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Abstract

In this paper hierarchical wage structures in promotion competition designed for work incentives and executive bonus designed for managerial incentives are analyzed together as a system of incentives in the internal labor market theoretically and empirically. It is found that ratio of male employees' number to directors' number, our proxy for the reverse of promotion probability has a strong effect on the differential between salary per director and average salary of male employees. In contrast, average salary of male employees by firm is mainly dependent on market index for average salary of male employees. It is also examined that generally the firm pays directors no bonuses if annual dividend per share is lower than 5 yen. Bonus per director depends mainly on pre-tax income per employees if it is paid. The above results are consistent with our story that salary and bonus to directors serve as prize of tournament and managerial incentive device respectively.

JEL Classification : J31; J33.

1, Introduction

The competition in the internal labor markets of Japanese large firms has been studied from different aspects. The main purpose of this paper is to analyze work incentives and managerial incentives as double complementary factors of a system of incentives of the internal labor markets.

Since the separation of ownership and management stressed by Berle and Means (1933), managerial incentives has been researched as one of the most important topics. The earliest empirical evidence suggested that scales of firms have significant influence on compensation to top managers. It is stable across time and countries[1]. For long time it is considered as empirical evidence supporting the view point that top managers maximize scales rather than profits or the value of the firm. In this paper , we would like to reexamine the relationship by dividing compensation to top managers to two components, salary and bonus in the following context.

Usually, white-collar employees at the same ladder compete each other to be promoted to a higher ladder. The higher is a ladder, the higher the wage payment is. The wage to the top manager is the highest corresponding to the highest ladder. Only the winner who has won all tournaments climbs up the highest ladder. In this sense, hierarchical wage structures are equivalent to prizes of multi-tournaments. It is common to both US large firms and Japanese large firms. In practice, in both US large corporations and Japanese large corporations top managers are promoted from employees and have tenures within firm longer than 25 years in US and longer than 30 years in Japan as reported in Kaplan (1994).

For contracts based directly on output or effort of each employee are not enforceable, incomplete contracts should be designed alternatively. In the context of multi-agents, it is argued that contracts based on the ordering of agent performance in the spirit of the rank order tournament of Lazear and Rosen(1981) can still be made enforceable by Malcomson (1984). The point is that a firm can commit itself to pay a proportion of agents higher wage than the rest. In Kanemoto and MacLead (1989), it is argued that the lifetime employment coupled with a agreed-upon total wage bill observed in Japan solves the double moral hazard problem.

In the context of Malcomson (1984), if promotion probabilities are different from scales of firms, to keep promotion be attractive, the smaller is the promotion probability, the higher the wage to the promoted workers should be. Intuitively, in a giant firm such like Toyota or GM, it is considerably difficult for a white-collar employee to be promoted to the post of president or CEO. Hence it can be conjectured that the estimated effect of scales on compensation to top managers might be no more than an apparent relationship since there is a strong negative correlation between scales and promotion probability. For example, it is estimated in Noda(1995) that the probability for a middle manager to be promoted to chairman, vice chairman, president or vice president in a firm with 300 employees or below is 42.5 times of that in a firm with 10,000 employees or over.

But tournaments function well no longer as managerial incentives since it is required that at least there should be two rival agents competing each other. Hence new institutions should be designed for presidents or CEOs. For example, executive bonuses based on accounting income and stock option serve as managerial incentive device.

In the above context, work incentives for employees and managerial incentives for top managers should be analyzed together as a system. Compensation to top managers are not only related to tournament incentives but also to managerial incentives. The components related to tournaments and managerial incentives should be distinguished in both theoretical and empirical research.

On empirical evidence for US large firms, the finding in Main, O'Reilly and Wade(1993) suggests that tournament is positive. In Garen(1994), it is also found that executives in larger firms earn higher salaries. For the Japanese firm, in Xu (1993) it is first that salary per director and bonus per director[2] in large Japanese firms are analyzed separately. The finding is that the former depends on sales and in contrast the latter depends on accounting incomes. Thus it was conjectured that salaries to top managers and bonuses to top managers might play different roles. In detail, the former provides work incentives and the later provides managerial incentives respectively.

In this paper we consider work incentives and managerial incentives as a system of institutions in the internal labor market. First, we analyze the institutions designed for work

incentives and the institutions designed for managerial incentives together by employing a simple model in section 2. To test the prediction derived in section 2, we investigate the effect of ratio of male employees' number to directors' number, our proxy for the reverse of promotion probability on the differential between salary per director and each market index for average salary of male employees. To examine the fact respecting regular wage, we also estimate average salary of male employees of each firm. Moreover we look at the relationship between management performance and bonus per director. Section 4 contains our conclusions.

2, The Model

We analyze a model where hierarchical wage structures and managerial incentives are incorporated into a system of incentives in the internal labor markets. After an employee recruited by a firm, he has to compete with his rivals to be promoted to a higher paying job in a hierarchy. Since it is difficult for a third party to verify actions or performance of employees, contracts depending directly on effort or output of each employee are not enforceable. Hence hierarchical wage structures serve as institutions providing incentives to employees for effort such like human capital investment.

Every employee lives two periods. Each employee chooses his effort $e_t \in \{e^H, e^L\}$ in each period. Each employee has identical lifetime utility function of $U(y_1)-D(e_1)+U(y_2)-D(e_2)$, where y_t, e_t ; $t=1,2$ denote income and effort in period t respectively[3]. $U(y_t)$ is strictly increasing and strictly concave in y_t : $U'()>0$, $U''()<0$. $D(e_t)$ is strictly increasing and convex in e_t : $D'()>0$, $D''()>0$.

Hierarchical wage structures are designed as follows. In period 1, every employee aged 1 is paid W_1. At the beginning of period 2, only one employee aged 2 choosing e^H in period 1 is promoted . We call him the manager. He is paid W_2^H. Here we assume that only employees choosing e^H in period 1 have a chance to be promoted without considering a rank-order tournament with random shock explicitly in order to make the problem simple without loss of generality. Each employee who is not promoted is paid W_2^L. Additionally assume that in

equilibrium the firm has incentive to employ employees not promoted for they invested in human capital and have marginal productivity in monetary term higher than v.

Now we look at the managerial incentives. To induce adequate effort of the managers, the firm offers him bonus scheme based directly on profit[4]. Denote bonus paid to the manager $B(P)$. The probability distribution of profit $P \in \{P^H, P^L\}; P^H > P^L$ depends on the effort level of the manager giving that employees aged 1 choose e^H and employees aged 2 choose e^L.[5] The distribution is $\{\pi^H, 1-\pi^H\}$ when the manager chooses e^H. For the simplification, assume that P^H realizes with probability of 0 if the manager chooses e^L. Here we deal promotion probabilities as endogenous variables like technology or cost functions of firms.

Alternatively, every employee aged 1 has an access to competitive spot labor market where workers aged 1 can receive W_1^S and workers aged 2 can receive W_2^S. Each employee aged 1 can choose to accept a permanent contract or work at the spot market. We also assume that $W_2^S = W_1^S = v$.

Then we solve the cost minimization wage contract[6]. The program is as follows.

$$\underset{W_1, W_2^L, W_2^H, B(P^H), B(P^L)}{MIN} \quad W_1 + (1-p)W_2^L + p(W_2^H + \pi^H B(P^H) + (1-\pi^H)B(P^L))$$

$$s.t. \quad U(W_1) - D(e^H) + p(\pi^H U(W_2^H + B(P^H)) + (1-\pi^H)U(W_2^H + B(P^L)) - D(e^H)) + (1-p)(U(W_2^L) - D(e^L)) \geq U(W_1) - D(e^L) + U(W_2^L) - D(e^L)$$

$$U(W_1) - D(e^H) + p(\pi^H U(W_2^H + B(P^H)) + (1-\pi^H)U(W_2^H + B(P^L)) - D(e^H)) + (1-p)(U(W_2^L) - D(e^L)) \geq U(W_1^S) - D(e^L) + U(W_2^S) - D(e^L)$$

$$\pi^H U(W_2^H + B(P^H)) + (1-\pi^H)U(W_2^H + B(P^L)) - D(e^H)) \geq U(W_2^H + B(P^L)) - D(e^L)$$

$$B(P^H) \geq 0$$

$$B(P^L)\geq 0$$

$$W_2^L \geq v$$

Without loss of generality, the program can be rewritten as follows.

$$\underset{W_1,W_2^L,W_2^H,B}{MIN} \quad W_1+(1-p)W_2^L+p(W_2^H+\pi^H B)$$

$$\begin{aligned} s.t. \quad & U(W_1)-D(e^H)+p(\pi^H U(W_2^H+B)+(1-\pi^H)U(W_2^H)-D(e^H)) \\ & +(1-p)(U(W_2^L)-D(e^L))\geq U(W_1)-D(e^L)+U(W_2^L)-D(e^L) \qquad (ICE) \end{aligned}$$

$$\begin{aligned} & U(W_1)-D(e^H)+p(\pi^H U(W_2^H+B)+(1-\pi^H)U(W_2^H)-D(e^H)) \\ & +(1-p)(U(W_2^L)-D(e^L))\geq U(v)-D(e^L)+U(v)-D(e^L) \qquad (IR) \end{aligned}$$

$$\pi^H U(W_2^H+B)+(1-\pi^H)U(W_2^H)-D(e^H))\geq U(W_2^H)-D(e^L) \qquad (ICM)$$

$$B\geq 0$$

$$W_2^L \geq v$$

Constraint *(ICM)* implies that the manager is better off choosing e^H. Condition *(ICE)* says that an employee aged 1 can enjoy higher lifetime utility level choosing e^H than choosing e^L. Condition *(IR)* means that it is indifferent for an employee to accept the lifetime employment contract or access to the competitive spot labor market as it is assumed in Kanemoto and MacLeod (1989). $W_2^L \geq v$ means that the firm has incentive to continue to employ employees not promoted.

