider ownership, have greater agency problems.

Motivated by the mixed empirical findings, this paper theoretically studies the consequences of the choice of two different types of executive compensation contracts. The analysis is based on a career concerns model in which compensation contracts are subject to renegotiation; compensation is paid on the basis of the agent's earnings report (e.g., a performance-based contract) or a non-verifiable measure within the firm (e.g., a conventional implicit contract). Career concerns were first formalized by Holmström (1999). Gibbons and Murphy (1992) and Meyer and Vickers (1997) develop dynamic models with explicit contracts based on the career concerns model of Holmström (1999) and enable analyses of the interplay between implicit dynamic incentives and explicit incentives. Kaarbøe and Olsen (2008) extend the work of Meyer and Vickers

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[1] Extra compensation qualifies as performance-based or pre-determined compensation if it was paid on the basis of performance measures that appear in a firm's financial reporting or if it was declared to the tax office before the execution of a contract.

(1997) by adding distorted performance measures based on the multi-task agency model of Feltham and Xie (1994). Kaarbøe and Olsen (2008) come closest to this paper's models; however, this paper takes a different approach when modeling distorted performance measures. Instead of using the weights given to a performance measure as a degree of distortion, this paper uses biases that the agent can introduce into his earnings report in order to inflate his performance evaluation. This paper follows the work of Fischer and Verrecchia (2000) when modeling the agent's biased reporting.

This paper also relates to the literature on relational contracts (e.g., Bull 1987; Baker et al. 1994; Levin 2003; MacLeod 2007). For example, Baker et al. (1994) consider subjective performance measures in implicit contracts and their model is similar in spirit to the one in this paper; however, the contract they consider is one in which a worker anticipates that the employer could renege on a promise if their contract is implicit, and they focus on the role of trust in enforcing implicit contracts. This paper assumes that Japanese firms' discretionary bonus contracts are driven by career concerns as compared to trust.

In the first of two main results, this paper shows that the conventional implicit contract can dominate the performance-based contract if the agent's bargaining power is moderate and the non-verifiable measure within the firm is sufficiently informative, making it unlikely that the agent's earnings report will trigger renegotiation for the second-period compensation contract. On the other hand, the second result shows that the performance-based contract is optimal if the non-verifiable measure is not sufficiently informative and the agent's bargaining power is considerably strong. One interpretation of these results complements Aoki's (1990, 12) following description of the way in which rank hierarchy works as an incentive:

> The existence of a credible threat of discharge when the employee does not meet the criteria for continual promotion plays an important role in enabling the rank hierarchy to operate as an effective incentive to curb shirking. A discharge in mid-career may point to some negative attributes of the discharged so that he or she may not be able to gain equivalent rank outside, when information about him or her is not perfect.

In these terms, the main results show that explicit contracts are not required when executives have concerns that they may not be able to gain equivalent rank outside and when information about them is not verifiable outside.

The remainder of this paper is organized as follows: Section 2 explains the model assumptions and derives the optimal contract in equilibrium. Section 3 theoretically addresses whether the shareholders in Japanese firms would benefit from the use of annual incentive plans. Section 4 provides the conclusion.

2. Model

2.1 Model Assumptions

Consider a two-period agency model with a risk neutral board of directors (the principal) and a risk neutral and effort averse manager (the agent), who run the business on behalf of the shareholders (the owner). Although shareholders are not active players, the paper assumes their presence. This is in order to emphasize the fact that non-verifiable measures, which play an important role in this analysis, are observed only by the contracting parties.

The key feature of this analysis is the consideration of two types of executive compensation contracts: conventional implicit contracts and performance-based contracts. At $t = 0$, the principal selects one of these two types of contracts and provides a take-it-or-leave-it offer. The initial contract commits both parties to stay in the relationship for two periods, but does not preclude the possibility that the principal may reset the terms of the contract, and in turn, the agent may terminate the employment relationship in the case of a

breakdown in renegotiation for the second period contract. However, to ease exposition, once selected (and accepted by the agent), it is assumed that the form of contract is not allowed to change for two periods. However, the parameters may change.

Figure 1 presents the timeline. At $t = 0$, a compensation contract is signed between the principal and the agent. During the first period, the agent's effort a_1 generates stochastic cash flow v_1. The realized value of the cash flow is not directly observable to anybody except the agent. After observing v_1, the agent provides his earnings report r_1, which is potentially distorted by his bias b_1. In addition to the agent's earnings report, the contracting parties (but not the shareholders) may observe the non-verifiable measure s_1, which is useful for subjective assessments of the agent's contribution to the value of the cash flow. At $t = 1$ the principal and the agent renegotiate the second-period contract w_2. The sequence of events is repeated in the second period except that at the end of period two, no further contract negotiation takes place. At that point, shareholders consume the residual income.

