

# Career Concern, Raiders and Disclosure Policy

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## Abstract

Agents has to worry about not only his incentives but also his future career. Employer's performance disclosure policy may cause a trade-off between bonus and career concern incentives. If agents have a chance to have a better match with a future employer in the future, it may induce his career concern incentives more. This paper shows that career concern incentives and bonus have substitutional relationship. For firms, If agents average ability is very low, "close" the performance information is the optimal strategy and otherwise "open" the performance information is the optimal strategy.

## 1 Introduction

My friend who is managing his own business asked me some advises to make his employees work hard. I just followed the typical convention, which is giving incentives, of the principal agent model and suggested giving them bonus depending on their performances. Performance based incentives are very common and popular incentive system in the real world. For example, it is easy to find news article that profitable firms' employees receive profit incentives (PI) in the end of the year or thanks to the stock option, many CEOs earn huge amount of money. However, a few months later, my friend said

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that though he suggested performance based bonus the workers do not work very hard. I had to think about the issue more deeply and realized that agents may have to worry about their future careers which is called career concerns. Chevalier et al (1999) show an evidence of career concerns using fund manager data. She show that young fund managers' portfolios are more conservative than senior fund managers'. In particular, highly advanced professions such as financial or information technology(IT) industry face strong career concern incentives, since a very productive engineer or fund manager can make huge output and they may get a better job offer from outside of the firm. If an agent cares about his future career, he wants to increase his effort level.<sup>1</sup>

In the firm's point of view, since losing a high performed manager brings bad effects to the firm value ?. Moreover, since the potential employer may have disadvantages of accessing manager's productivity information, the current employer may have an incentive to intervene for observability of manager's performance. However if the current firm closes the manager's productivity information, the manager loses incentive to work hard. Those two properties brings a trade-off?. We can think many kinds of sources for collecting manager's ability. Waldman(1990) says a promotion can be a good signal for others who want to hire a manager. Even though outsiders cannot explicitly see his performance or position, just knowing agent's comparative productivity among peer group can be a useful signal for outsiders?.

We also can think about the same agent's different productivity depending on employers, there is an old wisdom "*You have been faithful with a few things, I will put you in charge of many things*"<sup>2</sup>. Based on the quote, we may assume that successful agents may have a chance to move bigger firms and perform even better productivity than before. For example, if a firm hires an intern and give small and easy task, based on his performance the firm or the other firm evaluates his ability and may give more important project. In this case, we can assume different productivity depending on firms. Rosen(1982) also argues that the higher ability manager will control the the

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<sup>1</sup>I will follow the convention that he is the agent and she is the principal

<sup>2</sup>In the Bible, Mattew chapter 25

bigger assets. Lazear (1984) carefully elaborates ability asymmetry case and argued that high performed manager always have a chance to get job offer from out side of the firm.

In this paper, I study the role of disclosure policy with asymmetric productivity depending on current and potential employers. There are three main issues. First, different productivity causes different wage level and depending the degree of productive difference<sup>3</sup> firm's behavior can be changed. Second, I think about the relationship between bonus and moving another firm. Third, I analyze the optimal disclosure policy given productivity difference.

I consider a two period lived principal ("firm"). The firm and agent makes a contract in the beginning of the first period. In the first period, the agent and firm generate a project and the probability of success is fully depending on agent's ability (not by effort). However, nobody knows agent's ability. Though agent cannot control his ability, he can predict the projects viability by putting forward efforts before implementing the project and he can send a signal to the firm. After the first period, the project's quality will be revealed "high" or "low" and both player may have the second stage contract. Just be for the second period, the agent ("manager") can be raided from the outside of the firm ("raiders"). The raiders observe the agent's performance during the first period and bid agent's wage. Since the current and potential employer have different firm size and equipment agent's productivity could be different depending on his employer. After raiders' bidding, the firm can bid counter offer. The agent accepts higher offer and work for higher offered firm in the second period. I assume that firm can use two kinds of incentives. First, the firm can provide bonus based on agent's performance. Second, Firm can use the career concern incentives by controlling their information disclosure policy.

This article brings two main results. Firstly, if the productivity in the raiders' institution is higher than current firm, the agent has incentive to put forward more effort. However, if the productivity difference is higher than critical level, the agent does not

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<sup>3</sup>In this paper I will call the differences "matching component"

have an incentive work hard. Secondly, I also find a substitutional relationship between career concerns and bonus.

