Are We Working Too Hard or Should We Be Working Harder? A Simple Model of Career Concerns

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In modern corporations, ownership is typically separate from control. Holderness et al. (1999) find that executives and directors, as a group, owned an average of only 21 percent of the stock in corporations they ran in 1995. Typically, employees in lower levels of the hierarchy do not have any ownership. Moreover, employees are motivated by self-interest and not necessarily by the interest of the owners. Therefore, incentive problems arise in most corporations. The financiers cannot assure that employees will not expropriate funds or waste them on unattractive projects. (For a discussion of these corporate governance issues, see Shleifer and Vishny [1997] and Weinberg [2003].) The flows of enormous amounts of capital to firms indicate that, at least in most advanced market economies, the problems of corporate governance have been solved reasonably well. However, problems still arise, as illustrated by the scandals caused by the misreporting of corporate earnings; Shleifer and Vishny (1997) discuss evidence of managerial behavior that does not serve the interest of investors.

In this article, we study how an employee is disciplined by *career concerns*. Fama (1980) suggests that employees are disciplined by the opportunities provided by the *labor market* for their services, both within and outside the firm. This is the case when the market does not know the employee's future productivity and learns about it by observing his performance. In general, the employer has to pay more to the employee when the employee is believed to

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be more productive; otherwise another firm in the market would offer more to him. Thus, the employee's compensation depends on the *labor market's belief about his future productivity*. Therefore, when the employee decides his actions, he cares about his performance (and, consequently, the performance of the firm) because his performance influences his *reputation*—i.e., the beliefs about the employee's future productivity.

Consider a salesperson who knows that if the labor market believes that he has high ability (for example, he has a good sales strategy and knowledge of the market), he will more likely be offered a position as a sales manager. The salesperson's sales depends both on his ability and the number of hours worked. Because the market cannot directly observe the hours worked, it does not know if an increase in sales is the result of more hours or greater ability. However, we assume that the market believes that the salesperson works the typical number of hours (we require that the market expectation is confirmed in equilibrium) and interprets the amount sold as a signal of his ability. For example, suppose that the market believes that the salesperson works 40 hours per week. Also, suppose the market observes that the salesperson sells 100 units per week. Then, the market considers the salesperson's ability to be that of someone who sells 100 units in 40 hours. In this situation, the salesperson has incentives to work more hours in order to sell more, to appear more talented, and consequently, to increase the probability of being offered a better job.

A complementary approach to the study of career concerns is one that looks at how to pay employees in order to motivate them to act in the best interest of the employer. Surveys of the literature on optimal contracts can be found in Rosen (1992) and Murphy (1999).[1] In this case, the salesperson's employer could offer a contract that commits to pay more when the salesperson sells more. Such a contract also would provide incentives to work longer hours. Compensation contracts are not discussed in this article.[2]

Incentives derived from career concerns are not only important for the top executives of a firm, but also for other employees. Moreover, career-concern incentives matter in many lines of work. For example, an assistant professor writes papers for publication in part because the decision regarding his tenure and future salary depends on the beliefs about his future productivity, which is determined by his past production. Another example involves athletes. Stiroh

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[1] For a discussion of other mechanisms that discipline employees' behavior, see Shleifer and Vishny (1997).

[2] In many jobs, compensation contracts are not observed. Moreover, understanding career-concern incentives is also a step toward the study of compensation contracts that complement these incentives. Gibbons and Murphy (1992) study optimal contracts in a framework with career concerns and find that employers would choose to provide stronger incentives through contracts when career-concern incentives are weaker (later in the employee's career). They also present empirical evidence of their findings.

(2003) and Wilczynski (2004) present empirical evidence of the presence of career concerns for basketball players.

