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# Status Incentives

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When economists have studied incentives in organizations, the main focus has been on using monetary payments in exchange for performance in specific measurable dimensions. But organizations use a wide variety of means to motivate their workers. One such method, which has not been studied much to date, is the explicit creation of status rewards attached to good performance.[1] Under such schemes, an agent is given a positional good—such as a job title or a medal—whose value comes from its scarcity. Some organizations, such as the military, make extensive use of medals as status rewards rather than making cash payments. Academia, too, is awash with job titles, fellowships, and prizes whose value is mostly symbolic, but which convey status on their recipients.

In this paper, we consider the role of such status awards as an incentive device. We allow a principal to reward an agent for good performance in conventional terms (i.e., with money) and/or by giving him a positional good. We suppose that the latter has a zero marginal cost. (We have in mind rewards like "employee of the month" or "full professor" or "vice president.") To the extent that the positional good is valued, the organization is exploiting a preference for status to motivate agents. However, the extent of the status conveyed depends on how scarce the reward is and requires a well-defined rule that rewards only the deserving.

The paper studies a model with moral hazard and limited liability which limits the ability of an organization to achieve its desired effort level using monetary incentives. In addition to the standard problems that stem from this, we add the possibility that desired output is hard to measure. Specifically, even if the final output is observable, we assume that it is not verifiable. The principal needs to condition rewards on an imperfect, but contractible, signal of achievement. Even if the principal can observe the true output, it will not be ex post incentive compatible for him to pay a reward to an agent who has produced it.[2] The fact that status incentives are costless means that they are ex post incentive compatible in such circumstances. By the same token, status incentives also increase effort while reducing the optimal level of monetary incentives.

The economic implications of the idea that human beings have a craving for status has been widely studied (see, for example, Robert H. Frank 1985). A key component of the quest for status comes from the fact that humans make social comparisons when assessing the value of what they receive, something that has recently been found in brain activity (see K. Fleissbach et al. 2007) and in studies of subjective happiness (see Richard Layard 2005). This paper is also linked to the literature on how concerns about fairness and inequality affect wage structures within firms. Recent empirical evidence by Gordon D. A. Brown et al. (forthcoming) suggests that an individual's *rank* in the wage distribution affects job satisfaction even when monetary wage differentials are controlled for. Our paper is also related to the work of Ernst Fehr and Klaus M. Schmidt (1999) who emphasize the role of relative rewards within organizations due to perceptions of fairness and their implications for the design of incentives.

This paper is part of a wider project that considers how organizations foster effort using means other than the promise of money (or private goods). The use of status is a way of creating "motivated agents" in the sense of Besley and

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[1] Exceptions include Benny Moldovanu, Aner Sela, and Xianwen Shi (2007), Bruno Frey (2007), and Emmanuelle Auriol and Régis Renault (forthcoming).

[2] This clearly depends on the fact that we have a static model. For example, we do not consider the use of relational incentive contracts along the lines of George P. Baker, Robert Gibbons, and Kevin J. Murphy (2002).

Ghatak (2005). It is also related to recent work by George Akerlof and Rachel Kranton (2005) who discuss the importance of creating identities to improve organizational performance.

## I. The Benchmark Model

A principal employs a continuum of agents of size one, each of whom works independently on a project whose success depends on effort and is uncorrelated across the agents. The project yields an output $\pi_0$ in all states of the world. In addition, it generates $\pi > 0$ for the principal if is successful. The agent's effort $e$ determines the probability of success. We assume $e \in [0,1]$ and the cost of effort is $c/2\ e^2$. The agent has an outside option of $u$ which we set at zero.[3] We assume also that the agent has no wealth, i.e., there is limited liability.

Following Baker (1992), we assume that the stochastic part of the principal's payoff is observable but not verifiable. However, there is a contractible signal $\sigma \in \{0,\ 1\}$ on which contracts can be conditioned. It is important to note that, even though the principal's payoff may be observable, the fact that it is not verifiable means that there is no ex post incentive-compatible means of rewarding the agent when he produces $\pi$. This is because the principal would always have an incentive to lie after $\pi$ is realized in the event that $\sigma = 0$ and the output is $\pi$. This weakens the ability of the principal to create incentives for the agent to overcome the moral hazard problem.