*Related literature* This paper attempts to combine two issues which are career concern incentives and asymmetric productivity depending on firms.

Several authors have studied about career concern incentive mechanism. The origin of career concern discussions back to Fama(1980) and Holmstrom(1982). They assume symmetric information and productivity between the current employer (firm) and potential future employers (raiders). In contrast, in this paper, I assume that information and productivity asymmetry. By assuming information asymmetry, I could analyze the relationship between career concerns and firm and agent's behavior. Waldman(1990) discussed about career concerns and signaling. Though Waldman discusses about only internal firm promotion, in this article, I think about the matching with outside of the firm. By doing so, I can extract some properties. Milbourn et al (2001) discussed about career concern with two period model set up. They show the existence of the optimal effort level. however they do not mention about different productivity or matching depending on employers.

The origin of the asymmetric productivity starts from Lazear (1984). Lazear assumes that if a worker moves to another firm, his productivity may increase. On the other hand, I assume two more things that when the worker moves to another firm his productivity always increase and firm's disclosure policy is decided endogenously.

The organization of this article is as follows. In section 2, I present a model that captures the trade off and bidding strategy. Section 3 provides some preliminary results for the further analysis. Section 4 shows relationships between career concerns and effort level. Section 5 presents conclusions.

## 2 The Model

**PLAYERS.** There is a two period lived firm(F). The firm hires a manager who lives two periods. In the first period, the agent works for F and he may get other offers from the outside of the firm in the second period. There are two identical raiding companies,  $R_1$  and  $R_2$ , which bid competitively to hire agent (A). After observing raiders' offers, the firm can suggest a counteroffer. The agent works for a employer who offered the highest offer. All players are risk neutral.

**TECHNOLOGY.** I follow Milbourn et al's (2001) set up in this paper. In the first period, F hires an agent(A) who generates and evaluates a new project. The quality (q) of the project is high (h) or low (l) which is revealed after the project is implemented. The quality of the project will be decided by manager's ability  $a \in [0, 1]$  which is exogenously given and unknown for all players (firm, raiders and even agent). The average of ability follows unknown distribution with mean  $\mu$  and variance  $\sigma^2$ . The probability of generating the high project is  $\Pr[q = h|a] = E[a] = \mu$  which is an unconditional expectation for the agent's ability.

F evaluates the project's viability before it is implemented. The firm and the agent evaluate the project's viability by a signal  $s \in (s_h, s_l)$  which is observed by the firm and agent. The Agent's job consists of two parts. In the first part, he predict the project's viability with effort level  $e$ . The agent can predict project's viability more accurately by putting forth efforts.  $e \in [1/2, 1]$ . The effort level is only observed by the agent. In the second part, the agent implements the project with success probability of  $\mu$ .

$$\Pr[s = s_h|q = h] = \Pr[s = s_l|q = l] = e$$

When the signal is larger then  $1/2$  then it is informative. Though putting forth effort increases the prediction accuracy, it also brings disutility  $c(e)$ . The disutility function satisfies following convex conditions.

Assumption 1.  $c(1/2) = c'(1/2) = 0, c' \geq 0, c'' > 0, c''' > 0$  and  $c'(1) = \infty$

The following table shows the contingencies of the effort and ability.

Signal	Revealing	Probability
High signal	High	$e\mu$
High signal	Low	$(1 - e)(1 - \mu)$
Low signal	High	$(1 - e)\mu$
Low signal	Low	$e(1 - \mu)$

After observing the signal, the firm decides its investment (i). A high project makes profit ( $q = h > i$ ) and a low project makes net loss ( $q = l > i$ ). The expected profit  $E[V]$  for the project is 0. In other words  $E[V] = \mu h + (1 - \mu)l - i = 0$  and  $E[V|s = s_h] > 0 > E[V|s = s_l]$ . The firm only invests for the positive signed project.

The manager works on a different task in the second period. The manager's productivity in the second period is decided by the manager's ability and employer. If the agent works for the firm the output will be  $a$ . If the agent, who has an experience implementing a project, works for one of raiders, the experience will increase his ability and output will be  $a+m$ . ( $m > 0$ )<sup>4</sup>. However, even though the agent changes his employer in the second period, if the agent does not have an implementing experience, his output will be  $a$  in the second period. Because of the training issues, the agent cannot work for raiders directly. Since the agent's output in the second period does not depend on the agent's effort, there is no moral hazard problem in the second period. (*We can think about certain threshold level of  $m$  which disappears the winner's curse.*)

**INCENTIVE MECHANISMS.** I assume that the firm can use two kinds of incentive schemes. First, after the first period, the firm can provide bonus  $B$  for the high project. Second, the firm can use the manager's career concerns for the next period.