There is a large literature on the effects of career concerns on policymakers' decisions. We can think about policymakers as voters' employees. Voters learn about a policymaker's ability through his performance. Their decision to reelect him depends on the expectations about the policymaker's future performance (determined by the policymaker's past performance).[3] Policymakers want to be reelected, and therefore, consider how their decisions affect their performance.[4]

Following Holmstrom's (1999) seminal work, we present *career-concern incentives* in a simple model in which the employee decides how much effort to exert on the job.[5] The labor market does not know the employee's exact productive ability, and his ability is inferred from his output. Effort can neither be observed nor perfectly inferred from the output produced by the employee—there is no one-to-one relationship between effort and output. Thus, after observing output, the market still does not know the effort level exerted by the employee. Even though it is costly for the employee to exert effort, he does so because his future compensation depends on his performance. By exerting more effort, the employee produces more, and therefore, makes the market believe that he has more ability. When the market perceives that the employee has more ability, it assigns a higher compensation. We show that the employee exerts more effort when his future compensation is more sensitive to his reputation, and when he believes it is more likely that he can affect his compensation with his effort level.

To what extent do career-concern incentives eliminate the inefficiencies originated by the separation of ownership and control? Does the employee work as hard as he would if he owned the firm? In the model examined in this article, the effort the employee would exert if he owned the firm is the socially efficient effort level. This is the effort level a benevolent social planner would choose if he could observe the effort exerted by the employee. It can be defined as the effort level at which the social marginal cost of exerting effort

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[3] Empirical studies on economic voting show that voting behavior depends on economic performance (for a review, see Lewis-Beck and Stegmaier 2000). For example, Brender (2003) finds that "the incremental student success rate during the mayor's term had a significant positive effect on his reelection chances."

[4] Barro (1973) starts the literature on political agency discussed by Persson and Tabellini (2000) and Besley (2005). Besley and Case (1995) and Hess and Orphanides (1995, 2001) present empirical evidence supporting this theory. There are many applications of political agency models of career concerns. Besley and Case (1995) study the more typical effort-choice decisions. Persson and Tabellini (2000) present models of rent-seeking. Shi and Svensson (2002) study the cyclical manipulation of fiscal policy. Eggertsson and Le Borgne (2005) study the effects of career concerns for monetary policy.

[5] Discussions on the effect of career concerns on investment decisions are presented by Holmstrom (1999), Prendergast and Stole (1996), and Dasgupta and Prat (2005). Ahmad and Martinez (2005) study how career concerns may discipline recipients in donor-recipient relationships.

equals the social marginal benefit of exerting effort. From a social standpoint, is the employee working too hard or should he be working harder? In the simple model we present, the social cost of effort is given by the employee's cost. On the other hand, the social benefit of effort is given by the value of the output produced by the employee with his effort (this would be the employee's benefit if he owned the firm). In general, the social benefit does not coincide with the employee's private benefit of exerting effort, given by the expected increase in his future compensation. Consequently, there is no reason to expect that the employee would exert the efficient effort level. In general, we cannot expect that career-concern incentives will eliminate the inefficiencies originated by the separation of ownership and control. Similarly, we cannot expect an employee's decisions to be socially efficient because of career concerns.

The remainder of this article is organized as follows. In Section 1, we present a simple model of career concerns. In Section 2, we study the equilibrium effort decision for this model. In Section 3, we conclude.

1. A SIMPLE MODEL OF CAREER CONCERNS

We study a one-period version of the main model in Holmstrom's (1999) seminal article, but, following Martinez (2005a), we consider a discontinuous compensation scheme, which is reasonable and will allow us to show that the employee may work too hard in the simple framework presented in this article. Thus, we present a game played by the employee and the market for his services.

The Environment

At the beginning of the game, both the market and the employee are ignorant of the employee's ability. An employee may be ignorant of his ability when met with new tasks. Further, this assumption represents situations where an employee's success does not only depend on his individual ability but also on the ability of others working with him.[6] The employee and the market both share the same beliefs about the employee's ability. These beliefs are given by a probability distribution with a differentiable cumulative density function, F.

[6] As explained below, the assumption that the employee does not know his ability implies that the effort exerted by the employee is the effort expected by the employer. This assumption simplifies the exposition of the employer's learning, and, in the simple model presented in this article, implies that the employer learns the employee's ability after observing output.