Figure 1-Timeline

$t = 0$						$t = 1$	$t = 2$
Contract w_1 is signed between the principal and the agent.	Action a_1 is chosen by the agent.	Cash flow v_1 is realized. The agent observes it.	Bias b_1 is chosen by the agent.	The agent provides his earnings report r_1.	Non-verifiable measure s_1 is observed by the contracting parties.	Contract w_2 is offered by the principal.	Shareholders consume the residual income.
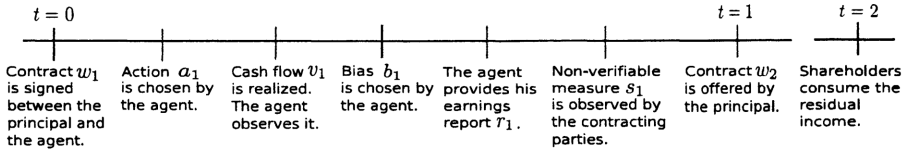
In the conventional implicit contract, compensation $\bar{w}_t$ is assumed to consist of only fixed payments, and the agent is motivated to work hard by career concerns. The principal uses information about the agent's current performance $x_t = (r_t, s_t)'$ to update her beliefs about the agent's ability, where x_t is a column vector composed of the earnings report r_t and the non-verifiable measure s_t. s_t is the realization of the random variable $\tilde{s}_t$ which is given by

$$\tilde{s}_t = a_t + \tilde{\eta} + \tilde{\zeta}_t,$$

where $a_t \in \mathbb{R}$ denotes the agent's effort in period t. The agent's effort is not observable by the principal (and shareholders). $\tilde{\eta}$ and $\tilde{\zeta}_t$ are two independent normally distributed random variables. It is assumed that $\tilde{\eta}$ has mean $E[\tilde{\eta}] > 0$ and variance σ_η^2 and $\tilde{\zeta}_t$ has mean zero and variance σ_ζ^2. $\tilde{\eta}$ represents a manager's unknown ability, which is related to the agent's contribution. $\tilde{\zeta}_t$ represents errors in the assessment of the agent's contribution. The realized s_t is common knowledge to the contracting parties, but not verifiable to a third party. This assumption corresponds closely with the Japanese firms' discretionary bonus contract practice in which the salary component in executive compensation is revised on the basis of a subjective assessment (from shareholders' perspective) in the previous period. On the other hand, in the performance-based contract, compensation w_t is assumed to be composed of fixed payments and variable (earnings-report-based) payments,

$$w_t = \bar{\alpha}_t + \beta_t r_t, \tag{1}$$

where $\bar{\alpha}_t \geq 0$ is the fixed payment for period t and $\beta_t > 0$ is an incentive coefficient for period t. This assumption corresponds exactly with performance-based compensation in Corporate Tax Act No. 34. It is assumed that the non-verifiable measure is not available when the performance-based contract is selected, and information available for the principal to update her beliefs is $x_t = r_t$.

The firm's cash flow in each period results from the agent's effort and ability and a random factor. The firm's cash flow in period t is given by the following expression:

$$v_t = a_t + \eta + \varepsilon_t,$$

68

where η is the agent's actual, unknown ability, ε_t is the realization of a normally distributed random variable $\tilde{\varepsilon}_t$ with mean zero and variance σ_ε^2. $\tilde{\varepsilon}_t$ denotes the impact of uncontrollable events on a firm's cash flow. Let $\tilde{\varepsilon}_t$ be independent of $\tilde{\eta}$ and of $\tilde{\zeta}_t$. The realization of the cash flow in each period v_t is not directly observable to anybody except the agent until the end of the second period; however, the functional form of $\tilde{v}_t$ and the distributions of noise and the agent's ability are common knowledge.

Observing the realization of the cash flow, the agent provides an earnings report to the principal (and shareholders). The earnings report for period t is potentially biased, as follows:

$$r_t = v_t + b_t,$$

where $b_t \in \mathbb{R}$ represents the bias introduced by the agent into the earnings report. b_t is not directly observed by the principal (and shareholders).

The agent is risk neutral and effort averse. It is assumed that exerting effort (both constructive and destructive, i.e., a_t and b_t) causes the agent to incur a private cost of $c(a_t, b_t)$. The cost function is given by

$$c(a_t, b_t) = \frac{a_t^2}{2} + \frac{c \cdot b_t^2}{2}.$$

c is a known positive parameter and denotes the marginal impact of effort for providing a biased report on the agent's private cost. To reduce the number of parameters, the marginal impact of productive effort a_t is assumed to be 1. When period t compensation is offered as w_t, the agent's objective function is given as

$$CE = E[\tilde{w}_1 + \tilde{w}_2] - c(a_1, b_1) - c(a_2, b_2). \tag{2}$$

Compensation w_t may be a random variable when it depends on performance measures that include random variables. The principal is risk-neutral, and her objective function can be stated as

$$E[\tilde{v}_1 + \tilde{v}_2] - E[\tilde{w}_1 + \tilde{w}_2]. \tag{3}$$

In order to make a contract, the principal considers two types of constraints. The first type consists of the incentive constraints: the agent will choose a_t and b_t to maximize his expected utility. The second type consists of participation constraints: the principal must offer the agent expected utility at least as high as the agent's reservation wage. Following Meyer and Vickers (1997), the agent's reservation wage depends on the total expected surplus. Let the total expected surplus at the start of the contract be Π:

$$\Pi = E[\tilde{v}_1 + \tilde{v}_2] - c(a_1, b_1) - c(a_2, b_2). \tag{4}$$

If the agent's bargaining power is $B \in (0, 1)$, his reservation wage is $B\Pi$ and the first-period participation constraint is given by

$$CE \geq B\Pi. \tag{5}$$

Throughout the paper it is assumed that the principal commits to satisfying the agent's participation constraints not only at the initial contract but also at the time of renegotiation.[2]

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[2] As Meyer and Vickers (1997) point out in their footnote 9, models along the lines of the career concerns literature with a participation constraint of this form need to recognize the possibility that (i) if the agent's expected productivity after the first period is extremely low, his efficient choice at that point is to change firms, and (ii) the agent may initially plan to leave after the end of the first period (take-the-money-and-run strategy). However, these possibilities are negligible as long as his ex ante expected outputs at the first-period firm are sufficiently larger than those at other firms, or the agent is to receive a sufficiently large lump-sum payment in the second period for remaining with his first-period firm. For example, the first-period fixed payment may be paid at the beginning of the second period.