It is not difficult to show that *(IR)* should be binding since the firm can always reduce W_1 and save labor cost without altering any other constraint. Now I will show that *(ICM)* also should be binding. Otherwise the firm can reduce B and raise W_2^H to save labor cost while keeping

$\pi^H U(W_2^H+B)+(1-\pi^H)U(W_2^H)$ constant since the manager is risk averse. Notice that other constraints are not affected. Substituting the binding condition $\pi^H U(W_2^H+B)+(1-\pi^H)U(W_2^H)-D(e^H))=U(W_2^H)-D(e^L)$ to *(ICE)*, we get

$$p(U(W_2^H)-U(W_2^L))\geq D(e^H)-D(e^L)$$

Combining this with (IR), it implies $U(W_1)+U(W_2^L)\leq U(v)+U(v)$. Then adding condition $W_2^L \geq v$ yields $W_1 \leq v \leq W_2^L < W_2^H$. Here it is not difficult to show that *(ICE)* should be binding. Otherwise, the firm can save labor cost by reducing W_2^H and raising W_1 since employees are risk averse while not altering any other constraint. For the same reason, $W_2^L = v = W_1$.

Now look at the effect of promotion probability p on hierarchical wage structures. To maintaining the incentive compatible condition for employees aged 1, a firm with smaller promotion probability should raise the salary paid to the manager. Furthermore, to provide incentive to the manager, bonus should also be raised when the salary to the manager is raised since he is risk averse.

The main prediction of the model is as follows. First, the differential between the utility levels corresponding to the salary paid to the manager and the salary of competitive spot market is decreasing function of promotion probability. The more difficult is the promotion, the higher the salary to the manager would be. Second, the salary to an employee who is newly recruited or not promoted depends on the salary of the competitive spot labor market. Third, promotion probability also affects absolute amount of bonus to the manager and its sensitivity to profit.

We believe that our model capture essential aspects of hierarchical wage structures and managerial incentives though it is very simple. In particular, our model is rich of testability because it does not require the availability of the data on individual observation. The model is also consistent with the argument in Alchian and Demzets (1976) where it is discussed that managers have residual control rights as monitors. To provide managers monitoring incentive, they should be residual claimants. Then work incentives and managerial incentives are two complementary factors of the internal labor markets. They serve as a system. In next section,

we test the prediction of our model empirically.

3, Empirical Evidence

The sample used here is unbalanced panel data involving 690 firm-years. The sample firms are 82 corporations in industries of general machinery and electronic machinery listed in the first section of the Tokyo Security Exchange from 1983 to 1991. For the two industries are two of the typical industries with strong comparative advantage in Japan and have recorded rapid growth after the World War II, I believe that the sample selection is suited well to my purpose.

The data source on each firm is Yuka Shoken Hokokusho (company report). Yuka Shoken Hokokusho supplies the data about numbers, average ages, average careers and average salaries for male employees[7], total amount of salaries paid to directors, total amount of bonus payments to directors. Dislike the disclosure required by SEC in US., only total amount of compensation to all directors is disclosed and compensation to individual director is not available publicly in Japan. In detail, salaries to directors are accounted as administrative expenditures, bonuses are accounted as distribution of net income suck like dividend in income statement. The Japanese company law requires that total amount of compensation to directors should be approved by general meeting of shareholders. But generally stock option to directors and executives is not granted in any publicly held Japanese firm since the current Japanese company law prohibits repurchasing of stock except for retirement or assignment to employee stock ownership plan.

I take salary per director, total amount of salaries paid to directors divided by number of managing directors and full time auditors as well as bonus per director as proxies for salary and bonus to the manager. I take ratio of number of male employees to number of directors as proxy for the reverse of promotion probabilities. Since only male employees are candidates to be promoted, we take the data on male employees[8].

The proxy for the salary of the competitive spot market is taken from the Wage Census surveyed by Policy Planning and Research Department, Minister's Secretariat, the Ministry of Labor Japan. It supplies average age, career, monthly contractual earnings by industry

(medium division) and size of enterprise, by industry total for all sizes of firm as well as industry covered indices by size and total for all sizes of firm of male employees. Sizes are divided to with 1000 employees or over, 100-999 employees and 10-99 employees. I take average contractual monthly earnings for male employees as the salary of the competitive spot labor market. All nominal variables are deflated to 1985 using consumers price.

To test the robustness and stability of our prediction, we group the sample by industry, ratio of male employees' number to directors' number. In detail, they are denoted as Pooling (total sample), M.I. (selected sample with firms of machinery industry), E.M.I.(selected sample with firms of electronic machinery industry) , Group L (selected sample with firms of ratio of male employees' number to directors' number higher than 275), Group M (selected sample with firms of ratio of male employees' number to directors' number lower than 275 and higher than 150) and Group H (selected sample with firms of ratio of male employees' number to directors' number lower than 150). Group L, Group M and Group H are grouped equally by ratio of male employees' number to directors' number.

3.1, Salary differential between directors and male employees

First we test the prediction that the difference between utility levels corresponding to the salary to each employee and the salary to the manager is increasing function of the reverse of promotion probability. The dependent variable is $U(W_2^H)$ -$U(v)$ where W_2^H is salary per director and v is an index for average contractual monthly earning of male employees[9] surveyed by the Wage Census. In detail we take average salary of male employees by firm, average salaries of male employees by industry, size of enterprise, or average salary of male employees total for all sizes of enterprise by industry, or industry covered average salaries of male employees by size of enterprise, or industry covered average salary of male employees total for all sizes of enterprise.

In empirical research, it is a subtle issue how to measure the wage differential between promoted workers and workers not promoted. As pointed out in Main et al(1993), a more reasonable measure of the tournament prize would involve the expected present value of

income differential between winners and losers. However the pay differential between president and typical vice president might not reflect the salary differential between workers promoted and workers not promoted since usually vice presidents compete each other to be promoted to the post of president and the losers usually leave the corporation. In detail, in Japanese large firms they usually go to subcompanies as presidents or directors. But such data is not available publicly.

As emphasized in Main et al.(1993), it seems more efficacious to motivate people with smaller, more frequent raises and promotions rather than relying on larger, less frequent raises and reinforcement. In other words, the tournament in the internal labor market is lifetime competition among workers. In this sense, the salary differential between executives and male employees used here may provide a reasonable measure for prize of such continuous small and frequent promotions.

Now look at results shown in table 3.1.2A-3.1.2E. We find that there is a statistically significant association between ratio of male employees' number to directors' number and the differential between salary per director and each index for average salary of male employees at 1% level in each regression. Results in table 3.1.1A show that *log*(sales) is statistically significant only in the regression for Group M at 10% level and the estimated coefficients are negative in the regressions for the rest grouping except E. M.I. when average salary of male employees by firm is used.

Substituting average salary of male employees by firm with average salary of male employees by industry and size of enterprise, it is found that sales has a significantly positive influence at 1% level in the regression for Group M, at 5% level in the regression for Polling and at 10% level in the regressions for E.M.I. and Group H respectively. Results in table 3.1.1C show that substituting average salary of male employees by firm with average salary of male employees total for all sizes of enterprise by industry yields significant influences of sales at 1% level in the regressions for Pooling and Group M, at 5% for M.I. and Group H, at 10% for E.M.I. A significant effect at 10% level of sales can not be examined in the regressions for E.M.I., Group L and Group H in table 3.1.1D. It is the same in the regressions for E.M.I. and Group L in table 3.1.1E. Moreover it is common to table 3.1.1A to 3.1.1E that estimated coefficients

are negative and lack of significance in regressions for Group L.