**DISCLOSURE POLICY.** The firm can decide its manager's performance disclosure policy. If the firm chooses "open" the manager's performance information, raiders

<sup>4</sup> $m$  is called matching component in the other literatures

will have the same information with the firm ( $\omega_F = \omega_R$ , where  $\omega_F$  is the firm's information set,  $\omega_R$  is the raider's information set). Since all the information about the manager's performance will be revealed, the manager has to concern about his career in the next period. If the firm choose "close" the manager's performance information for the first period, the raiders do not have information about manager's productivity but the firm do. In this case, since the potential employers, who are raiders, cannot observe the manager's performance, he should only be concerned the relationship between the firm and agent himself.

**PAYOFF.** Since all players are risk neutral, we just need to know each player's payoff. For Agent, in the first period he can expect basic salary which is lump sum payment  $W$  and bonus payoff when he succeed the project  $u_1^t(e) = \Pr[s = s_h|q = h]B + W - c(e)$ . In the second period, the Agent's payoff will be decided by the raiders and firm's offers.

$$u_2^t = \begin{cases} E[\beta_F(\omega_F, \omega_R)|e^*] & \text{if manager stays with F} \\ E[\beta_R(\omega_F, \omega_R)|e^*] & \text{otherwise} \end{cases} \quad (1)$$

$e^*$  is the raider's belief for manager's expected effort level. In the first period, the firm will get expected payoff  $\pi_1^t(e) = E(V|s = s_h, e) \Pr(s = s_h) - \Pr(s = s_h, q = h)B - W$ . In the second period, firm's payoff will be decided firm's and raider's bids.

$$\pi_2^t = \begin{cases} E_{(\omega_F, \omega_R)} E_a[a - \beta(\omega_F, \omega_R)|(\omega_F, \omega_R), e] & \text{if the manager stays with F} \\ 0 & \text{otherwise} \end{cases} \quad (2)$$

**TIMELINE.** The timing in the game is as follows :

Period 1.0. F offers a contract, which contains basic salary  $W$ , bonus scheme  $B$  and performance disclosure policy, to the agent(A). If the agent accepted the contract, the game goes to the next period. Otherwise the game ends.

Period 1.1. The agent (A) generates a project and evaluates the project with putting forth effort  $e$  and sends a signal  $s \in (s_l, s_h)$ .

Period 1.2. The project is implemented if the signal is high ( $s = s_h$ )

Period 1.3. The project's quality is revealed. The firm pays the salary and bonus.

Raiders observe the performance based on their observability. Period 1 ends.

Period 2.0.  $R_1$  and  $R_2$  offer their bids  $\beta_1$  and  $\beta_2$  to the manager (A).

Period 2.1. After observing raiders' offers, the firm suggests a counter offer  $\beta_F$ .

Period 2.2. The agent chooses his second period employer who offers a higher bid.

Period 2.3. Wages paid, the game ends.

### 3 Basic Results

#### 3.1 Raiders bidding strategy.

The posterior expectations of the manager's ability conditional on each of project are like following.

$$\begin{aligned} E_a(a|\{s_h, h\}, e^*) &= \mu + \frac{\sigma^2}{\mu} \\ E_a(a|\{s_h, l\}, e^*) &= \mu - \frac{\sigma^2}{(1-\mu)} \\ E_a(a|\{s_l\}, e^*) &= \mu - \frac{\sigma^2(2e^*-1)}{(\mu-(2\mu-1)e^*)} \end{aligned}$$

( $e^*$  is the raiders' belief of agent's effort level)

Those results are presented and proved in Milbourn et al 2001. I will use the results for agent's conditional expected ability for the second period in this paper. To simplify the notation, Let

$$w_h = E_a(a|\{s_h, h\}, e^*), \quad \bar{w}(e^*) = \bar{w} = E_a(a|\{s_l\}, e^*), \quad w_l = E_a(a|\{s_h, l\}|e^*)$$

*and*

$$w_l \leq \bar{w}(e^*) \leq E(a) = \mu \leq w_h$$

Since labor market in the second period is competitive, raiders has to bid up to agent's expected productivity. The firm also has to bid up to agent's expected productivity. However the raiders' expectation for the agent's ability is depended on the firm's disclosure policy.