Setting the participation constraint in (5) as an equality,[3] the principal's objective function in (3) can be simplified as follows:

$$E[\tilde{v}_1 + \tilde{v}_2] - c(a_1, b_1) - c(a_2, b_2) - B\Pi = (1 - B)\Pi. \tag{6}$$

Note that $(1 - B)$ is always positive.

2.2 Conventional Implicit Contracts

This section presents the model's solution assuming that the conventional implicit contract is selected. The modeling is based on the career concerns model of Holmström (1999). First, the optimal contract in the second period is characterized.

At the start of the second period the principal maximizes her share of the total amount of second-period expected surplus:

$$(1 - B)\Pi_2 = (1 - B)\left\{ E[\tilde{v}_2 | \boldsymbol{x}_1] - c(\hat{a}_2, \hat{b}_2) \right\}, \tag{7}$$

subject to the following two constraints:

$$a_2, b_2 \in \arg\max_{a_2', b_2'} \{ E[\tilde{w}_2 | \boldsymbol{x}_1] - c(a_2', b_2') \}, \tag{8}$$

$$E[\tilde{w}_2 | \boldsymbol{x}_1] - c(a_2, b_2) \geq B\Pi_2, \tag{9}$$

where $\hat{a}_t$ and $\hat{b}_t$ are the principal's belief about the equilibrium amount of effort and bias, respectively. The constraint in (8) is the incentive constraint and the constraint in (9) is the agent's participation constraint.

From the principal's perspective, the total surplus Π_2 can be rewritten as

$$\Pi_2^{con} = E[\tilde{v}_2] + \rho_{r1}^d (r_1 - E[\tilde{r}_1 | \hat{a}_1, \hat{b}_1]) + \rho_{s1}(s_1 - E[\tilde{s}_1 | \hat{a}_1]) - c(\hat{a}_2, \hat{b}_2). \tag{10}$$

ρ_{r1}^d reflects the marginal impact of the first-period earnings report r_1 on the principal's belief about the second-period cash flow. Similarly, ρ_{s1} reflects the marginal impact of the first-period non-verifiable measure s_1 on the principal's belief about the second-period cash flow. The exact expressions for the regression coefficients ρ_{r1}^d and ρ_{s1} are contained in Appendix. It is noted that $\rho_{r1}^d, \rho_{s1} \in (0, 1)$ and $\rho_{r1}^d + \rho_{s1} < 1$.

To determine the agent's optimal effort choice, recall that compensation $\tilde{w}_2$ in (8) is defined as a fixed payment. Because the agent's efforts do not impact compensation, his optimal effort choice is $a_2 = b_2 = 0$.

Considering the agent's bargaining power, the principal offers a contract to satisfy the participation constraint. Setting (9) as an equality and substituting $a_2 = b_2 = 0$, $\tilde{w}_2$ is given by

$$\bar{w}_2^{con}(\boldsymbol{x}_1) = BE[\tilde{v}_2 | \boldsymbol{x}_1]. \tag{11}$$

The symbol "*con*" is used to denote that it is satisfied in the optimal conventional implicit contract. Note that the second-period contract $\bar{w}_2^{con}(\boldsymbol{x}_1)$ in (11) depends on $\boldsymbol{x}_1 = (r_1, s_1)'$. This comes from the fact that the principal updates her belief about the agent's ability $\tilde{\eta}$ by observing $\boldsymbol{x}_1$. Thus, $\bar{w}_2^{con}(\boldsymbol{x}_1)$ gives an implicit incentive to the agent in the first period, i.e., career concerns are present in the first period. Recall that $\bar{w}_2^{con}(\boldsymbol{x}_1)$ does not give any incentive to the agent in the second period, i.e., $a_2 = b_2 = 0$. Thus, both the earnings report and the non-verifiable measure are used to provide only implicit incentives in the conventional implicit contract.

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[3] The equality is satisfied under the optimal contract. Because the principal initiates a negotiation, she will set compensation w_t at the lowest level at which the agent is willing to accept the contract, i.e., $CE = B\Pi$. On the other hand, when $CE = B\Pi$ is satisfied, the participation constraints and the agent's outside opportunities give him the same level of expected utility. Because it is a take-it-or-leave-it offer and this paper supposes that the agent will not choose outside opportunities that give the same expected utility as the principal's offer, the agent will accept the principal's offer.