At last notice that F statistic and adjusted R-square in each regression with log(sales) is lower than that of the corresponding regression substituting log(sales) with log(male employees' number/directors' number) by comparing results in table 3.1.1A, 3.1.1B, 3.1.1C, 3.1.1D and 3.1.1E with results in 3.1.2A, 3.1.2B, 3.1.2C, 3.1.2D and 3.1.2E.

(Insert table 3.1.2A, 3.1.2 B, 3.1.2C, 3.1.2D and 3.1.2E here)

(Insert table 3.1.1A, 3.1.1 B, 3.1.1C, 3.1.1D and 3.1.1E here)

Then it is not difficult for us to conclude that the effect of *log*(male employees' number/directors' number) on *log*(salary per director)-*log*(average salary of male employees) is robust and stable. In contrast, the effect of sales is lack of robustness and stability and sometimes with negative estimated coefficient. Though a significant effect is found in some regressions, it is caused by the strong negative correlation between sizes of firms and promotion probabilities and no more than apparent one. We also try to estimate the determinant by substituting *log*(male employees' number/directors' number) with *log*(male employees' number). For almost every regression, it is not statistically significant. The results are not reported here.

The mean ratio of salary per director to average salary of male employees by firm is 5.25, the maximum is 12.64 and the minimum is just 1.88. The mean annual salary per director is 20 million yen, about $200,000 dollars evaluated at the exchange rate 1 dollar = 100 yen with the range from 6.6 million yen to 43.6 million yen. The mean average annual salary of male employees by firm is 3.7 million yen.

The estimated elasticity in Table 3.1.2A is from 0.43 to 0.53. This implies that a 10% increasing of the reverse of promotion probability gives a 4.3% to 5.3% increase of ratio of salary per director to average salary of male employees. Measured at the mean ratio of salary per director to average salary of male employees by firm and the mean average annual salary of male employees, it amounts to some 800,000 yen to 1 million yen, about $8,000 to $10,000 in

current exchange rate.

Applying it straight to the argument that the earning distribution within large corporations are more equal in Japan than in US[10], we want stress that it can be explained by the difference of promotion probability between US large corporations and Japanese large corporations. For example, there is about 222,000 employees in GE in December 1993 comparing with 80,000 employees of Hitachi in September 1993. Since scale correlates negatively with promotion probability, the salary paid to the CEO of GE is higher than the salary paid to the president of Hitachi. Generally it is said that Japanese large firms are far slime comparing with US large firms. Hence it is not difficult to understand why in average ratio between CEO's compensation and the average employee earning in US. large firms is higher than that in Japanese large firms.

For dummy of poor management performance in t-1, defined as either dividend per share lower than 5 yen or net income per share lower than dividend per share in t-1, it has negative coefficient except in the regressions for Group H and the regressions for M.I. where log(sales) is included in independent variables. It is also lack of stable significance. This implies that the Japanese firm cuts bonus payments to let directors take responsibility of management rather than reduces salaries of directors since it related to total wage structures. Recently it is reported that a firm suffered loss in the earthquake in Kobe reduced salaries of all managers. And the rate of the reduction of the salary to a director in percentage is higher than that of a middle manager.[11] All of this suggests that to maintain work incentives and reputation firms adjust whole wage structures rather than only reduce salaries paid to directors.

So far, wage profile and compensation to top managers are estimated separately. In this paper we estimate wage structures as a whole system. In particular, we try to test the hypotheses that salaries to directors work as prize of tournament as directly as possible. Of course, it is the best to compare salaries of employees with the same age, education level and career within firm. But it would had been constrained by data availability strictly.

3.2, Average salary of male employees by firm and regular salary

For comparison, we also estimate average salary of male employees for each firm-years. The

result is consistent with the stylized fact that one of factors considered most important when determining amount of wage increase is respecting regular wage (Soba chingin in Japanese, usually average wage of employees by industry, size of enterprise).

The estimations for average salary of male employee are showed in table 3.2A-3.2D. The finding tells that each index for average salary of male employees has a significantly positive effect at 1% level on average salary of male employees by firm. The estimated coefficients are round 1 (within 0.93 to 1.45). The results are stable across different indices for average salary of male employee and subsamples.

(Insert table 3.2A, 3.2B, 3.2C, 3.2D here)

To control the effect of age and career, independent variables include the differences of average age, average career between each firm and the corresponding sample used in calculating each index for average salary of male employees in the Wage Census. Significant effects of the differences are found for some groups. Adding sales, number of male employees, ratio of male employees' number to directors' number and pre-tax income per male employee in t or in t-1 respectively to independent variables, neither of them has a significant effect on average salary of male employee by firm for almost every group. The results are omitted. It seems that average salary of male employees by firm is affected by neither scales nor management performance.

It is well-known that within industry average wage of employees in Japanese large firms are little variable among firms. It is called "Yokonarabi" (respecting regular wage)[12]. Managers are concerned with regular wage, average wage by industry, size of enterprise. The prediction of our model is consistent with this fact. Here regular wage can be explained as the wage of the competitive spot labor market.

Though it is maintained that the Japanese firm is labor-managed like and maximize average earning of employees, it seems not consistent with the fact respecting regular wage. The executives of the Japanese firm are concerned with how to maintain the efficiency of the whole organization rather than maximization of average earning of employees. The reason why

executives dislike to raise salaries of employees for it is not easy to renegotiate to reduce them with the union in the future to maintain the wage structure be efficient.

The same evidence has been examined by Sano(1981), Muramatsu(1986), Brunello and Ohtake(1987) and Ueda and Okasaki(1989). In Xu(1992), it was examined that either scale or management performance has no significant effect on labor cost per employee by firm but industry-covered labor cost per employee has a strong influence. It is also maintained by Koike, one of the leading Japanese economists, that labor-managed like hypothesis is not consistent with such widely known fact.

3.3, Average bonus per director and management performance

Bonus paid to directors are based directly on corporation performance ex post. It is different from bonus payments to employees agreed-upon ex ante. The mean compensation per director including bonus is 27.3 million yen. It is well-known fact that top managers in Japanese large firms have cash-earnings considerably lower than their counterparts in US..

Now group the total sample as follows. The one sample includes all firm-years that paid their directors bonuses. The other sample are firm-years without bonus payments to directors due to poor management performance. Let us look at the difference of the two samples. Out of 540 firm-years, the number of the sample with bonus payment to directors, the mean ratio of annual bonus to monthly salary earning is 4.75. Only 25 firm-years of the 540 have poor management performance. The mean bonus per director of the above 25 firm-years is 3.71 million yen lower than 7.16 million yen, the mean bonus per director of the sample covered all firm-years with bonus payments to directors. The mean amount of compensation (salary + bonus) per director is also lower.

Out of 150 firm-years, the number of the sample firm-years without bonus payments to directors due to poor management performance, 136 firm-years have dividend per share lower than 5 yen. 11 of the rest 16 firms had retained earning per share lower than 3 yen. It is no doubt that executive bonus is dependent on accounting performance.

The fact suggests that a director would lose 30% of cash earning if the firm fails to pay their

shareholders dividend per share equal to 5 yen or over. This is the reason why directors of Japanese listed firms are concerned with whether they can pay shareholders dividend equal or more than 5 yen per share. Though granting stock option to directors is prohibited by the company law in Japan, it seems that such bonus scheme to directors provides important managerial incentives.

As described above we know that directors can not earn bonuses if management performance is bad, but we do not know the criterion of cutting bonus. Then the data is censored. Here we use Heckman's two stage method to estimate the determinant of bonus payments to directors. First, estimate likelihood that firms pay their directors bonuses with probit regression.

(Insert table 3.30 here)

Independent variables in probit regression are poor management performance dummy (dividend per share is lower than 5 yen or dividend per share is lower than net income per share), dividend per share, retained net income per share. The effect of poor management performance dummy is significantly negative at 1% level in all regressions except E.M.I.. Dividend per share increases executive bonus payment likelihood and is statistically significant at 5% in the regression for Group H and at 1% in the rest regressions. Change of annual dividend per share from t-1 to t has a significantly positive influence on executive bonus payment likelihood in the regressions for Pooling, M.I. and Group H at 1% level respectively but has no significance in the rest regressions. Retained net income per share also increases executive bonus payment likelihood. It is significant in the regression for Pooling at 1% level, in the regressions for M.I. and Group M at 5% level respectively.

Paying annual dividend per share equal to 5 yen or over seems an important yardstick for directors of Japanese firms can earn bonuses or not. It is said that the Japanese firm sticks to paying annual dividend per share equal to 5 yen or over. In pioneer we clarify the relationship between complete cutting of executive bonus payment and annual dividend per share from viewpoints of managerial incentives.