[Closed Information case]      Following tables analyze the "information closed" case. First, let's assume that the agent showed low performance in the first period. The firm (the current employer) will not bid more than the agent's expected productivity which is  $w_l$ . Since raiders cannot see the agent's performance, they have to guess his expected ability objectively. If the raiders bid  $w_l + m$ , the firm cannot provide a better counter offer and a rider win the agent. However, If the raiders bid more than  $w_l + m$ , it will be overbid. Since the raiders want to avoid the overbid. The raiders' dominant strategy is  $w_l + m$ .

$\beta_R$	$\beta_F$	Winner
$w_l + m$	$w_l$	R
$\bar{w}(e^*)$	$w_l$	R(overbid)
$w_h + m$	$w_l$	R(overbid)

Second, let's assume that the agent sent a low signal for the project and did not implement the project in the first period. His expected ability in the second period is  $\bar{w}(e^*)$ . If the riders bid less than  $\bar{w}(e^*)$  the firm can provide slightly the better counter

offer,  $w_l + m + \epsilon^5$ , up to the agent's expected productivity  $\bar{w}(e^*)$ . If the raiders bid more than  $\bar{w}(e^*)$  then the firm cannot provide a better counter offer and the raiders win the agent. However, if the raiders bid more than his expected productivity  $\bar{w}(e^*)$  that will be overbidding. So the raiders' dominant strategies are  $w_l + m$  and  $\bar{w}(e^*)$

$\beta_R$	$\beta_F$	Winner
$w_l + m$	$w_l + m + \epsilon$	F
$\bar{w}(e^*)$	$\bar{w}(e^*)$	F
$w_h + m$	$\bar{w}(e^*)$	R(overbid)

Third, let's assume that the agent performed a high project in the first period. If the raiders offer less than  $w_h$  the firm can provide slightly the better counter offer than raiders' bid and win the agent until the raiders' bid reach the  $w_h$ . However, if raiders bid more than  $w_h$  the firm cannot provide a better counter offer and the raiders win the agent. Since the raiders have to compete each other, they have to bid up to the agent's expected productivity which is  $w_h + m$

$\beta_R$	$\beta_F$	Winner
$w_l + m$	$w_h + m + \epsilon$	F
$\bar{w}(e^*)$	$\bar{w}(e^*) + \epsilon$	F
$w_h + m$	$w_h$	R

In sum, because of the winners curse (or overbidding) problem, the raiders' dominate strategy is  $w_l + m$ . If experience factor (or matching factor)  $m$  is large enough to overcome the agent's low ability, the winner's curse could disappear. I present the raider's closed case bidding function in the following way.

$$\beta_{R1} = \beta_{R2} = w_l + m$$

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<sup>5</sup>  $\epsilon$  is a very small number

[Open information case] Since raiders can have perfect information, raiders' bid will be the same as the manager's expected ability

$$\beta_{R1} = \beta_{R2} = \begin{cases} E[a|\omega_R] + m & \text{if the agents has an experience} \\ \bar{w}(e^*) & \text{otherwise} \end{cases}$$

### 3.2 Career concern based incentives

To concentrate the career concern issue, I assume that the firm do not provide any bonus. so agent's payoffs are  $W - c(e)$  for the first period and  $E[a|\omega_R] + m$  or  $\bar{w}(e^*)$  for the second period. (Recall,  $e^*$  is the raiders' belief of agents' effort level)

$$\max_e U(e) = W - c(e) + \mu e(w_h + m) + (1 - e)(1 - \mu)(w_b + m) + (\mu(1 - e) + (1 - \mu)e)\bar{w}(e^*) \quad (3)$$

The first order condition of the maximization problem is

$$\mu((w_g + m) - \bar{w}(e^*)) + (1 - \mu)(\bar{w}(e^*) - (w_b + m)) = c(e^*) \quad (4)$$

The above equation provides understanding of career concerns. If the agent puts more effort, it ensures that a good project is identified and implemented with high probability. So the agent's expected payoff increase from  $\bar{w}$  to  $w_b + m$ . On the other hand, if the project is bad, the agent can identify the bad project and increase his payoff from  $w_b + m$  to  $\bar{w}$ . Since when the agent put high effort which brings more accurate evaluation and