First, the employee decides the effort he exerts on the job, $a \geq 0$.[7] The employee produces output, y. Output is a function of the employee's productive ability, η, and his effort. In particular,

$$y = a + \eta. \tag{1}$$

After the employee chooses his effort, η is realized. That is, when the employee decides his effort, he does not know exactly how much he will produce, but he knows that with increased effort he will produce more.

We do not consider the employee's *current-period* compensation because it has already been determined and does not affect the employee's decision problem.[8] The employee exerts effort in order to influence his *future* compensation (for a multi-period version of this model, see Holmstrom [1999] or Martinez [2005a]). At the end of the game, the employee's *future* compensation, w, is determined (see discussion below).

There is a cost to exerting effort, $c(a)$, with $c'(a) \geq 0$, $c''(a) > 0$, and $c'(0) = 0$. With w, the employee buys w units of output for his own consumption. We assume that the employee's utility is linear in consumption. In particular, if the employee consumes w, we assume that his utility equals

$$u(w, a) = w - c(a). \tag{2}$$

Players (the employee and the market) observe y, while η is not directly observed. The market does not observe the employee's exact effort, while the employee does.[9]

The Equilibrium Concept

The equilibrium effort is given by a^* if when the market believes that the employee chooses a^*, it is optimal for him to do so. When the market determines the employee's compensation, it does not know the employee's effort level. Thus, the market's belief about the exerted effort needs to be defined. We assume that the market believes that the employee chooses the equilibrium effort.

Equilibrium Learning

As explained above, in equilibrium, the market assigns probability one to the employee exerting the equilibrium effort. The market is rational and

[7] We assume that the employee plays a pure strategy.

[8] Recall that we assume that there are no compensation contracts, and incentives come only from career concerns. Gibbons and Murphy (1992) present a model with both compensation contracts and career concerns.

[9] Alternatively, in agency models of career concern, we assume that the agent's action is observable but the principal is uninformed (see, for example, Shi's and Svensson's [2002] political budget cycle model).

understands the game. In particular, it can infer the employee's equilibrium strategy, a^*. Loosely speaking, the market knows how hard an employee with certain characteristics works in certain situations.

Observing y allows the market to learn η by using its knowledge about the effort exerted by the employee, a^*, and the production function. Thus, the ability inferred by the market is given by

$$\eta_m \equiv y - a^* = \eta + a - a^*. \tag{3}$$

The employee can manipulate the ability inferred by the market with his effort decision. In particular, if the employee exerts more effort, the market believes that he has more ability: η_m is increasing with respect to a. Consequently, if the employee's compensation is higher when the market believes he has more productive ability, the employee has career-concern incentives to exert effort.

On the equilibrium path, the effort expected by the market is the effort exerted by the employee, and therefore, the ability inferred by the market is equal to the true ability. The inference of the market is wrong, however, when the employee deviates from equilibrium behavior.

The Compensation Scheme

In models of career concerns, the employee's compensation depends on the market's belief about his future productivity.[10] As illustrated in equation (1), the employee's productivity depends on his ability and on the effort he exerts. Martinez (2005a) shows that, in general, the market's belief about the employee's ability is sufficient for determining the effort it expects the employee to exert (the equilibrium effort). Consequently, its belief about the employee's ability is sufficient for determining its belief about his future productivity, and therefore, for determining his compensation. Thus, we assume that compensation is a function of the ability inferred by the market.

Furthermore, following Martinez (2005a), we consider a discontinuous compensation scheme. That is, we assume that a small change in the employee's reputation may imply a large change in his compensation. In particular, we assume that

$$w\left(\eta_m\right) = \begin{cases} w_H, \text{ if } \eta_m \geq \eta_G \\ w_L, \text{ otherwise,} \end{cases} \tag{4}$$

[10] The exact relationship between the market's belief about the employee's future productivity and compensation depends on the labor market structure considered (see MacDonald 1982, Bernhardt 1995; Gibbons and Waldman 1999; Persson and Tabellini 2000; Prescott 2003). The analysis of this relationship is beyond the scope of this article. We focus on the incentives generated when the agent's compensation depends on his future productivity.