The first-period problem is solved in a similar manner. The principal's problem at $t = 0$ is to maximize her objective function in (6) subject to the participation constraint in (5) and the incentive constraint

$$a_1, b_1 \in \arg\max_{a_1', b_1'}\{CE\}. \tag{12}$$

Because the second-period compensation $\bar{w}_2^{con}(x_1)$ in (11) depends on $x_1 = (r_1, s_1)'$, the agent has an incentive to exert effort in the first period to increase $\bar{w}_2^{con}(x_1)$. Thus, the agent's incentive constraint can be rewritten as

$$a_1, b_1 \in \arg\max_{a_1', b_1'}\{\bar{w}_2^{con}(x_1) - c(a_1', b_1')\},$$

for which the solution is

$$a_1^{con} = B(\rho_{r1}^d + \rho_{s1}), \tag{13}$$
$$b_1^{con} = \frac{1}{c}B\rho_{r1}^d. \tag{14}$$

Setting (5) as an equality, $\bar{w}_1$ is given by

$$\bar{w}_1^{con} = B\left(a_1^{con} + E[\eta]\right) + (1 - B)c(a_1^{con}, b_1^{con}). \tag{15}$$

Substituting compensations in (11) and (15) and the agent's induced efforts, the total expected surplus for the conventional implicit contract Π^{con} is given by

$$\Pi^{con} = -\frac{1}{2}\left[(\rho_{r1}^d + \rho_{s1})^2 + \frac{1}{c}(\rho_{r1}^d)^2\right]B^2 + (\rho_{r1}^d + \rho_{s1})B + 2E[\tilde{\eta}].$$

Π^{con} is used in Section 3 when the principal compares her share of the total expected surplus for each type of contract.

2.3 Performance-based contracts

In this section, the optimal contract for the performance-based contract is derived. The modeling is based on dynamic models with explicit contracts developed by prior literature (e.g., Baker et al. 1994; Meyer and Vickers 1997; Kaarbøe and Olsen 2008). Similar to the aforementioned conventional implicit contract, the principal maximizes her objective function in (7) subject to constraints in (8) and (9) at $t = 1$. From (7) and the fact that the information available for the principal is now $x_1 = r_1$, the total expected surplus Π_2 from principal's perspective can be written as

$$\Pi_2^{per} = E[\tilde{v}_2] + \rho_{r1}(r_1 - E[\tilde{r}_1|\hat{a}_1, \hat{b}_1]) - c(\hat{a}_2, \hat{b}_2). \tag{16}$$

The symbol "*per*" is used to denote that it is satisfied in the optimal performance-based contract. ρ_{r1} reflects the marginal impact of the first-period earnings report on the principal's belief about the second-period cash flow. Note that the regression coefficient ρ_{r1} is different from ρ_{r1}^d which was given in the aforementioned conventional implicit contract. For the principal the first-period earnings report in the performance-based contract is the sole source of information about the agent's efforts and ability. In contrast, in the conventional implicit contract the principal can use not only the first-period earnings report, but also the first-period non-verifiable measure. Thus, the impacts of the first-period earnings report ρ_{r1} in the performance-based contract are bigger than ρ_{r1}^d in the conventional implicit contract for the principal. The exact expression is contained in Appendix.

For determining the agent's optimal effort choice, first consider the expectation of his compensation at $t = 1$. For the contract defined in (1), it is given by

$$E[\tilde{w}_2|\boldsymbol{x}_1] = \bar{\alpha}_2 + \beta_2 \left\{ E[\tilde{v}_2|\boldsymbol{x}_1] + b_2 \right\}. \tag{17}$$

Substituting (17) in the constraint in (8), the agent's optimal effort choice is given by

$$a_2^{per} = \beta_2, \tag{18}$$

$$b_2^{per} = \frac{1}{c}\beta_2. \tag{19}$$

Maximizing (7) with respect to β_2 and considering the agent's induced efforts in (18) and (19), the incentive weight of the optimal contract at $t = 1$ is given by

$$\beta_2^* = \frac{c}{c+1}. \tag{20}$$

The fixed component of the agent's compensation $\bar{\alpha}_2$ is determined in a manner that satisfies the constraint in (9). This is given by

$$\bar{\alpha}_2^*(\boldsymbol{x}_1) = (B - \beta_2^*)E[\tilde{v}_2|\boldsymbol{x}_1] - \frac{1}{c}(\beta_2^*)^2 + (1 - B)\left[\frac{1}{2}(\beta_2^*)^2 + \frac{1}{2c}(\beta_2^*)^2\right].$$

Therefore, the second-period wage contract offered to the agent is

$$w_2^{per}(\boldsymbol{x}_1) = \bar{\alpha}_2^*(\boldsymbol{x}_1) + \beta_2^* r_2. \tag{21}$$

Note that the second-period fixed payment $\bar{\alpha}_2^*(\boldsymbol{x}_1)$ in (21) depends on the first-period earnings report r_1. However, the optimal second-period incentive payment $\beta_2^* r_2$ in (21) does not depend on r_1, because it is an explicit contract based on the second-period earnings report r_2.

Next, consider the first-period problem. The principal's problem at $t = 0$ is to maximize her objective function (6) subject to the constraints in (12) and (5). Recall that the agent's second-period fixed payment $\bar{\alpha}_2^*(\boldsymbol{x}_1)$ in (21) depends on his first-period earnings report r_1. Thus, the incentive constraint in (12) can be written as

$$a_1, b_1 \in \arg\max_{a_1', b_1'}\{E[\beta_1\tilde{r}_1] + E[\bar{\alpha}_2^*(\boldsymbol{x}_1)] - c(a_1', b_1')\}, \tag{22}$$

for which the solution is

$$a_1^{per} = \beta_1 + \mu_{r1}, \tag{23}$$

$$b_1^{per} = \frac{1}{c}\left(\beta_1 + \mu_{r1}\right), \tag{24}$$

where $\mu_{r1} = (B - \beta_2^*)\rho_{r1}$ is the implicit incentive to increase the second-period fixed payment. The sign of μ_{r1} is ambiguous. It is positive when $B > \frac{c}{1+c}$ and negative when $B < \frac{c}{1+c}$.