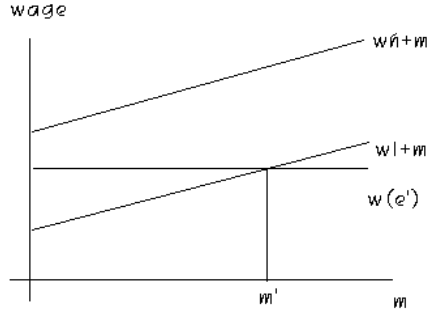


Figure 1: The relationship between wage and career concerns

helps the agent to reveal his true ability when he has a high ability and hide his low ability when he has a low ability. so we can think about the relationship between effort level and  $m$ .

when the  $m$  is larger than  $m'$ , since the implementing experience brings additional payoff in the second period, the agent does not have any incentive to put effort to evaluate the project. Plugging in the expressions for  $w_h, w_l, \bar{w}(e^*)$  and simplifying the equation we can obtain like following.

$$\kappa(e^*, m) = m(2\mu - 1) + \frac{\sigma^2}{\mu - (2\mu - 1)e^*} = c'(e) \quad (5)$$

We can break down the  $\kappa(e^*, m)$  into two parts. The first part of the left hand side,  $m(2\mu - 1)$ , is the expected gains from experiencing a project and the second part,  $\frac{\sigma^2}{\mu - (2\mu - 1)e^*}$ , marginal benefit of effort because of career concerns. The  $c'(e)$  is the marginal cost for exerting effort today. we can obtain following properties from the equa-

tion (5)

$$\begin{aligned}
 \text{a) } \frac{d}{de^*} \kappa(e^*, m) &> 0 \text{ and } \frac{d\kappa(e^*, m)}{dm} > 0 \text{ if } \mu > 1/2 \\
 \text{b) } \frac{d}{de^*} \kappa(e^*, m) &< 0 \text{ and } \frac{d\kappa(e^*, m)}{dm} < 0 \text{ if } \mu < 1/2
 \end{aligned}$$

**Proposition 1** *If the project is more likely to succeed i) the raiders high expected effort level induce the agents expected career concern benefits. ii) The higher experience premium (or matching component) increase the agents expected career concern benefits. otherwise vice versa.*

In terms of  $\kappa'(e^*, m)$ , if the project is more likely to succeed ( $\mu > 1/2$ ), the agent's benefit of effort due to career concerns increase given raiders' belief about the agent's effort ( $e^*$ ) the other case is vice versa. In terms of  $\frac{d\kappa(e^*, m)}{dm}$  if the project is more likely to succeed ( $\mu > 1/2$ ) then the agent's effort brings more benefits. On the other hand, if the project is less likely to succeed ( $\mu < 1/2$ ) then as the  $m$  increases the agent's incentive of putting effort will decrease. Intuitively, if the project has high chance to succeed, an accurate prediction make better chance to have  $w_h + m$  instead of  $\bar{w}(e^*)$ . If the project has low chance to succeed and the experience premium ( $m$ ) is high, since the different between  $w_l + m$  and  $\bar{w}(e^*)$  is very small or even could be negative, an accurate prediction does not bring large benefits. So proposition 1 provide the consistent implications with figure 1.

In equilibrium, the raiders have correct beliefs about the agent's effort level,  $e = e^*$ . then

$$\kappa(e, m) = c(e) \tag{6}$$

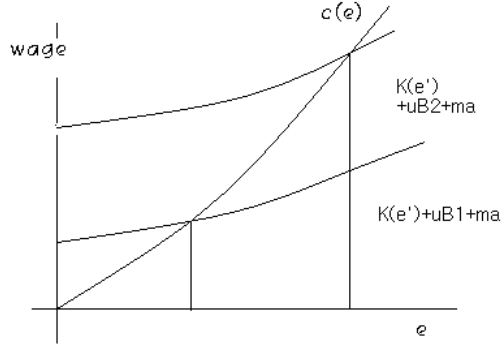


Figure 2: The relationship between effort, bonus and career concerns

Assumption 1 ensure that the solution always exists.