Let $\gamma(1)$ denote the probability that the signal is $\sigma = 1$ when the project is successful and let $\gamma(0)$ denote the probability that the signal is $\sigma = 1$ when the project is a failure. We assume that the signal is (weakly) informative in the sense that $\gamma(1) \geq \gamma(0)$. If $\gamma(1) = 1$ and $\gamma(0) = 0$, then output is perfectly observed.

All agents are identical, so we can study the determination of incentives for a representative agent. As a benchmark, consider the first best where effort is chosen to maximize the joint surplus of the principal and agent. This yields effort level

$$e^* = \arg\max_e \left\{ e\pi - \frac{c}{2}e^2 \right\} = \frac{\pi}{c}.$$

[3] It would be straightforward, although taxanomic, to extend the model to the case where the participation constraint binds.

We assume $\pi/c < 1$ to focus on interior solutions.

A contract is a pair $\{b\ (\sigma)\}_{\sigma\in\{0,1\}}$. It is straightforward to solve for the optimal incentive scheme. Let $\Delta = \gamma(1) - \gamma(0)$. First, observe that the optimal effort level of the agent is

$$\begin{aligned}\hat{e} = \arg\max_e \{ & e\Delta[b(1) - b(0)] \\ & + [\gamma(0)[b(1) - b(0)] \\ & + b(0) - \frac{c}{2}e^2]\} \\ = & \frac{\Delta[b(1) - b(0)]}{c}.\end{aligned}$$

Plugging this into the principal's payoff function, she chooses the contract to maximize

$$\frac{\Delta[b(1) - b(0)]}{c}[\pi - \Delta[b(1) - b(0)]] - \gamma(0)b(1) - (1 - \gamma(0))b(0).$$

This yields:

PROPOSITION 1. *The optimal contract sets* $b(0) = 0$ *and*

$$b(1) = \max\left\{0, \frac{\pi\Delta - \gamma(0)c}{2\Delta^2}\right\}.$$

*The corresponding effort level is*

$$e = \max\left\{0, \frac{b(1)\Delta}{c}\right\}.$$

This result is intuitive. It is optimal to reduce $b(0)$ down to the minimum possible level (given limited liability), i.e., 0, as extra effort can be elicited while reducing the principal's cost. The interesting issue is whether it is worthwhile to offer a bonus when the verifiable signal $\sigma = 1$ is observed. Here, Proposition 1 says that, if the output is sufficiently well measured, there is positive incentive pay to elicit effort. Specifically, this will be the case if

$$\frac{\pi}{c} \geq \frac{\gamma(0)}{\Delta},$$

which is more likely to be satisfied the higher is $\gamma(1)$ and the lower is $\gamma(0)$. In particular, it will always hold when $\gamma(0)$ is close enough to zero. If this condition does not hold, it is not worthwhile for the principal to use any incentive pay

at all. This is basically the main finding of Baker (1992) applied to this framework.

## II. Introducing Status Incentives

We now allow the principal to introduce a purely nominal reward—a pure positional good to the agent in the event that he produces high output for the principal. As discussed above, this could be a job title change (promotion from associate to full professor), granting some agents interior offices rather than open-plan desks, or calling some employees "employee of the week." We focus on the case where this good is completely free from the principal's point of view.

We denote the award of a discrete positional good by $\eta \in \{0, 1\}$ and suppose that this good generates utility of $h(\hat{e})$ where $\hat{e}$ is the fraction of workers in the organization who are awarded the positional good. Assume that $h'(\hat{e}) < 0$ and $h(\hat{e}) = 0$ for $\hat{e} \geq \bar{e}$ where $\bar{e} \leq 1$. This says that there is a crowding effect—if everyone gets the positional good, then its value goes to zero.[4]

We assume that granting the honor is part of an implicit contract and could, in principle, be conditioned on $\pi$ rather than just $\sigma$. However, it has to be incentive compatible for the principal to award the positional good to everyone who produces $\pi$ after output is realized. This is where the fact that the positional good has a zero marginal cost plays a key role and differs from monetary incentives. The principal is actually indifferent about awarding the positional good to anyone, so it is weakly optimal for him to commit to a rule $\eta(\pi) = 1$ and $\eta(0) = 0$, i.e., status is conferred only on those who produce high output. This is an important feature of purely nominal rewards, which we record as:

PROPOSITION 2: *Even though the principal's payoff is not verifiable, it is incentive compatible for the principal to award the positional good to every agent who produces high output.*

Of course, the case where the positional good is costless is the extreme case, but there is a difference between rewards that exploit status from those that require money (as in a dynamic model along the lines of Baker, Gibbons, and Murphy 1994) since it will generally require less stringent reputational enforcement in a dynamic setting.