Considering the agent's optimal effort choice and maximizing (6) with respect to $\check{\beta}_1$, $\check{\beta}_1 = \beta_1 + \mu_{r1}$, the incentive weight of the optimal contract at $t = 0$ is given by

$$\check{\beta}_1^* = \begin{cases} \frac{c}{1+c} & B < B_F, \\ \mu_{r1} & B > B_F, \end{cases} \tag{25}$$

where $B_F = \frac{c(1+\rho_{r1})}{(1+c)\rho_{r1}}$. Note that the incentive weight of the performance-based contract in (1) is defined as positive, i.e., $\beta_1 > 0$. Perhaps when $\check{\beta}_1^* = \mu_{r1}$ is satisfied, the contract can be defined as a semi-performance-based contract because it provides a direct incentive only in the second period. Thus, B_F is the

threshold above which the semi-performance-based contract has to be offered instead of the performance-based contract.

Setting (5) as an equality and considering the agent's optimal action choice and the optimal incentive weights, the first-period fixed payment is given by

$$\bar{\alpha}_1^* = (B - \check{\beta}_1^*)E[\tilde{v}_1] + (1 - B)c(\check{\beta}_1^*, \frac{1}{c}\check{\beta}_1^*) - \beta_1(\frac{1}{c}\check{\beta}_1^*) - \mu_{r1}E[\tilde{r}_1]. \tag{26}$$

Note that a long-term linear contract in which the fixed payment is $\alpha_1 + (\alpha_2 - \mu_{r1}r_1)$ and the incentive coefficient for r_t is always $\frac{c}{1+c}$ would be a renegotiation-proof contract.

The total expected surplus for the performance-based contract Π^{per} and that for the semi-performance-based contract Π_F^{per} are given by
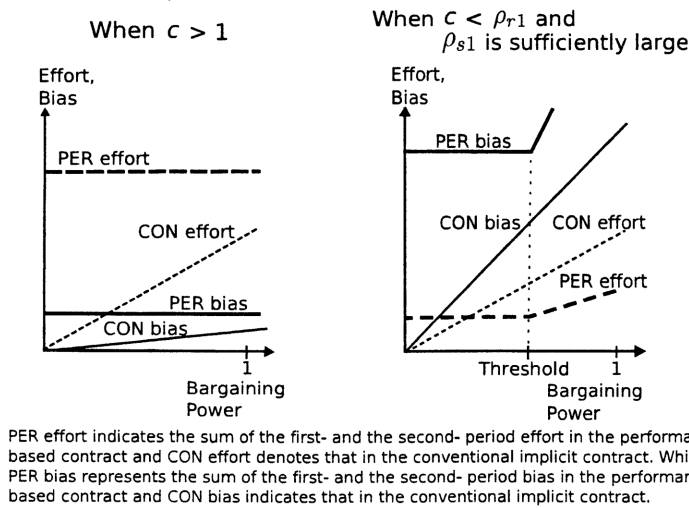
$$\Pi^{per} = \frac{c}{1+c} + 2E[\tilde{\eta}],$$

$$\Pi_F^{per} = -\frac{1+c}{2c}\left[\left(\frac{c}{1+c}\right)^2 + \mu_{r1}^2\right] + \frac{c}{1+c} + \mu_{r1} + 2E[\tilde{\eta}].$$

Note that $\Pi^{per} \geq \Pi_F^{per}$ is satisfied (and the equation is satisfied when $B = B_F$). Recall that Π^{per} is computed to be the optimal total surplus.

Figure 2 shows the agent's induced actions in equilibrium. For example, PER (CON) effort indicates the sum of the first- and the second- period effort of the performance-based contract (the conventional implicit contract). The x-axis measures the bargaining power scale. When c is larger than one, the agent's cost of introducing bias is higher than that of exerting productive effort. Thus, the line of induced effort is always above the line of induced bias in each contract. In this case, the effort exerted in the performance-based contract is always higher than that in the conventional contract.

On the other hand, when c is less than ρ_{r1} and ρ_{s1} is sufficiently large, i.e., the non-verifiable measure is sufficiently informative, the agent's preference for effort and bias is completely opposite in each contract. Importantly, when c is less than ρ_{r1} and ρ_{s1} is sufficiently large, the bias of the performance-based contract is always higher than that of the conventional implicit contract, and in some interval, the effort of the conventional implicit contract is higher than that of performance-based contract.

Figure 2-Agent's induced actions

PER effort indicates the sum of the first- and the second- period effort in the performance-based contract and CON effort denotes that in the conventional implicit contract. While PER bias represents the sum of the first- and the second- period bias in the performance-based contract and CON bias indicates that in the conventional implicit contract.

3. Choice of the Type of Contracts

In this section, the optimal choice of the type of contract is derived. At the start of period 1, the principal compares her share of the total expected surplus for each type. The following proposition summarizes the results.

Proposition 1: Suppose $\sigma_\zeta^2 = k\sigma_\varepsilon^2$, $k > 0$.

(i) For $c \geq 1$, the performance-based contract is optimal.

(ii) For $c < 1$, $k^{con}(c)$ exists such that $k^{con}(c)$ is a decreasing function in c and

- For $k > k^{con}(c)$, the performance-based contract is optimal over $B \in (0, 1)$ if $c > \rho_{r1}$, and over $B \in (0, B_F)$ if $c < \rho_{r1}$;
- For $k < k^{con}(c)$, $c^{con} \in (0, 1)$, B^{con} and B^{exp}, $0 < B^{con} < B^{exp}$, exists such that for $c < c^{con}$ the conventional implicit contract is optimal over $B \in (B^{con}, B^{exp})$ if $B^{exp} \leq \min(B_F, 1)$, and over $B \in (B^{con}, \min(B^{exp}, 1))$ if $B^{exp} > \min(B_F, 1)$.