where $w_H > w_L$.[11] This compensation scheme may be interpreted as the employee being assigned to a high-compensation occupation if his reputation is good enough, and to a low-compensation occupation otherwise.[12] For example, suppose that there are two tasks. One task has a low return, $w_L > 0$. The other task has a high return, w_H, if assigned to a high-ability employee, $\eta \geq \eta_G$, and a negative return if assigned to a low-ability employee, $\eta < \eta_G$. With this technology, the employee would be assigned to the high-return task if and only if $\eta_m \geq \eta_G$.[13]

2. THE EQUILIBRIUM EFFORT DECISION

At the beginning of the game, the employee's expected utility is given by

$$w_L + (w_H - w_L)\, P\left[\eta_m \geq \eta_G\right] - c\,(a)\,,$$

where $P\,[x]$ denotes the probability of x.

Recall that $\eta_m \geq \eta_G$ if and only if $\eta \geq \eta_G - a + a^*$. Thus, by exerting a higher effort, the employee decreases the minimum realization of ability that would allow him to enjoy the high compensation. The employee's maximization problem is given by

$$\max_a \left\{(w_H - w_L)\left[1 - F\left(\eta_G - a + a^*\right)\right] - c\,(a)\right\}. \tag{5}$$

We shall proceed by characterizing the employee's equilibrium effort decision through the first-order condition of his problem.[14] Let $\hat{a}\,(a^*)$ denote

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[11] The results presented here do not change much if w_H and w_L depend on the employee's reputation. The assumption that w_H and w_L do not depend on reputation simplifies the analysis and allows us to focus on the incentives generated by a discontinuity in the compensation scheme.

[12] Employees' abilities may be occupation-specific. However, as long as there is a positive correlation between employees' abilities in different occupations, employees with better performance in one occupation are more likely to perform well in other occupations. We can interpret the model presented in this article as one in which the employee tries to manipulate the signal that is relevant in order to be assigned to the high-compensation occupation.

[13] Discontinuous compensation schemes are widely observed in various occupations. First, as documented by the empirical literature, the employee may be assigned to different levels in a hierarchy according to his reputation, and these reassignments often imply a discontinuous change in the employee's compensation (see Murphy 1985; Kwon 2005). The span-of-control literature presents theories of why employees with higher ability are assigned to higher levels in hierarchies (see Prescott 2003). There is a theoretical literature explaining why a firm would choose this compensation structure (see Bernhardt 1995). Furthermore, capacity constraints imply that the employer replaces the incumbent employee when the employer expects to be better off with the replacement. In general, the employee is not indifferent about losing his position.

[14] The first term in problem (5) may not be globally concave. Thus, the employee's maximization problem may not be globally concave. However, we can assure the global concavity of the employee's problem by assuming that the cost of exerting effort is convex enough. For example, one could find an upper bound for the slope of the marginal benefit curve and assume that the slope of the marginal cost curve is always higher. Another alternative is to assume that $c(a) = a^n$, and n is high enough. Consequently, the marginal cost is very low for a low a and, for a high enough a, it starts increasing rapidly, assuring that the marginal cost curve crosses the marginal benefit curve only once (from below) and, therefore, the problem is globally concave (see Martinez 2005b).

the employee's *optimal* effort choice when the market expects the employee to choose a^*. Let f denote the density function corresponding to F. The optimal effort, $\hat{a}\,(a^*)$, is given by

$$c'\left(\hat{a}\left(a^*\right)\right) = \left(w_H - w_L\right) f\left(\eta_G - \hat{a}\left(a^*\right) + a^*\right). \tag{6}$$

In order to find the equilibrium effort, we have to solve a fixed-point problem. We need to find an a^* such that when the market expects a^*, it is optimal for the employee to choose a^*. In equilibrium, the effort expected by the market has to be equal to the effort the employee chooses to exert given the market's expectations. That is, a^* is the equilibrium effort exerted by the employee if and only if $\hat{a}\,(a^*) = a^*$.