We now consider how awarding positional goods to all agents who produce $\pi$ affects the choice of monetary incentives. To get a simple closed-form solution, suppose that

$$h(\hat{e}) = \begin{cases} \theta - \lambda \hat{e} & \text{if } \hat{e} \leq \theta/\lambda \\ 0 & \text{otherwise} \end{cases}.$$

Thus, $\bar{e} = \theta/\lambda$ is the fraction of agents producing high effort above which the value of status goes to zero.[5]

In this case, organizational effort (in a Nash equilibrium) will be

$$\hat{e} = \frac{\theta + \Delta[b(1) - b(0)]}{c + \lambda},$$

which we assume is less than $\theta/\lambda$. Repeating the logic that lead to Proposition 1, we now have:

PROPOSITION 3: *The optimal contract sets* $b(0) = 0$ *and*

$$b(1) = \max\left\{0, \frac{(\pi - \theta)\Delta - \gamma(0)(c + \lambda)}{2\Delta^2}\right\}.$$

*The corresponding effort level is*

$$e = \frac{\theta + \Delta b(1)}{c + \lambda}.$$

It is clear, upon inspection, that $b(1)$ is lower compared to the previous case. The condition for $e$ to be lower in this case is $\Delta/c < \theta/\lambda$, which holds given our assumption above that $\hat{e} < \theta/\lambda$, together with the fact that $b(1) < (\pi - c)/2\Delta$.

This result gives a clear idea of how adding status incentives has an impact on the choice of monetary compensation. They relax monetary

[4] It is possible to provide more explicit micro-foundations for this preference. Consider, for example, a simple career-concerns setting. Suppose that there are high-ability types in the population who always produce high output and a fraction $\alpha$ of the agents is of that kind. Status (and possibly future rewards) come from being this type. Then, with common effort level $\hat{e}$ among the low ability agents, the probability that the agent is good conditional on having received the award is $\alpha/(\alpha + (1 - \alpha)\hat{e})$, which is decreasing in $\hat{e}$.

[5] One possible interpretation of this formulation is as follows. Suppose that $\theta = \lambda$. Then $(1 - \hat{e})$ is the percentage of workers who do not succeed, and hence the size of group to whom the successful group feels superior.

incentives in two distinct ways. First, there is a direct effect due to the fact that status incentives create motivated agents in the sense of Besley and Ghatak (2005). Second, there is an indirect effect due to crowding whereby increasing monetary rewards reduce the value of status and hence reduce the principal's use of monetary incentives.

We will now see a bonus being offered when $\sigma = 1$ if, and only if,

$$\frac{\pi - \theta}{c + \lambda} \geq \frac{\gamma(0)}{\Delta}.$$

The condition for the use of incentive pay to be optimal for the principal is more stringent than in the absence of status incentives. Intuitively, incentive pay is costly while status is costless from the principal's point of view.

What is the incentive of the firm to use status incentives? We show that firms that use status incentives will have higher payoffs, other things being equal. The expected payoff of the principal from a single agent, in the case of an interior solution, is

$$\Pi = \pi_0 + e\pi - \Delta e b(1) - \gamma(0) b(1).$$

As $b(1) = [(c + \lambda)e - \theta]/\Delta$, this can be viewed as a function of $e$. Since the principal can be viewed as "choosing" $e$ via $b(1)$ by the envelope theorem, only the direct effect of $\theta$ needs to be considered. This turns out to be

$$\frac{\partial \Pi}{\partial \theta} = e + \frac{\gamma(0)}{\Delta} > 0. \tag{1}$$

That is, the principal always benefits from having a status-motivated agent, and since creating status incentives is costless in our framework, will always do so. The intuition is simple: anything that raises effort for "free" will raise expected profits.

### III. Implications

Our model has implications for the balance of monetary and status incentives that we are likely to see an organization use. Even though an organization faces no variable cost in creating status incentives, suppose that it bears a fixed cost in setting up such a system of rewards. We are interested in understanding which firms will make use of such incentives.

Differentiating (1) yields

$$\frac{\partial^2 \Pi}{\partial \theta \partial \pi} = \frac{1}{2(c + \lambda)} > 0.$$

Hence, firms with higher returns from high output will tend to benefit most from introducing status incentives. To see this, observe that how much expected profits go up when $\theta$ increases depends on $e$ which is increasing in $\pi$.