Looking at the OLS regressions of the second stage, we find that pre-tax income per male

employee[13] has a significantly positive effect on average bonus per director at 1% in every regression in table 3.3A as well as ratio of male employees' number to directors' number. It is also found that the product of ratio of directors' number to male employees' number and pre-tax income per male employee has a significantly negative effect at 1% level in every regression. Interpreting ratio of directors' number to male employees' number as promotion probability, it is consistent with the derived predictions that reduction of promotion probability raises both absolute amount of bonus per director and its sensitivity to profit.

(Insert table 3.3A here)

Evaluating the effect of pre-tax income per male employee at sample means, it is found that bonus per director increases by 0.81 million yen for Pooling , 0.54 for the sample of M.I. , 0.92 million yen for the sample of E.M.I. respectively when pre-tax income per male employee increases by 1 million yen. By ratio of male employees number to directors' number, an increase of pre-tax income per male employee by 1 million yen raises bonus per director by 1.49 million yen for Group L, 0.45 million yen for Group M and 0.31 million yen for Group H respectively. Notice that ratio of male employees' number to directors' number interpreted as the reverse of promotion probability reduces the sensitivity of executive bonus to profit.

At last, for reverse Mill's ratio estimated in each probit regression, a significant effect is examined at 1% in regressions for Pooling and Group H, at 5% level in the regressions for M.I. and Group M, at 10% level in the regression for E.M.I. in table 3.3A respectively.

(Insert table 3.3B, 3.3C here)

Table 3.3B and table 3.3C are estimations substituting ratio of male employees' number to directors' number with male employees' number or sales alternatively. Comparing with the effect of ratio of male employees' number to directors' number, male employees' number has no significantly positive influence on bonus per director except the estimation for Group M. A significantly negative effect at 10% level and a significantly positive effect at 1% of sales are

examined in the regressions for Group L and Group M respectively. As described above, neither sales nor male employees' number has a stable effect on bonus per director.

Since bonuses to employees are not available generally, the determinant of bonuses to employees are not estimated here. However it is worthwhile to be noted that the effect of accounting income per employee on bonus per employee is just marginal. In practice, it is seldom heard that employees suffer bonus reduction due to poor management performance. In detail, in Ohhashi(1990) it is estimated that an increase by 100 million yen of ordinary income per employee by industry just increases bonus per employee by industry by 12,000 yen. Assuming that the change of ordinary income is equal to the change of pre-tax income and women employee proportions is 50%, the effect of ordinary income per employee on bonus per directors estimated here is at least 20,000 times of the coefficient estimated in Ohhashi(1990). Recalling that bonuses to directors are cut completely when management performance is bad, actually executive bonuses are far more sensitive to accounting income than bonuses to employees. The same viewpoint is also asserted in Ono(1989).

The above fact suggests that bonuses to employees and bonuses to directors have different natures. The former is just one component of fixed salary agreed ex ante, the latter is ex post performance-dependent payment providing directors managerial incentives. It also can be understood as indirect evidence that the Japanese firm is not labor-managed like.

Table 3.3D to 3.3I present the regressions adding sales per male employee, average salary of male employee to independent variables respectively or together in each regression in table 3.3A. For sales per male employee, a significantly positive effect at 10% level and 1% level is found in regressions for M.I. group and Group M respectively. Results in table 3.3E and 3.3H also show that the coefficients of pre-tax income per male employee, ratio of employees' number to directors' number and their interaction are affected slightly by adding sales per male employee and average salary of male employee by firm respectively or together. Additionally, the estimated coefficients and t-values of sales per male employees do not change large by adding average salary of male employees to independent variables as shown in the above tables. In the regressions for the rest groups, it is not statistically significant and the estimated coefficients are negative in the regressions where sales per male employee is included in table

3.3F, 3.3G and 3.3I.

But no significant effect of average salary of male employee by firm can be examined irrespective of including sales per male employee in independent variables except the regressions for E.M.I. group. Tough a significantly influence is examined in the regressions for E.M.I., the estimated coefficient is negative in each regression as shown in table 3.3F. Once again it is examined that directors in Japanese large firms have no monetary incentives to maximize average earning of employees. In other words, it provides direct evidence suggesting that the Japanese firm is not labor-managed like but profit maximizing.

4, Conclusions

In this paper, we investigate roles of executive salary and executive bonus by employing a simple tournament model incorporate with the issue of managerial incentives. The main prediction of the model is as follows. First, the utility differential corresponding to the salary paid to the manager and the salary of competitive spot market is decreasing function of promotion probability. The more difficult is the promotion, the higher the salary to the manager is. Second, the salary to an employee who are newly recruited or not promoted is equal to the salary of the competitive spot labor market. Third, promotion probability reduces both absolute amount of bonus to the manager and its sensitivity to profit.

As predicted by the model, the empirical findings show a significantly positive association between log of ratio of number of male employees to number of directors, the proxy for the reverse of promotion probability and *log*(the salary per director)-*log*(average salary of male employees), the proxy for the difference of the utility levels corresponding to the salary to the manager and the salary of the competitive spot labor market.

In contrast, average salary of male employees by firm depends on index for average salary of male employees surveyed by the Wage Census. It is consistent with our prediction that the salary to employees newly recruited or not promoted depends on the salary level of the competitive spot labor market and the stylized fact called respecting regular wage. It also provides indirect evidence that the Japanese firm is not labor-managed like.

For executive bonus, the empirical findings suggest that whether directors can earn bonus or not mainly depends on dividends per share, poor management performance defined as dividend per share is lower than 5 yen or dividend per share is lower than net income per share. Bonus per director is determined by pre-tax income per male employee as well as ratio of employees' number to directors' number. The sensitivity of bonus per director to pre-tax income per male employee decreases with ratio of directors' number to male employees' number. All of these suggest that executive bonus serves as managerial incentive device. Additionally, it is reexamined that directors of the Japanese firm have no monetary incentives to maximize average earning of employees.

Our study focuses on hierarchical wage structures, the aspect of the centralized personnel management in the Japanese firm. In particular, we analyzed work incentives and managerial incentives in Japanese large firms as two complementary factors of the system of incentives in the internal labor markets. We hope that it will gives new insight to the research about the system of incentives in the Japanese firm.

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[1]See Rosen(1990), Xu(1992),(1993) and Kaplan(1994).

[2]Comparing with a large number of empirical researches on the executive market in US, there is little literature on the managerial incentives of Japanese large firms until the end of 1980s because the data of compensation paid each top manager is not publicly available. Recently, some hypotheses on the management objectives, such like labor managed-firm like (or employeeism dubbed by Miyazaki(1993)) are tested gradually. However the findings of Xu(1992) suggest that average earning of employee has no significant effect on compensation to presidents. On turnover rate of top managers, international comparative studies are initiated by Kaplan(1994) and Kaplan and Minton(1994).

[3]The result is not affected by considering discount rate.

[4]In spring, the union renegotiates wage increase and ratio of bonus payment to monthly scheduled earning of union members. It is seldom for either wage or bonus to employees be altered ex post. It is also said that ratios of bonus payment to scheduled monthly earning are

little variable within industry. Assumption that bonus based on profit directly is possible only for directors is consistent with such stylized fact.

[5]Profits denotes expected profit per employee. Assuming that promotion probabilities are small enough to ensure that effort level per employee are almost the same for all firms with different promotion probabilities.

[6] This model borrows basic ideas from Kanemoto and Macleod (1989). But it is concluded that promotion should involve all employees in Kanemoto and Macleod(1989). Their conclusion is consistent with wage structure for junior employees with firm tenure of 10 to 15 years or below. In this model promotion probability is dealt as given and managerial incentives are analyzed together.

[7]The term of employee implies regular employee throughout the paper.

[8]It is better to take the data on white collar male employees with educational level of college or university . But number of such employees in detail for each firm is not available. I am grateful to Fumio Ohtake, Yasushi Ohkusa and Toshiaki Tachibanaki to point out this issue.

[9]Bonuses to employees are not available generally. But ratio of bonus payment to contractual monthly earning is not so variable within industry.

[10]It is reported in Sheridan and Kendall(1992) that United States chief executives earn 85 times than the average worker while in their Japanese counterparts earn just 16 times.

[11]Nihon Keizai Shinbun, 8 March 1995.

[12] For example, in this spring the difference of wage increase between Toyota and Nissan is only 900 yen even through Toyota earned and Nissan suffered loss in FY 1993 and 1994.

[13]Pre-tax income of the firm/number of male employees.

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Table 3.1.1A

OLS regression for log(salary per director)

-log(average salary of male employees by firm) (1)

Sample	Pooling	M.I.	E.M.I.	Group L	Group M	Group H
Constant	1.71	2.57	1.36	2.35	0.103	1.69
Log(sales)	-0.00367	-0.028	0.026	-0.049	0.125[c]	-0.012
	(-.102)	(-.57)	(.497)	(-.87)	(1.88)	(-.19)
Poor management	-0.049[b]	-0.043	-0.058	-0.064[c]	-0.064	0.015
performance in t-1	(-1.98)	(-1.24)	(-1.60)	(-1.71)	(-1.53)	(.343)
Number of observations	690	362	328	225	232	233
Adjusted R-square	0.706	0.665	0.735	0.757	0.771	0.705
F-statistic	21	16.9	24.3	18.5	18.7	14.5

T-statistics are in parentheses. Firm dummy and time dummy are controlled in all regressions.