Assuming that problem (5) is strictly concave assures that for a given effort expected by the market, a^*, there exists a unique *optimal* effort level, $\hat{a}\,(a^*)$, given by the first-order condition in equation (6). This does not mean that the *equilibrium* effort, a^*, exists and is unique. There could be more than one a^* such that when the market expects a^*, the employee's optimal effort level is given by a^*, that is, there could be more than one a^* such that $\hat{a}\,(a^*) = a^*$. It could also be that there is no equilibrium effort level, a^*, such that when the market expects a^*, it is optimal for the employee to choose a^*.

In our framework, a unique equilibrium effort exists.[15] In order to find the equilibrium effort, the fixed-point condition, $\hat{a}\,(a^*) = a^*$, is imposed in the first-order condition in equation (6). Thus, the equilibrium effort, a^*, is defined by

$$c'\left(a^*\right) = \left(w_H - w_L\right) f\left(\eta_G\right). \tag{7}$$

The right-hand side of equation (7) is positive. The marginal cost of exerting effort is strictly increasing, and $c'\,(0) = 0$. Consequently, there exists a unique equilibrium effort, $a^* > 0$, satisfying equation (7). The intuition behind uniqueness is clear. The effort expected by the market affects the marginal benefit of exerting effort through the ability inferred by the market, η_m. In equilibrium, the effort exerted by the employee is that which is expected by the market, and therefore, $\eta_m = \eta$, which does not depend on that effort. Thus, equilibrium effort does not depend on the effort expected by the market.

Discussion

In this section, we discuss the results presented above through a simple example. Let us consider a salesperson who sells products from store to store. The

[15] Martinez (2004) discusses a firing model of career concerns in which the convexity of the agent's problem implies that the agent's equilibrium strategy does not exist even though an optimal effort level exists for each effort expected by the principal. He also shows that, in a more general framework, if the agent's problem is strictly concave, the agent's equilibrium action exists and is unique.

market may not be able to observe how many hours the salesperson is working, but it knows how many a salesperson typically works. We assume that the market believes that the salesperson works the typical number of hours. Suppose that the market believes the salesperson works 40 hours per week ($a^* = 40$) and observes that the salesperson sells 100 units per week ($y = 100$). Based on this information, the market considers that the salesperson's ability is that of someone who sells 100 units in 40 hours.

We show that in our framework, a unique equilibrium effort exists, as defined by equation (7). For any number of hours that the market expects the salesperson to work, a^*, it is optimal for the salesperson to work $\hat{a}\ (a^*)$ hours. We require that in an equilibrium, $\hat{a}\ (a^*) = a^*$. In general, it may be that such an equilibrium does not exist. It may also be that multiple equilibria exist. For example, if the salesperson is expected to work 50 hours per week, it is optimal for him to do so. On the other hand, if he is expected to work 40 hours per week, it is optimal for him to do that.

The right-hand side of equation (7) represents the salesperson's benefit from working an extra hour. This benefit is given by the change in the probability of receiving the high compensation implied by an extra hour of work, $f\left(\eta_G\right)$, multiplied by the gain from receiving the high compensation, $w_H - w_L$. As intuition suggests, the model predicts that the salesperson would work more hours because of career concerns when his future compensation is more sensitive to his reputation (i.e., $w_H - w_L$ is higher), and when he believes it is more likely that he can affect his compensation with the hours he works (i.e., $f\left(\eta_G\right)$ is higher).[16] Holmstrom (1999) shows that we can expect the employee to exert less effort later in his career. Martinez (2005a) shows that the relationship between the employee's decisions and his current reputation is typically nonmonotonic; equilibrium effort is hump-shaped over reputation. Furthermore, Martinez (2005b) shows that there is a renegotiation cycle—if the employee's compensation is decided infrequently, he would typically exert more effort (for the same reputation level) closer to the compensation period.