#### 4 The relationship between incentives and experience premium. |

the firm can provide bonus as well as career concern incentives. In this case the agent's problem can be written as

$$\max_e U(e) = u_1(e) + u_2(e) = \mu e B + W - c(e) + E[a|\omega_R]$$

The first order condition of the problem is

$$\kappa(e^*, m) = \underbrace{\mu B}_{\text{marginal benefit (MB) from bonus}} + \underbrace{m(2\mu - 1)}_{\text{MB from matching}} + \underbrace{\frac{\sigma^2}{\mu - (2\mu - 1)e^*}}_{\text{MB from Career Concern}} = c'(e) \quad (7)$$

equation (7) provides the relationship between incentives and  $m$  value. Figure 2 shows the relationship

When the  $m$  goes up, the agent has incentives to put forth more efforts. Figure 2 shows that the  $m$  and  $e$  have a complimentary relationship.

## 5 Optimal disclosure policy

### 5.1 Optimal Bonus level

■ **Optimal contract when the firm close the information.** As we discussed previous section before, since raiders cannot observe the agent's performance, their dominant bidding strategy is the lowest bid.  $w_l + m$  and the firm cannot depend on the agent's career concerns. However, the firm still can rely on the bonus. The optimization program for the agent is

$$\max_e U(e) = u_1(e) + u_2(e) = \underbrace{\mu e B + W - c(e)}_{first} + \underbrace{w_l + m}_{second} \quad (8)$$

First order condition is

$$\mu B = c'(e) \quad (9)$$

The optimal effort level have to follow the equation (9).

we can think about the firm's optimal condition with similar logic. In the first period, the firm's expected profit is  $E[V|s_g, e] \Pr(s = s_g) - \mu e B - W$ . In the second period, the agent's expected productivity is  $\mu$ . Since the raider's dominant bidding strategy is the lowest, expected wage in the second period is also  $w_l + m$ . So the expected profit is  $E_{(\omega_F, \omega_R)} E_a[a - \beta_F(\omega_F, \omega_R)] = \mu - (w_l + m)$ . So now, we can set up the optimization program for the firm.

$$\begin{aligned} \max_{W, B, e} \pi(e) &= [E(V|s_g, e) \Pr(s = s_g) - \mu e B - W] + [\mu - (w_l + m)] \\ s.t. &\begin{cases} \mu e B + W - c(e) + w_l + m = \mu & (IR) \\ \mu B = c'(e) & (IC) \end{cases} \end{aligned} \quad (10)$$

Using the IR constraint, we can eliminate W, B and rewrite the equation

$$\begin{aligned} \max_e \pi(e) &= \mu e(g - i) + (1 - \mu)(1 - e)(b - i) - c(e) - m & (11) \\ \text{s.t. } \mu B &= c'(e) & (IC) \end{aligned}$$

By first order condition for the equation and IC, we can get the profit maximization condition

$$B^{c*} = \frac{G}{\mu} \quad \text{where, } G \text{ is expected quality gap, } \mu(g - i) - (1 - \mu)(b - i) \quad (12)$$

The condition says that the optimal level of profit can be obtained by choosing the optimal bonus level. Intuitively, in the closed information case, the agent put forth efforts only for the bonus so by controlling the bonus, the firm obtain the maximum profit.

■ **Optimal contract when the firm open the information** For the agent, his first period expected wage is same as the closed information case,  $u_1(e) = E[V|s_g, e] \Pr(s = s_g) - \mu e B - W$ , and second period expected wage is decided by raiders' and firm's expectation which is decided by first period's performance,  $u_2(e) = E[a|\omega_R]$ . For the firm, her first period profit function is the same as the open case. However, since raiders and the firm will bid up to his expected her second period profit is zero. so we can set up the optimization problem

$$\begin{aligned} \max_e \pi(e) &= [\mu e(g - i) + (1 - \mu)(1 - e)(b - i) - \mu e B - W] + [E(a|\omega_F) - E(a|\omega_R)] & (13) \\ \text{s.t. } \begin{cases} \mu e B + W - c(e) + E(a|\omega_R) = \mu & (IR) \\ \mu B - c'(e) + \kappa(e, m) = 0 & (IC) \end{cases} \end{aligned}$$

by first order condition and constraints, we can obtain the optimal condition for the open case.