[a]Statistic significance at 1% level

[b]Statistic significance at 5% level

[c]Statistic significance at 10% level

Table 3.1.2A

OLS regression for log(salary per director)

-log(average salary of male employees by firm) (2)

Sample	Pooling	M.I.	E.M.I.	Group L	Group M	Group H
Constant	-1.18	-0.325	-1.01	-0.702	-1.21	-0.879
Log(male employees'	0.51[a]	0.535[a]	0.48[a]	0.438[a]	0.507[a]	0.504[a]
number /directors' number)	(13.6)	(10.6)	(8.56)	(6.34)	(5.01)	(7.57)
Poor management	-0.04[c]	-0.032	-0.05	-0.046	-0.06	0.028
performance in t-1	(-1.90)	(-1.11)	(-1.60)	(-1.38)	(-1.54)	(.792)
Number of observations	690	362	328	225	232	233
Adjusted R-square	0.775	0.753	0.789	0.8	0.794	0.773
F-statistic	29.6	25.5	32.3	23.4	21.3	20.3

T-statistics are in parentheses. Firm dummy and time dummy are controlled in all regressions.

[a]Statistic significance at 1% level

[b]Statistic significance at 5% level

[c]Statistic significance at 10% level

Table 3.1.1 B

OLS regression for log(salary per director)-log(average salary of male employees by industry, size of enterprise) (1)

Sample	Pooling	M.I.	E.M.I.	Group L	Group M	Group H
Constant	0.881	1.6	0.763	2.26	-0.615	0.364
Log(Sales)	0.074[b]	0.068	0.084[c]	-0.035	0.194[a]	0.103[c]
	(2.15)	(1.47)	(1.65)	(-0.648)	(3.1)	(1.73)
Poor management	-0.038	0.000406	-0.082[b]	-0.041	-0.057	0.044
performance in t-1	(-1.62)	(0.012)	(-2.39)	(-1.12)	(-1.46)	(1.03)
Adjusted R-square	0.745	0.73	0.755	0.761	0.813	0.721
F-statistic	25.2	22.6	26.8	18.8	23.8	15.6
Number of observations	690	362	328	225	232	233

T-statistics are in parentheses. Firm dummy and time dummy are controlled in all regressions.

[a]Statistic significance at 1% level

[b]Statistic significance at 5% level

[c]Statistic significance at 10% level

Table 3.1.2B

OLS regression for log(salary per director)

-log(average salary of male employees by industry, size of enterprise) (2)

Sample	Pooling	M.I.	E.M.I.	Group L	Group M	Group H
Constant	-0.834	-0.243	-0.483	-0.367	-0.95	-0.871
Log(male employees' number /directors' number)	0.463[a] (12.7)	0.515[a] (10.8)	0.4[a] (7.17)	0.39[a] (5.62)	0.476[a] (4.93)	0.507[a] (7.64)
Poor management performance in t-1	-0.043[b] (-2.07)	-0.00623 (-0.231)	-0.085[a] (-2.73)	-0.026 (-0.783)	-0.064[c] (-1.73)	0.033 (0.93)
Adjusted R-square	0.797	0.801	0.79	0.795	0.826	0.783
F-statistic	33.5	33.4	32.5	22.8	25.9	21.4
Number of observations	690	362	328	225	232	233

T-statistics are in parentheses. Firm dummy and time dummy are controlled in all regressions.

[a]Statistic significance at 1% level

[b]Statistic significance at 5% level

[c]Statistic significance at 10% level

Table 3.1.1C

OLS regression for log(salary per director)

-log(average salary of male employees total for all sizes of enterprise by industry) (1)

Sample	Pooling	M.I.	E.M.I.	Group L	Group M	Group H
Constant	0.698	1.22	0.781	2.12	-0.699	0.071
Log(sales)	0.098[a]	0.107[b]	0.091[c]	-0.015	0.209[a]	0.136[b]
	(2.85)	(2.30)	(1.79)	(-.26)	(3.34)	(2.30)
Poor management	-0.033	7.15E-03	-0.079[b]	-0.04	-0.053	0.051
performance in t-1	(-1.41)	(.220)	(-2.29)	(-1.06)	(-1.34)	(1.19)
Number of observations	690	362	328	225	232	233
Adjusted R-square	0.739	0.717	0.756	0.754	0.809	0.71
F-statistic	24.5	21.3	27	18.2	23.2	14.8

T-statistics are in parentheses. Firm dummy and time dummy are controlled in all regressions.

[a]Statistic significance at 1% level

[b]Statistic significance at 5% level

[c]Statistic significance at 10% level

Table 3.1.2C

OLS regression for log(salary per director)-log(average salary of male employees total for all sizes of enterprise by industry) (2)

Sample	Pooling	M.I.	E.M.I.	Group L	Group M	Group H
Constant	-0.783	-0.322	-0.389	-0.324	-0.836	-0.986
Log(male employees'	0.472[a]	0.531[a]	0.401[a]	0.4[a]	0.474[a]	0.551[a]
number /directors' number)	(13.0)	(11.2)	(7.19)	(5.72)	(4.86)	(8.51)
Poor management	-0.041[b]	-6.26E-03	-0.083[a]	-0.027	-0.062[c]	0.034
performance in t-1	(-2.02)	(-.233)	(-2.65)	(-.781)	(-1.66)	(.971)
Number of observations	690	362	328	225	232	233
Adjusted R-square	0.793	0.794	0.791	0.791	0.82	0.784
F-statistic	32.8	32	32.7	22.2	24.9	21.5

T-statistics are in parentheses. Firm dummy and time dummy are controlled in all regressions.

[a]Statistic significance at 1% level

[b]Statistic significance at 5% level

[c]Statistic significance at 10% level

Table 3.1.1D

OLS regression for log(salary per director)

-log(industry covered average salary of male employees by size of enterprise) (1)

SAMPLE	POOLING	M.I.	E.M.I.	GROUP L	GROUP M	GROUP H
Constant	0.784	1.52	0.751	2.11	-0.787	0.394
Log(sales)	0.078[b]	0.079[c]	0.081	-0.027	0.204[a]	0.096
	(2.28)	(1.69)	(1.60)	(-.49)	(3.28)	(1.63)
Poor management	-0.035	6.99E-03	-0.082[b]	-0.036	-0.053	0.046
performance in t-1	(-1.46)	(.215)	(-2.38)	(-.985)	(-1.35)	(1.10)
Number of observations	690	362	328	225	232	233
Adjusted R-square	0.756	0.741	0.757	0.763	0.816	0.748
F-statistic	26.7	23.9	27.2	19.1	24.3	17.8

T-statistics are in parentheses. Firm dummy and time dummy are controlled in all regressions.

[a]Statistic significance at 1% level

[b]Statistic significance at 5% level

[c]Statistic significance at 10% level

Table 3.1.2D

OLS regression for log(salary per director)

-log(industry covered average salary of male employees by size of enterprise) (2)

SAMPLE	POOLING	M.I.	E.M.I.	GROUP L	GROUP M	GROUP H
Constant	-0.824	-0.167	-0.48	-0.413	-0.966	-0.828
Log(male employees'	0.452[a]	0.503[a]	0.391[a]	0.389[a]	0.47[a]	0.489[a]
number /directors' number)	(12.4)	(10.5)	(7.05)	(5.68)	(4.87)	(7.35)
Poor management	-0.04[c]	-1.63E-03	-0.084[c]	-0.022	-0.062[c]	0.037
performance in t-1	(-1.93)	(-.060)	(-2.71)	(-.66)	(-1.66)	(1.02)
Number of observations	690	362	328	225	232	233
Adjusted R-square	0.804	0.806	0.791	0.798	0.827	0.801
F-statistic	35	34.4	32.8	23.2	26.1	23.7

T-statistics are in parentheses. Firm dummy and time dummy are controlled in all regressions.

[a]Statistic significance at 1% level

[b]Statistic significance at 5% level

[c]Statistic significance at 10% level

Table 3.1.1E

OLS regression for log(salary per director)-log(industry covered average salary of male employees total for all sizes of enterprise) (1)

SAMPLE	POOLING	M.I.	E.M.I.	GROUP L	GROUP M	GROUP H
Constant	0.894	1.31	1.05	2.4	-0.578	0.226
Log(sales)	0.082[b]	0.096[b]	0.068	-0.038	0.2[a]	0.124[b]
	(2.40)	(2.08)	(1.36)	(-.70)	(3.20)	(2.12)
Poor management	-0.035	6.17E-03	-0.081[b]	-0.043	-0.055	0.051
performance in t-1	(-1.48)	(.191)	(-2.36)	(-1.18)	(-1.40)	(1.21)
Number of observations	690	362	328	225	232	233
Adjusted R-square	0.741	0.72	0.759	0.761	0.808	0.709
F-statistic	24.7	21.7	27.3	18.8	23.1	14.8

T-statistics are in parentheses. Firm dummy and time dummy are controlled in all regressions.