Recall that the uncertainty about the salesperson's ability is crucial for the existence of career-concern incentives. For example, suppose that in our model, the market knows the salesperson's ability at the beginning of the game. Consequently, $w\left(\eta_m\right)$ is determined at the beginning of the game, and the salesperson knows that his compensation does not depend on sales.[17]

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[16] In a multi-period version of the model, the employee considers that exerting effort affects the probability of receiving w_H in every future period. In this situation, the employee makes an *intertemporal* decision as well. In order to affect his future compensation, the employee could decide to exert more effort in the current period or in the future. The employee compares the cost and the effectiveness of exerting effort in each period (see Martinez 2005a, 2005b).

[17] In general, in models of career concerns, the employee's compensation depends on the market's belief about his future productivity. Therefore, compensation depends on output only because output affects the market's inference about the employee's future productivity.

Thus, the salesperson works the minimum number of hours. (Recall that in our model there are no output-contingent compensation contracts.)

Similarly, in a multi-period version of the simple model we present in this article, the salesperson would only work more than the minimum number of hours in the first period. In this environment, the market completely learns the salesperson's productive ability after one observation of sales. When the market knows his ability, the salesperson has no career-concern incentives to work more than the minimum number of hours. This is not the case when sales are a stochastic function of hours and ability, and therefore, ability is not completely learned after one observation (see Holmstrom 1999). The units sold may not only depend on the salesperson's effort and ability but also, for example, on his luck in finding customers who are more likely to buy. Furthermore, if his ability varies over time, the salesperson would work more than the minimum number of hours every period (see Holmstrom 1999). For example, the products the salesperson offers or the type of customers he faces may change over time, and his ability may depend on each of these factors.

Efficiency

Does the employee choose to work too hard or should he choose to work harder? More specifically, is the effort decided by the employee higher or lower than the efficient effort level? Would the employee exert a higher or a lower effort if he owned the firm? The socially efficient effort level can be defined as the level at which the social marginal cost of exerting effort equals the social marginal benefit of exerting effort. In our model, this is the effort level a social planner would ask the employee to exert if the planner could observe the exerted effort. The social cost of effort is given by the employee's cost. On the other hand, the social benefit of effort is given by the value of the output produced by the employee through his effort. The value of the output is also the benefit the employee would consider if he owned the firm. Consequently, the socially efficient effort level is also that which the employee would exert if he owned the firm.

The linear production function in equation (1) implies that with an extra unit of effort, the employee produces an extra unit of output. The utility function in equation (2) implies that the value of an extra unit of output (consumption) is 1. Thus, the efficient effort level, $\bar{a}$, is given by $c'(\bar{a}) = 1$.

In general, the right-hand side of equation (7) is not equal to 1. That is, the social benefit of exerting effort does not coincide with the employee's private benefit of exerting effort. Specifically, the employee will exert the efficient level of effort if and only if $f\left(\eta_G\right)(w_H - w_L) = 1$. This situation is fairly restrictive, so there is no reason to expect that the employee would exert the efficient effort level. Most likely, the employee works too hard or not hard enough.

If the employee believes that an increase in effort is very likely to affect his future compensation (i.e., $f\left(\eta_G\right)$ is high), or if the compensation structure is very sensitive to reputation (i.e., $w_H - w_L$ is high), the employee works too hard. On the other hand, if he believes that increasing effort will have negligible effect on his chances of higher future earnings (i.e., $f\left(\eta_G\right)$ is low), or if the increase in earnings from a better reputation is small (i.e., $w_H - w_L$ is low), then he will exert less than the efficient level. We cannot expect an employee's decisions to be socially efficient because of career concerns.

3. CONCLUSION

This article presents a simple model of career concerns. An employee with career concerns wants to establish a reputation for high productivity, as the labor market's expectations of high productivity allow the employee to receive better compensation. These career concerns do not necessarily lead to socially efficient decisions by the employee. For example, if the employee believes exerting additional effort will drastically increase his chances for better compensation, or if the payoff for having a better reputation is significant, then he will work too hard (from a social efficiency standpoint). Alternatively, if exerting additional effort has a low impact on increasing the probability of better compensation, and if the increase in compensation from having a better reputation is low, the employee will not work hard enough. Getting employees to make socially efficient decisions would require additional incentives beyond those created by career concerns.

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