All proofs are in Appendix.

The intuition behind these results is straightforward. When the private cost of introducing bias into an earnings report is higher than that of exerting productive effort for the agent, i.e., $c \geq 1$, the performance-based contract in which the performance measure serves as an incentive to work hard dominates the conventional implicit contract. Furthermore, even though introducing bias into an earnings report is an easier choice for the agent, i.e., $c < 1$, when the non-verifiable measure is not informative enough, i.e., $k > k^{con}$, the performance-based contract is still the optimal choice for the principal. On the other hand, when reporting with bias is an easier choice for the agent, i.e., $c < 1$, and the non-verifiable measure is sufficiently informative so that the agent's earnings report does not consider renegotiation for the next compensation contract, i.e., $k < k^{con}(c)$, the conventional implicit contract could dominate its counterpart. Note that the coefficient k in $\sigma_\zeta^2 = k\sigma_\varepsilon^2$ could be a measure of relative informativeness. A lower coefficient k reflects a superior non-verifiable measure's relative informativeness to the earnings report. Recall that the shareholders observe only the agent's earnings report. It can be said that when the non-verifiable measure works well the agent works hard despite the fact that his contribution is assessed with an opaque decision process from the shareholders' perspective, which is often observed in Japanese management mechanisms. These results correspond to the empirical evidence provided by Kaplan (1994), Kato (1997), and Basu et al. (2007). These studies report that a relationship-oriented governance mechanism works as well as a market-oriented governance mechanism. Arguably, non-verifiable measures in relationship-oriented governance mechanisms are sufficiently informative because they provide common consent, which can be interpreted as that in which a non-verifiable measure would play an important role in relationship-oriented mechanisms.

However, it is not the case if the agent's bargaining power B is in the range $(0, B^{con}] \cup (B^{exp}, \min(B_F, 1))$. In particular, when the agent's bargaining power is considerably strong, i.e., $B \in (B^{exp}, \min(B_F, 1))$, the conventional implicit contract allows the agent to provide a biased earnings report and get excess compensation as compared to the performance-based contract. The following corollary shows that inequality $B^{exp} < \min(B_F, 1)$ is satisfied and a non-empty set $(B^{exp}, \min(B_F, 1))$, in which the performance-based contract is optimal, exists.

Corollary 1: Suppose $c < \rho_{r1}$ and $k < k^{con}$. If k is sufficiently close to $k^{con}(c)$, $\rho^{exp} \in (0, 1]$ exists such that for $\rho_{r1} < \rho^{exp}$, $B^{exp} < B^F < 1$ is satisfied and the performance-based contract is optimal over $B \in (B^{exp}, B_F)$.

In other words, when the non-verifiable measure in the conventional implicit contract is relatively uninformative and when the marginal impact of the earnings report in the performance-based contract ρ_{r1} is weaker, i.e., $\rho_{r1} < \rho^{exp}$, the performance-based contract can dominate the conventional implicit contract depending on the strength of the agent's bargaining power. The results imply a scenario: the conventional implicit contract may be chosen by managers who have strong bargaining power as compared to the board of directors, although a performance-based contract could be optimal for their firms. This scenario is consistent with Basu et al. (2007), who find that top Japanese executives earn more in firms with higher insider ownership.

Figure 3 characterizes the case where the assumptions of Corollary 1 and $c < c^{con}$ are satisfied.

Figure 3-Difference of the total surplus

$\Delta\Pi = \Pi^{con} - \Pi^{per}$
CON: conventional implicit contract
PER: performance-based contract
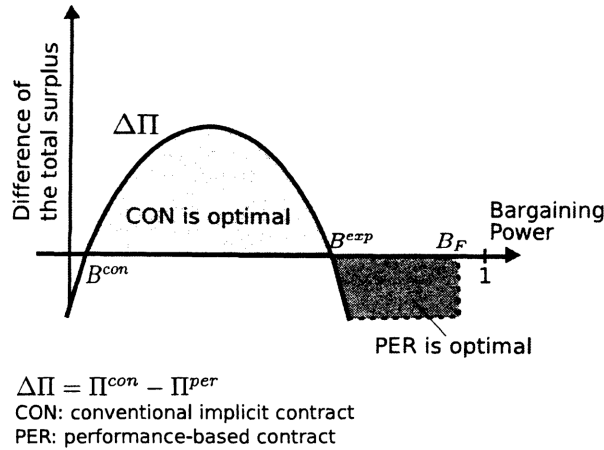
3.1 Empirical Implications

On the basis of the aforementioned results, implications for empirical compensation research can be discussed. First, the firms' executive compensation policy (e.g., how directors are paid) is may not serve as a useful test in identifying profitable firms. A change in the pay policy from discretionary to performance-based bonus contract practice is not expected to have a positive relationship with firm performance. This prediction is consistent with Kubo (2005), who analyzes whether a firm's method of paying its directors matters, although the current study does not agree with his conclusion that executive compensation is not designed to motivate executives to work towards increasing shareholder value. Second, the combination of the firms' executive compensation policy and ownership structure is likely to be associated with the level of executive compensation. If firms with higher insider ownership continue to use a conventional contract, they may experience higher agency costs.