[a]Statistic significance at 1% level

[b]Statistic significance at 5% level

[c]Statistic significance at 10% level

Table 3.1.2E

OLS regression for log(salary per director)-log(industry covered average salary of male employees total for all sizes of enterprise) (2)

SAMPLE	POOLING	M.I.	E.M.I.	GROUP L	GROUP M	GROUP H
Constant	-0.743	-0.328	-0.318	-0.227	-0.807	-0.953
Log(male employees'	0.466[a]	0.529[a]	0.39[a]	0.384[a]	0.47[a]	0.548[a]
number /directors'	(12.9)	(11.4)	(7.03)	(5.54)	(4.85)	(8.57)
number)						
Poor management	-0.04[b]	-5.30E-03	-0.082[a]	-0.028	-0.063[c]	0.037
performance in t-1	(-1.99)	(-.200)	(-2.63)	(-.842)	(-1.69)	(1.06)
Number of observations	690	362	328	225	232	233
Adjusted R-square	0.795	0.799	0.793	0.794	0.82	0.785
F-statistic	33.2	32.8	33	22.6	25	21.7

T-statistics are in parentheses. Firm dummy and time dummy are controlled in all regressions.

[a]Statistic significance at 1% level

[b]Statistic significance at 5% level

[c]Statistic significance at 10% level

Table 3.2A

OLS regression for average salary of male employees by firm (A)

SAMPLE	POOLING	M.I.	E.M.I.	GROUP L	GROUP M	GROUP H
Constant	-9.38E-05	-1.25E-03	3.20E-04	3.40E-04	9.16E-05	-1.03E-03
Poor management	-2.12E-05	5.51E-05	-1.11E-04[a]	4.28E-05	-4.03E-05	-2.29E-05
performance in t-1	(-.908)	(1.60)	(-3.84)	(1.27)	(-1.06)	(-.474)
Average career of male	2.61E-05[b]	-4.18E-05[c]	5.75E-05[a]	1.10E-05	7.30E-05[a]	-4.60E-05
employees of firm -average career						
of male employees						
in the corresponding sample	(2.06)	(-1.72)	(4:05)	(.591)	(3.69)	(-1.42)
used in the Wage Census						
Average age of male employees	4.01E-05[a]	8.47E-05[a]	2.41E-05[b]	3.61E-05[b]	1.52E-05	9.58E-05[a]
of firm -average						
age of male employees in the	(3.61)	(3.73)	(2.18)	(2.13)	(1.05)	(3.14)
corresponding sample used in the						
Wage Census						
Average salary male employees	1.23[a]	1.45[a]	1.08[a]	1.07[a]	1.16[a]	1.44[a]
for all sizes						
of enterprise by industry	(30.4)	(21.5)	(23.4)	(20.2)	(17.0)	(15.4)
Number of observations	690	362	328	225	232	233
Adjusted R-square	0.835	0.845	0.839	0.856	0.858	0.846
F-statistic	42	49.2	42.7	37.2	31.3	30.6

T-statistics are in parentheses. Firm dummy and time dummy are controlled in all regressions.

[a]Statistic significance at 1% level

[b]Statistic significance at 5% level

[c]Statistic significance at 10% level

Table 3.2B

OLS regression for average salary of male employees by firm (B)

SAMPLE	POOLING	M.I.	E.M.I.	GROUP L	GROUP M	GROUP H
Constant	4.61E-05	-5.13E-04	4.24E-04	4.66E-04	3.02E-04	-4.74E-04
Poor management	-2.55E-05	4.13E-05	-1.09E-04[a]	4.87E-05	-5.23E-05	-3.79E-05
performance in t-1	(-1.10)	(1.19)	(-3.77)	(1.49)	(-1.32)	(-.807)
Average career of male	4.55E-05[a]	4.68E-05[b]	4.92E-05[a]	1.48E-05	7.52E-05[a]	3.36E-05[c]
employees of firm -average						
career of male employees						
in the corresponding	(4.54)	(2.85)	(3.51)	(.857)	(4.15)	(1.71)
sample used in the Wage						
Census						
Average age of male	2.60E-05[b]	2.46E-05	2.26E-05[b]	2.39E-05	5.14E-06	5.58E-05[b]
employees of firm -average						
age of male employees in	(2.46)	(1.19)	(2.04)	(1.42)	(.347)	(2.10)
the corresponding sample						
used in the Wage Census						
Average salary male	1.1	1.17[a]	0.983[a]	0.938[a]	1.03[a]	1.21[a]
employees by industry,						
size of enterprise	(35.4)	(26.1)	(23.1)	(22.6)	(18.6)	(18.0)
Number of observations	690	362	328	225	232	233
Adjusted R-square	0.836	0.841	0.837	0.864	0.846	0.85
F-statistic	42.4	41.7	41.9	34.9	28.6	31.6

T-statistics are in parentheses. Firm dummy and time dummy are controlled in all regressions.

[a]Statistic significance at 1% level

[b]Statistic significance at 5% level

[c]Statistic significance at 10% level

Table 3.2C

OLS regression for average salary of male employees by firm (C)

SAMPLE	POOLING	M.I.	E.M.I.	GROUP L	GROUP M	GROUP H
Constant	-4.12E-05	-1.34E-03	4.48E-04	4.39E-04	7.22E-05	-6.72E-04
Poor management	-1.31E-05	6.72E-05[c]	-1.06E-04[a]	4.46E-05	-3.68E-05	6.72E-06
performance in t-1	(-.561)	(1.91)	(-3.76)	(1.31)	(-.945)	(.137)
Average career of male employees of firm -average career of male employees in the corresponding sample used in the Wage Census	3.55E-05[a]	-2.96E-07	5.35E-05[a]	2.01E-05	7.36E-05[a]	4.24E-07
	(2.71)	(-.011)	(3.82)	(1.05)	(3.45)	(.013)
Average age of male employees of firm -average age of male employees in the corresponding sample used in the Wage Census	2.57E-05[b]	3.72E-05	2.37E-05[b]	1.71E-05	1.38E-05	4.33E-05
	(2.22)	(1.41)	(2.19)	(.969)	(.917)	(1.27)
Industry covered average wage male employees for all sizes of enterprise	1.24[a]	1.44[a]	1.07[a]	1.05[a]	1.18[a]	1.43[a]
	(33.5)	(23.9)	(25.2)	(21.1)	(17.9)	(17.0)
Number of observations	690	362	328	225	232	233
Adjusted R-square	0.833	0.838	0.848	0.854	0.85	0.843
F-statistic	41.5	40.7	45.8	32.2	29.6	29.9

T-statistics are in parentheses. Firm dummy and time dummy are controlled in all regressions.

[a]Statistic significance at 1% level

[b]Statistic significance at 5% level

[c]Statistic significance at 10% level

Table 3.2D

OLS regression for average salary of male employees by firm (D)

SAMPLE	POOLING	M.I.	E.M.I.	GROUP L	GROUP M	GROUP H
Constant	-5.56E-05	-1.00E-03	4.07E-04	3.65E-04	2.39E-04	-4.42E-04
Poor management	-1.47E-05	5.87E-05	-0.000101[a]	6.39E-05[c]	-3.66E-05	-1.76E-05
performance in t-1	(-.617)	(1.61)	(-3.58)	(1.87)	(-.882)	(-.362)
Average career of male employees of firm -average career of male employees in the corresponding sample used in the Wage Census	7.05E-05[a]	9.27E-05[a]	4.46E-05[a]	2.41E-05	7.89E-05[a]	9.50E-05[a]
	(7.57)	(6.55)	(3.26)	(1.44)	(4.34)	(5.59)
Average age of male employees of firm -average age of male employees in the corresponding sample used in the Wage Census	9.57E-06	-2.44E-05	2.62E-05[b]	1.52E-05	1.05E-05	-7.21E-06
	(.900)	(-1.1)	(2.42)	(.918)	(.687)	(-.25)
Industry covered average wage male employees by size of enterprise	1.1[a]	1.24[a]	0.969[a]	0.941[a]	1.03[a]	1.25[a]
	(33.1)	(23.3)	(24.8)	(20.8)	(16.6)	(17.5)
Number of observations	690	362	328	225	232	233
Adjusted R-square	0.825	0.825	0.844	0.851	0.83	0.843
F-statistic	39.2	37.3	44	31.6	25.5	30

T-statistics are in parentheses. Firm dummy and time dummy are controlled in all regressions.