$$B^{o*} = \frac{G - \kappa(e, m)}{\mu} \quad (14)$$

If the  $\mu$  is larger than 1/2 the open case's optimal level of bonus is always smaller than closed case which means thanks to the career concern incentives the firm obtain maximum profit with small amount of bonus. we also can think about the comparative statics for the bonus.

$$\begin{aligned} \frac{\partial B^{o*}}{\partial e} < 0, \frac{\partial B^{o*}}{\partial m} < 0 & \text{ if } \mu > 1/2 \\ \frac{\partial B^{o*}}{\partial e} > 0, \frac{\partial B^{o*}}{\partial m} > 0 & \text{ if } \mu < 1/2 \end{aligned}$$

When the agent's ability,  $\mu$ , is larger than 1/2, as effort level goes up, marginal benefit for future income goes up. That means the agent cares about the future career. So the firm can use the bonus and career concerns substitutionally. In regard to matching component, using the same logic, if the matching component become larger, the agent has to more care about the future income and the firm can rely on the career concern more. However if the  $\mu$  is smaller than 1/2, since the agent is not confident for his future, the optimal level of B become larger as  $e$  and  $m$  goes up. so when firm think the average ability of the agent is higher than 1/2 then opening the information is the optima strategy. Otherwise vice versa.

**Proposition 2** *a) If the firm close the agent's performance information, since the agent does not care about his career, the firm can maximize the profit by choosing optimal level of bonus b) If the firm open the agent's performance information, the agent's career concern incentives, matching component, and bonus have substitutional relationships*

## 5.2 Optimal disclosure policy.

To find the optimal disclosure policy, I compare the optimization problem for "close", eq(10), and "open",eq(13). case. when we subtract (10) from (13) then we can obtain profit different function  $D(e, m)$ . If the sign of the function is negative, close the information is the optimal and If the sign of the function is positive, open the information is

the optimal.

$$D(e, m) = \int \kappa(e, m) = K(e, m) = \underbrace{\left(\frac{G - m(2\mu - 1)}{\mu}\right)\left(e - \frac{1}{2}\right) + m}_{\text{matching incentives}} + \underbrace{\sigma^2 \ln 2(\mu - (2\mu - 1)e)}_{\text{Career Concern Incentives}} \quad (15)$$

Assumption 2 Expected quality gap( $G$ ) is larger than experience premium (or matching component -  $m$ ),  $G > m$

If we assume the assumption2 hold, matching incentives are always positive and career concern incentives have various signs depending on  $\mu$ . If the average agent ability is larger than  $1/2$ , Both terms are positive which means "open" the information is the optimal disclosure policy. However, average agent ability is smaller than  $1/2$ , though matching incentives are positive, career concern incentives are negative. Moreover, If the  $\mu$  is smaller than certain critical value  $\mu'$ (proof in the appendix), then  $D$  function goes negative which means "close" is the optimal disclosure policy under a certain condition. We can interpret the those result like following. If the agent's ability is high, since he expects huge rewards in the next period, he will work very hard to show his ability. By opening the performance the firm can extract the agent's the best effort. However, if the agent's ability is low, even though matching incentives are positive, since raiders observed his low ability, the agent has to worry about his next career. If his ability is very low, less than  $\mu'$ , his career concern overwhelm the matching incentives and produces less than "close" case. In this case, close the information and control the agent by bonus and lump sum salary is the optimal disclosure policy.

**Proposition 3** a) *If the average agent's ability is larger than  $1/2$  "Open" the performance information is the always optimal disclosure policy.* b) *If the average agent's ability is  $1/2 > \mu > \mu'$  "Open" is the optimal.* c)  *$\mu' > 1/2$  then "Close" is the optimal disclosure policy.*

## 6 Conclusion

First, If the agent's ability is higher than average, since his expected benefit in the next period is high, the agents putting forth more effort reveals his high ability. However, if the agent's ability is lower than average, putting more effort can hide his low ability. If the experience premium(or matching component) is very high then the agent does not have any incentives to work hard. Second, The career concern and bonus has a substitutional relation with each other. That means the firm design the incentive scheme more flexibility by using the agent' career concern. Third,for the firm, If the agent's average ability is higher than  $\mu'$ , "Open" is the optimal disclosure policy. However, if the agent's average ability is less than  $\mu'$  then "Close" is the optimal disclosure policy.

Further research, in this model raiders exogenously give job offer however, in the real world manager want to find a better position. Taking into account that behavior can bring an interesting result.

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