4. Conclusion

This paper studies the consequences of the choice of two types of executive compensation contracts. The analysis is based on a two-period agency model in which compensation contracts are subject to renegotiation; compensation is paid on the basis of the agent's earnings report (e.g., a performance-based contract) or a non-verifiable measure within the firm (e.g., a conventional implicit contract). The analysis shows that assessment of the agent's contribution based on an earnings report creates incentives for providing a biased report; these incentives could significantly distort the structure of the optimal-compensation contract. The effect makes the

conventional implicit contract optimal if the non-verifiable measure within the firm is sufficiently informative and the agent's bargaining power is moderate. In contrast, if the non-verifiable measure is not sufficiently informative and the agent has strong bargaining power, the conventional implicit contract motivates the agent to provide a biased report and the performance-based contract becomes optimal.

These results imply two different scenarios. First, Japanese firms use the conventional implicit contract because top executives in those firms are motivated to work hard by subjective assessments of their contribution to firm value, though it can be seen as an opaque decision process by shareholders. Second, the conventional implicit contract is chosen by top executives who have strong bargaining power as compared to the board of directors, although their non-verifiable measures are relatively uninformative and so a performance-based contract could be optimal for their firms. Therefore, the shareholders in firm with Japanese governance mechanisms would not always benefit from the use of annual incentive plans.

As long as the Japanese governance mechanisms are working well, implementation of a performance-based compensation contract may give excessive rewards to executives who are already motivated to work hard. A performance-based compensation contract would not be what improves firms' transparency but it seems to work well in firms that already have a transparent governance mechanism.

Although this paper has applied classic agency theory, which is built upon the assumption that there is a conflict of interest between a principal and an agent, it is easy to imagine analyses relaxing the assumption. For example, further insights on performance-based measures under various control mechanisms can be generated by introducing a goal congruent agent.[4]

Acknowledgement

Appendix

Regression Coefficients

The covariance matrix $(\tilde{v}_2, \tilde{r}_1, \tilde{s}_1)$ is

$$
\begin{pmatrix}
\sigma_\eta^2 + \sigma_\varepsilon^2 & \sigma_\eta^2 & \sigma_\eta^2 \\
\sigma_\eta^2 & \sigma_\eta^2 + \sigma_\varepsilon^2 & \sigma_\eta^2 \\
\sigma_\eta^2 & \sigma_\eta^2 & \sigma_\eta^2 + \sigma_\zeta^2
\end{pmatrix}.
$$

By applying well-known formulas for multivariate normal distributions (e.g., DeGroot 2004),

$$
\rho_{r1}^d = \frac{\sigma_\eta^2 \sigma_\zeta^2}{\sigma_\eta^2 \sigma_\zeta^2 + \sigma_\varepsilon^2 \sigma_\eta^2 + \sigma_\varepsilon^2 \sigma_\zeta^2},
$$

$$
\rho_{s1} = \frac{\sigma_\eta^2 \sigma_\varepsilon^2}{\sigma_\eta^2 \sigma_\zeta^2 + \sigma_\varepsilon^2 \sigma_\eta^2 + \sigma_\varepsilon^2 \sigma_\zeta^2},
$$

$$
\rho_{r1} = \frac{\sigma_\eta^2}{\sigma_\eta^2 + \sigma_\varepsilon^2}.
$$

---

[4] For example, this kind of analysis is conducted by Banker et al. (2010). They integrate agency theory and organizational control theory and study three types of control: outcome based control; behavior-based control; and clan control.

Proof of Proposition 1

Let $\Delta\Pi = \Pi^{con} - \Pi^{per}$ and $\Delta\Pi_F = \Pi^{con} - \Pi_F^{per}$. Recall that $(1 - B)$ is positive. Hence $(1 - B)\Delta\Pi$ and $\Delta\Pi$ have the same sign, and $(1 - B)\Delta\Pi_F$ and $\Delta\Pi_F$ also have the same sign, $\Delta\Pi$ and $\Delta\Pi_F$ can be taken as the principal's measure of the optimal type of contract. To examine the sign of $\Delta\Pi$, the discriminant of $\Delta\Pi$ is evaluated. From $\sigma_\zeta^2 = k\sigma_\varepsilon^2$, ρ_{r1}^d can be written as $\rho_{r1}^d = k\rho_{s1}$. Substituting the expression, $\Delta\Pi$ can be rewritten as

$$\Delta\Pi = -\frac{1}{2}\left[(1 + k)^2 + \frac{1}{c}k^2\right]\rho_{s1}^2 B^2 + (1 + k)\rho_{s1}B - \frac{c}{1 + c}.$$

The discriminant of $\Delta\Pi$ is given by

$$D = \frac{\rho_{s1}^2}{1 + c}\left[(1 - c)(1 + k)^2 - 2k^2\right].$$

(i) For $c \geq 1$. Because the discriminant of $\Delta\Pi$ is negative, i.e., $D < 0$, $\Delta\Pi$ has no real roots. Because the coefficient of B^2 in $\Delta\Pi$ is negative, $\Delta\Pi$ is the parabola that opens downwards. Thus, the sign of $\Delta\Pi$ is negative for all B. Further, for $c > 1$, $B_F > 1$ over all $\rho_{r1} \in (0, 1)$. Therefore, the performance-based contract is optimal over all $B \in (0, 1)$.