[a]Statistic significance at 1% level

[b]Statistic significance at 5% level

[c]Statistic significance at 10% level

The results of regression according Heckman's two-stage method

Table 3.30

First stage: PROBIT REGRESSION FOR DIRECTOR'S BONUS PAYMENT

SAMPLE	POOLING	M.I.	E.M.I.	GROUP L	GROUP M	GROUP H
C	-1.14	-1.33	-0.862	-1.93	-1.43	-0.485
Poor management	-1.28[a]	-1.33[a]	-1.47[a]	-0.603	-1.40[a]	-1.56[a]
performance in t	(0.278)	(0.404)	(0.447)	(0.649)	(0.423)	(0.494)
Dividend per share	0.439[a]	0.420[a]	0.474[a]	0.602[a]	0.497[a]	0.282[b]
	(0.0836)	(0.117)	(0.124)	(0.191)	(0.160)	(0.126)
Change of dividend per	0.201[a]	0.354[a]	-0.0796	0.144	0.158	0.259[a]
share from year t-1 to t	(0.0771)	(0.110)	(0.121)	(0.202)	(0.121)	(0.120)
Retained net income	0.021[a]	0.0421[b]	0.0139	0.0336	0.0218[b]	0.0399
per share	(7.91E-03)	(0.0176)	(0.0105)	(0.0293)	(9.93E-03)	(0.0266)
Number of observations	690[540]	362[265]	328[275]	225[189]	232[185]	233[166]
R-square	0.765	0.764	0.802	0.841	0.738	0.758

Numbers of positive observations are in square brackets. Standard errors are in parentheses.

[a]Statistic significance at 1% level

[b]Statistic significance at 5% level

[c]Statistic significance at 10% level

Table 3.3A Second stage: OLS regression according Heckman's two-stage method for bonus per director (A)

SAMPLE	POOLING	M.I.	E.M.I.	GROUP L	GROUP M	GROUP H
Constant	5.81	5.38	6.05	8.01	1.72	-0.302
Poor management	1.13[c]	1.37	-0.156	-0.766	1.54	1.38[c]
performance in t	(1.78)	(1.19)	(-0.225)	(-1.18)	(1.49)	(1.9)
Pre-tax Income	1.03[a]	0.752[a]	1.12[a]	2.05[a]	0.876[a]	0.644[a]
per male employee	(10.9)	(6.79)	(8.57)	(6.78)	(5.27)	(5.88)
Number of male employees	0.00491[a]	0.021[a]	3.33E-03[a]	3.76E-03[a]	0.022[a]	0.039[a]
/number of directors	(4.71)	(7.44)	(3.68)	(3.89)	(4.3)	(4.82)
Pre-tax Income per male	-83.8[a]	-44.5[a]	-99.1[a]	-426[a]	-89.1[a]	-37.9[a]
employee×directors'						
number						
/ male employees' number	(-7.21)	(-3.82)	(-7.94)	(-4.15)	(-3.07)	(-3.48)
Reverse Mill's ratios	-2.53[a]	-1.99[b]	-1.75[c]	-0.755	-3.23[b]	-2.36[a]
	(-3.71)	(-2.57)	(-1.86)	(-0.677)	(-2.14)	(-4.24)
Number of observations	540	265	275	189	185	166
Adjusted R-square	0.886	0.883	0.873	0.783	0.889	0.937
F-statistic	44.1	45.4	48.2	18.7	33.6	63.4

Two stage OLS regression in the second stage according to Heckman's two-stage method. Reverse Mill's ratios are estimated by using probit model shown in Table 3.30. T-statistics shown in parentheses are heteroskedastic-consistent estimates according to White(1980). Firm dummy and time dummy are controlled in all regressions.

[a]Statistic significance at 1% level

[b]Statistic significance at 5% level

[c]Statistic significance at 10% level

Table 3.3B Second stage: OLS regression according Heckman's two-stage method for bonus per director (B)

SAMPLE	POOLING	M.I.	E.M.I.	GROUP L	GROUP M	GROUP H
Constant	7.02	7.79	7.06	9.73	3.57	1.82
Poor management	1.11[c]	1.75[c]	-0.271	-0.956[c]	1.74[c]	0.999
performance in t	(1.78)	(1.72)	(-0.409)	(-1.74)	(1.74)	(1.39)
Pre-tax Income	1.03[a]	0.914[a]	1.09[a]	2.06[a]	1.24[a]	0.906[a]
per male employee	(10.6)	(6.71)	(8.15)	(6.69)	(7.11)	(6.29)
Number of male	0.0000453	7.15E-04	9.01E-07	9.00E-05	1.13E-03[b]	1.61E-03
employees	(0.289)	(1.21)	(5.94E-03)	(0.63)	(2.1)	(0.855)
Pre-tax Income per male	-86.3[a]	-66.4[a]	-98.7[a]	-475[a]	-157[a]	-63.7[a]
employee×directors'						
number / male employees'	(-7.11)	(-3.86)	(-7.85)	(-4.53)	(-5.18)	(-4.14)
number						
Reverse Mill's ratios	-2.48[a]	-2.18[a]	-1.62[c]	-0.632	-3.16[b]	-1.8[a]
	(-3.81)	(-2.94)	(-1.83)	(-0.688)	(-2.4)	(-2.76)
Number of observations	540	265	275	189	185	166
Adjusted R-square	0.877	0.849	0.864	0.763	0.878	0.926
F-statistic	40.4	34.1	44.5	17	30.5	54

Two stage OLS regression in the second stage according to Heckman's two-stage method. Reverse Mill's ratios are estimated by using probit model shown in Table 3.30. T-statistics shown in parentheses are heteroskedastic-consistent estimates according to White(1980). Firm dummy and time dummy are controlled in all regressions.

[a]Statistic significance at 1% level

[b]Statistic significance at 5% level

[c]Statistic significance at 10% level

Table 3.3C Second stage: OLS regression according Heckman's two-stage method for bonus per director (C)

SAMPLE	POOLING	M.I.	E.M.I.	GROUP L	GROUP M	GROUP H
Constant	7.16	8.22	7.08	10.1	3.79	3.47
Poor management	1.13[c]	1.75[c]	-0.254	-0.871	1.55[c]	0.839
performance in t	(1.8)	(1.71)	(-0.38)	(-1.49)	(1.66)	(1.16)
Pre-tax Income	1.03[a]	0.917[a]	1.1[a]	2.1[a]	1.07[a]	0.944[a]
per male employee	(10.2)	(6.58)	(7.56)	(6.4)	(5.96)	(5.34)
Sales	-2.37E-07	2.26E-06	-2.92E-07	-1.03E-06[c]	2.46E-05[a]	1.79E-06
	(-0.53)	(0.396)	(-0.644)	(-1.94)	(4.87)	(0.147)
Pre-tax Income per male	-86.6[a]	-67.4[a]	-99.4[a]	-485[a]	-142[a]	-67.3[a]
employee×directors'						
number / male employees'	(-6.97)	(-3.87)	(-7.4)	(-4.71)	(-4.44)	(-4.01)
number						
Reverse Mill's ratios	-2.51[a]	-2.17[a]	-1.65[c]	-0.852	-2.75[b]	-1.67[b]
	(-3.83)	(-2.9)	(-1.85)	(-0.861)	(-2.22)	(-2.48)
Number of observations	540	265	275	189	185	166
Adjusted R-square	0.877	0.848	0.864	0.766	0.887	0.925
F-statistic	40.4	33.7	44.5	17.2	33	53.6

Two stage OLS regression in the second stage according to Heckman's two-stage method. Reverse Mill's ratios are estimated by using probit model shown in Table 3.30. T-statistics shown in parentheses are heteroskedastic-consistent estimates according to White(1980). Firm dummy and time dummy are controlled in all regressions.

[a]Statistic significance at 1% level

[b]Statistic significance at 5% level

[c]Statistic significance at 10% level

Table 3.3D Second stage: OLS regression according Heckman's two-stage method for bonus per director (D)

(POOLING)

Constant	6.33[a]	7.71[a]	7.42[a]
	(6.45)	(4.47)	(4.15)
Poor management	0.756	0.734	0.729
performance in t	(1.23)	(1.19)	(1.19)
Pre-tax income	0.905[a]	0.922[a]	0.9[a]
per male employee	(8.53)	(9.52)	(8.44)
Sales per male employee	7.79E-03		8.92E-03
	(.500)		(.566)
Average salary of male		-2.18E-03	-2.40E-03
employee by firm		(-.64)	(-.70)
Number of male employees	5.50E-03[a]	5.44E-03[a]	5.49E-03[a]
/number of directors	(5.14)	(5.20)	(5.13)
Pre-tax income per male employee	-75.5[a]	-74.8[a]	-74.8[a]
*Number of directors /number of male	(-6.77)	(-6.70)	(-6.67)
employees			
Reverse Mill's ratios	-1.73[a]	-1.72[a]	-1.7[a]
	(-2.84)	(-2.79)	(-2.79)
Adjusted R-square	0.872	0.872	0.872
F-statictics	41.7	41.7	41.2
Number of observations	540	540	540

Two stage OLS regression in the second stage according to Heckman's two-stage method. Reverse Mill's ratios are estimated by using probit model shown in Table 3.30. T-statistics shown in parentheses are heteroskedastic-consistent estimates according to White(1980). Firm dummy and time dummy are controlled in all regressions.