The model also predicts that the case for status incentives is stronger the more severe is the problem of measuring $\pi$. To see this most clearly, we normalize $\gamma(1) + \gamma(0) = 1$ and let $q \equiv \gamma(0) = 1 - \gamma(1)$. The higher is $q$, the less informative is $\sigma$ as a measure of high output. Now it is straightforward to show that

$$\frac{\partial^2 \Pi}{\partial \theta \partial q} = \frac{1}{2(1 - 2q)^2} > 0.$$

To understand this, note that an increase in $\theta$ raises expected profits via two channels. First, it raises effort for a given bonus level. Second, it enables the firm to reduce the bonus. Bonuses are a costly and inefficient instrument to elicit effort when the signal of output is noisy. As a result, if $q$ goes up, even though the first source of the gain is smaller, the second source of the gain is large and the net effect is to raise the marginal gain from having motivated workers.

We record these facts as:

PROPOSITION 4: *All firms gain from using status incentives, but the gains are higher for firms where output is harder to verify and the return to higher output is greater.*

The finding that status incentives are incentive compatible hinges on there being no possibility of agents bribing the principal to receive a status reward. Since such rewards can be created for free and they are valuable to agents, there is the possibility of corruption within in the organization, which would undermine the success of these rewards, since in the limit they will be sold by the principal to a point where $h(e) = 0$. This explains why, in practice, organizations that use status incentives may go to pains to point out that they are given out only

to the deserving, and that there is no market in such rewards.[6]

Status incentives work by creating social divisions. So far, we have assumed that they raise the utility of the winner while having no impact on the utility of those who are not awarded them. But this need not be the case. It could even be true that the disutility from the shame that accrues from not receiving a positional good outweighs the utility from the honor among those who receive it.[7] This creates a potential cost to the principal of introducing status incentives. In the current setting, however, where the agent gets a rent from working for the principal, this cost is not internalized by the principal.[8] So status incentives could be introduced even in situations where the welfare of agents goes down.

To illustrate this formally, for simplicity, suppose that $\gamma(1) = 1, \gamma(0) = 0$, and $\lambda = 0$. Suppose that status yields utility $\overline{\theta}$ and failure to achieve status yields $-\underline{\theta}$. Now, $\hat{e} = (\pi + \overline{\theta} + \underline{\theta})/2c$ and $b(1) = [\pi - (\overline{\theta} + \underline{\theta})]/2$[9]. It is straightforward to show that introducing a status reward raises agent utility if, and only if,

$$\frac{1}{8}(\pi + \overline{\theta} + \underline{\theta})^2 - \frac{1}{8}\pi^2 > c\underline{\theta}.$$

This can never hold if $\overline{\theta} = \underline{\theta} = \theta$, i.e., when the disutility of low status exactly offsets the utility of gaining status.[10] The intuition is simple. Suppose we set $\overline{\theta} = 0$ and consider a small increase in $\underline{\theta}$ starting from 0. By the envelope theorem, the effect via $e$ can be ignored. However, the bonus will go down and, in addition, there is a first-order negative effect on the agent's utility conditional on failure. As a result, he is worse off. In contrast, if $\overline{\theta}$ goes up from 0, by a similar logic the bonus will go down, but this will be dominated by the first-order effect of the utility conditional of success. Naturally, the higher is $\underline{\theta}$ the more likely the agent is worse off.

[6] The creation of honor from a status reward also comes from a general perception that those who receive the reward have produced high output. This would be the case we have assumed where $\pi$ is observable, but not verifiable. However, it would be interesting to explore the role of status rewards where whether an agent has produced $\pi$ is not observed by everyone in the organization.

[7] Of course, the same could also be true of regular incentive pay. However, for positional goods, as opposed to money, this effect seems more plausible.

[8] This would not be the case if the outside option constraint was binding.

[9] This assumes that $\pi > \overline{\theta} + \underline{\theta}$.

[10] To see this, observe that this condition reduces to $(\pi + \theta)/2c > 1$, which contradicts the requirement that $\hat{e} = (\pi + 2\theta)/2c < 1$.

## IV. Concluding Comments

This paper has studied the role of status incentives by firms to increase effort. In future work it would be interesting to look at broader aspects of status incentives, especially the contrast between those created within firms with those creating outside firms (such as national honors systems and professional honors).

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