(ii) For $c < 1$. To determine the sign of the discriminant of $\Delta\Pi$, denote $\psi(k) = (1 - c)(1 + k)^2 - 2k^2$. The discriminant of $\psi(k)$ is given by $8(1 - c) > 0$. Thus, $\psi(k)$ has two real roots. Because the coefficient of k^2 in $\psi(k)$ is negative, $\psi(k)$ is the parabola that opens downwards. The roots are given by

$$\frac{1 - c - \sqrt{2(1 - c)}}{1 + c}, \text{ and, } \frac{1 - c + \sqrt{2(1 - c)}}{1 + c}.$$

Let $k^{con} = \frac{1 - c + \sqrt{2(1 - c)}}{1 + c}$. Note that k^{con} is a decreasing in c. Because the sign of $\frac{1 - c - \sqrt{2(1 - c)}}{1 + c}$ is negative and that of k^{con} is positive, $\psi(k) > 0$ for $k \in [0, k^{con})$ and $\psi(k) < 0$ for $k > k^{con}$ is known.

For $k > k^{con}$. The discriminant of $\Delta\Pi$ is negative, i.e., $D < 0$. Thus, $\Delta\Pi < 0$ over all $B \in (0, 1)$. Taking account of the fact that if $c < \rho_{r1}$ the performance-based contract is unfeasible over $B \in [B_F, 1)$, it can be said that the performance-based contract is optimal, over $B \in (0, 1)$ if $c > \rho_{r1}$, and over $B \in (0, B_F)$ if $c < \rho_{r1}$.

For $k < k^{con}$. Because the discriminant of $\Delta\Pi$ is positive, $\Delta\Pi$ has two real roots. These roots are given by

$$\frac{(1 + k) - \sqrt{\frac{1}{1 + c}[(1 - c)(1 + k)^2 - 2k^2]}}{[(1 + k)^2 + \frac{1}{c}k^2]\rho_{s1}}, \text{ and, } \frac{(1 + k) + \sqrt{\frac{1}{1 + c}[(1 - c)(1 + k)^2 - 2k^2]}}{[(1 + k)^2 + \frac{1}{c}k^2]\rho_{s1}}.$$

Let $B^{con} = \frac{(1 + k) - \sqrt{\frac{1}{1 + c}[(1 - c)(1 + k)^2 - 2k^2]}}{[(1 + k)^2 + \frac{1}{c}k^2]\rho_{s1}}$ and $B^{exp} = \frac{(1 + k) + \sqrt{\frac{1}{1 + c}[(1 - c)(1 + k)^2 - 2k^2]}}{[(1 + k)^2 + \frac{1}{c}k^2]\rho_{s1}}$. One knows that $\Delta\Pi > 0$ over $B \in (B^{con}, B^{exp})$. The fact that $\Delta\Pi(0)$ is negative implies that $B^{con} > 0$ and $B^{exp} > 0$. Because the limit of B^{con} as c approaches zero is zero, $c^{con} \in (0, 1)$ exists such that for $c < c^{con}$, $B^{con} < 1$ is satisfied. Recall that $\Delta\Pi_F \geq \Delta\Pi$ for all B. If $B^{exp} > B_F$ and $\Delta\Pi > 0$ over $B \in (B^{con}, B^{exp})$, $\Delta\Pi_F > 0$ is satisfied over $B \in (B_F, B^{exp})$. Thus, the conventional implicit contract is optimal, over $B \in (B^{con}, B^{exp})$ if $B^{exp} \leq \min(B_F, 1)$, and over $B \in (B^{con}, \min(B^{exp}, 1))$ if $B^{exp} > \min(B_F, 1)$. This completes the proof of Proposition 1.

Proof of corollary 1

Let the vertex of $\Delta\Pi$ be $(B_v, \Delta\Pi(B_v))$. Because $\Delta\Pi(k)$ is continuous, the roots of $\Delta\Pi$ can be made to be as close to B_v as desired by making k sufficiently close to k^{con}. Thus, when $B_v < B_F$ is satisfied, inequality $B_v < B^{exp} < B_F$ can be derived by making k sufficiently close to k^{con}. Consider now when inequality $B_v < B_F$ is satisfied. Inequality $B_v < B_F$ can be rewritten as $[(1 + \frac{1}{c})B_v - 1] < \frac{1}{\rho_{r1}}$. Denote $\psi(c, k) = (1 + \frac{1}{c})B_v - 1$. When $k = k^{con}$, $\psi(c, k^{con}) > 0$ is satisfied. Suppose c is fixed somewhere

in $(0, \rho_{r1})$. Because $\psi(c, k)$ is a continuous function, for any number $\varepsilon > 0$, some number $\delta > 0$ exists such that for all k, $|k - k^{con}| < \delta \Rightarrow |\psi(c, k) - \psi(c, k^{con})| < \varepsilon$. Thus, $\psi(c, k) > 0$ in the neighbourhood $U = \{(c, k)||k - k^{con}| < \delta, c \in (0, \rho_{r1})\}$. Let $\rho^{exp} = \min\{\frac{1}{\psi(c,k)}, 1\}$, $(c, k) \in U$. If $\rho_{r1} < \rho^{exp}$, $\psi(c, k) < \frac{1}{\rho^{exp}} < \frac{1}{\rho_{r1}}$. This indicates that $B_v < B_F$ is satisfied over $(c, k) \in U$. From the proof of Proposition 1, $\Delta\Pi < 0$ over $B \in (B^{exp}, B_F]$. Therefore, the performance-based contract is optimal over $B \in (B^{exp}, B_F)$. This completes the proof of Corollary 1.

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