[a] Statistic significance at 1% level

[b] Statistic significance at 5% level

[c] Statistic significance at 10% level

Table 3.3E Second stage: OLS regression according Heckman's two-stage method for bonus per director (E)

(M.I.)

Constant	5.44[a]	4.12[b]	3.51[b]
	(7.80)	(2.51)	(2.13)
Poor management	1.01	1.11	1.08
performance in t	(1.04)	(1.08)	(1.10)
Pre-tax income	0.51[a]	0.561[a]	0.512[a]
per male employee	(4.19)	(4.98)	(4.29)
Sales per male employee	0.038[c]		0.036[c]
	(1.89)		(1.87)
Average salary of male		5.70E-03	5.29E-03
employee by firm		(1.37)	(1.28)
Number of male employees	0.023[a]	0.022[a]	0.023[a]
/number of directors	(8.94)	(8.97)	(8.97)
Pre-tax income per male employee	-35.1[a]	-33.1[a]	-36[a]
*Number of directors /number of male employees	(-3.04)	(-2.91)	(-3.21)
Reverse Mill's ratios	-1.05	-1.25[c]	-1.18[c]
	(-1.50)	(-1.67)	(-1.65)
Adjusted R-square	0.894	0.893	0.894
F-statictics	42.1	41.8	41.4
Number of observations	265	265	265

Two stage OLS regression in the second stage according to Heckman's two-stage method. Reverse Mill's ratios are estimated by using probit model shown in Table 3.30. T-statistics shown in parentheses are heteroskedastic-consistent estimates according to White(1980). Firm dummy and time dummy are controlled in all regressions.

[a] Statistic significance at 1% level

[b] Statistic significance at 5% level

[c] Statistic significance at 10% level

Table 3.3F Second stage: OLS regression according Heckman's two-stage method for bonus per director (F)

(E.M.I.)

Constant	7.4[a]	13.3[a]	13.3[a]
	(6.38)	(5.85)	(5.85)
Poor management	-0.407	-0.413	-0.414
performance in t	(-.67)	(-.64)	(-.64)
Pre-tax income	1.14[a]	1.05[a]	1.07[a]
per male employee	(7.13)	(7.24)	(6.42)
Sales per male employee	-0.017		-3.80E-03
	(-.82)		(-.17)
Average salary of male		-0.014[a]	-0.014[a]
employee by firm		(-3.0)	(-3.0)
Number of male employees	-0.014[a]	-0.014[a]	-0.014[a]
/number of directors	(-3.0)	(-3.0)	(-3.0)
Pre-tax income per male employee	-93.0[a]	-86.9[a]	-87.3[a]
*Number of directors /number of male	(-6.30)	(-6.16)	(-6.16)
employees			
Reverse Mill's ratios	-1.18	-1.35	-1.35
	(-1.49)	(-1.63)	(-1.63)
Adjusted R-square	0.874	0.877	0.877
F-statictics	39.9	40.1	40
Number of observations	275	275	275

Two stage OLS regression in the second stage according to Heckman's two-stage method. Reverse Mill's ratios are estimated by using probit model shown in Table 3.30. T-statistics shown in parentheses are heteroskedastic-consistent estimates according to White(1980). Firm dummy and time dummy are controlled in all regressions.

[a] Statistic significance at 1% level

[b] Statistic significance at 5% level

[c] Statistic significance at 10% level

Table 3.3G Second stage: OLS regression according Heckman's two-stage method for bonus per director (G)

(Group L)

Constant	11.4[a]	16.7[a]	17.3[a]
	(5.12)	(3.17)	(3.29)
Poor management	-1.02	-1.07[c]	-1.09[c]
performance in t	(-1.6)	(-1.8)	(-1.7)
Pre-tax income	2.05[a]	1.94[a]	2.06[a]
per male employee	(6.24)	(6.24)	(6.29)
Sales per male employee	-0.041		-0.037
	(-1.5)		(-1.3)
Average salary of male		-0.015	-0.014
employee by firm		(-1.4)	(-1.2)
Number of male employees	4.28E-03[a]	4.18E-03[a]	4.10E-03[a]
/number of directors	(4.35)	(4.10)	(4.13)
Pre-tax income per male employee	-420[a]	-428[a]	-422[a]
*Number of directors /number of male	(-4.41)	(-4.50)	(-4.44)
employees			
Reverse Mill's ratios	-0.163	-0.141	-0.168
	(-.185)	(-.172)	(-.200)
Adjusted R-square	0.789	0.789	0.789
F-statictics	15.9	15.9	15.7
Number of observations	189	189	189

Two stage OLS regression in the second stage according to Heckman's two-stage method. Reverse Mill's ratios are estimated by using probit model shown in Table 3.30. T-statistics shown in parentheses are heteroskedastic-consistent estimates according to White(1980). Firm dummy and time dummy are controlled in all regressions.

[a] Statistic significance at 1% level

[b] Statistic significance at 5% level

[c] Statistic significance at 10% level

Table 3.3H Second stage: OLS regression according Heckman's two-stage method for bonus per director (H)

(Group M))

Constant	0.347	4.3[c]	2.75
	(.223)	(1.67)	(1.08)
Poor management	1.26	1.19	1.21
performance in t	(1.34)	(1.13)	(1.24)
Pre-tax income	0.827[a]	0.797[a]	0.819[a]
per male employee	(5.13)	(5.00)	(5.08)
Sales per male employee	0.069[a]		0.072[a]
	(3.13)		(3.33)
Average salary of male		-2.92E-03	-4.93E-03
employee by firm		(-.67)	(-1.2)
Number of male employees	0.017[a]	0.019[a]	0.016[a]
/number of directors	(3.19)	(3.69)	(3.06)
Pre-tax income per male employee	-122[a]	-83.2[a]	-121[a]
*Number of directors	(-3.73)	(-2.95)	(-3.67)
/number of male employees			
Reverse Mill's ratios	-2.55[c]	-2.62[c]	-2.47
	(-1.73)	(-1.68)	(-1.64)
Adjusted R-square	0.901	0.895	0.901
F-statictics	31.9	30	31.3
Number of observations	185	185	185

Two stage OLS regression in the second stage according to Heckman's two-stage method. Reverse Mill's ratios are estimated by using probit model shown in Table 3.30. T-statistics shown in parentheses are heteroskedastic-consistent estimates according to White(1980). Firm dummy and time dummy are controlled in all regressions.

[a] Statistic significance at 1% level

[b] Statistic significance at 5% level

[c] Statistic significance at 10% level

Table 3.3I Second stage: OLS regression according Heckman's two-stage method for bonus per director (I)

(Group H)

Constant	0.84	-2.37	-1.85
	(.369)	(-.97)	(-.62)
Poor management	1.35[b]	1.47[b]	1.5[b]
performance in t	(2.08)	(2.16)	(2.18)
Pre-tax income	0.563[a]	0.593[a]	0.612[a]
per male employee	(3.88)	(4.41)	(4.14)
Sales per male employee	-3.24E-03		-7.19E-03
	(-.14)		(-.32)
Average salary of male		7.15E-03	7.35E-03
employee by firm		(1.60)	(1.64)
Number of male employees	0.04[a]	0.036[a]	0.036[a]
/number of directors	(5.07)	(4.88)	(4.81)
Pre-tax income per male employee	-31.2[b]	-36.3[a]	-36.6[a]
*Number of directors	(-2.54)	(-2.87)	(-2.86)
/ number of male employees			
Reverse Mill's ratios	-1.94[a]	-2.1[a]	-2.13[a]
	(-3.48)	(-3.66)	(-3.66)
Adjusted R-square	0.938	0.939	0.939
F-statictics	53	54.2	52.7
Number of observations	166	166	166

Two stage OLS regression in the second stage according to Heckman's two-stage method. Reverse Mill's ratios are estimated by using probit model shown in Table 3.30. T-statistics shown in parentheses are heteroskedastic-consistent estimates according to White(1980). Firm dummy and time dummy are controlled in all regressions.

[a] Statistic significance at 1% level

[b] Statistic significance at 5% level

[c] Statistic significance at 10% level