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Delegation of decision rights and the winner's curse

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Abstract

I show that delegating decision rights to subordinates increases their career concern incentives by making their performance more transparent and alleviating the winner's curse in the labour market.

Keywords: Delegation; Winner's curse

JEL classification: D23 (Organizational Behaviour); D82 (Asymmetric and Private Information)

1. Introduction

In recent years, numerous organisations have engaged in a process of empowerment of their workers, allowing them to take decisions without interference from upper management. According to a survey by Osterman (1994), for instance, around 45% of workers have significant discretion over the mode of doing their job. Following Aghion and Tirole (1997), the main emphasis of the theoretical literature on delegation has been on the congruence of objectives between a firm and its workers. As interests become more aligned, delegation of decision-making rights motivates employees without causing severe disruption to the decision-making process.

This paper provides an additional rationale for delegation, stressing that it can improve implicit incentives by allowing workers to take credit for the decisions they have influenced. One reason is that delegation makes the performance of a worker more transparent to third parties, by removing the possible

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noise of a superior overruling a worker's decisions. Furthermore, I show that delegation also makes information about performance of the worker more symmetric, since the superior becomes an observer, rather than a participant, of the result of the decision-making process. The reduction in this asymmetry of information about the worker's ability decreases the strength of the winner's curse effect in the labour market (first studied by Greenwald, 1986). This is costly ex post since it decreases the quality of the decisions, and it also denies the employer the possibility of keeping an able worker at depressed wages. However, the advantage to the employer stems from the fact that the worker has improved incentives to appear as able ex ante. I show that when the employer does not wish to overrule her subordinate often and when he strongly discounts the future, such an employer prefers delegation to keeping authority over decision-making rights.

2. The model

An employer hires a worker during Period 1. A large number of potential employers, or raiders, consider employing the worker in Period 2. The raiders and the (current) employer have access to the same technology.

2.1. Production technology and information structure

The worker's job is to choose between two possible projects, $d \in \{A, B\}$, which requires evaluating their respective chances of being technically successful. A project is technically successful when it coincides with the state of the world, $x \in \{A, B\}$ (i.e. when $d=x$). The worker receives a signal about x of precision $p(e, a)$, depending on his innate ability, $a \in \{h, l\}$ and his choice of effort, $e \in [0, \infty)$, with $p \in (1/2, 1)$. I assume that $p(e, a)$ and $p_e(e, a)$ are differentiable with respect to e, with $p_e(e, a) > 0$, $p_{ee}(e, a) < 0$ and $\lim_{e \to \infty} p_e(e, a) = 0$. I also assume that $p(e, h) > p(e, l)$ (the high ability worker always holds better information than the low ability worker) and $\frac{p_e(e,h)}{1-p(e,h)} \leq \frac{p_e(e,l)}{1-p(e,l)}$ (the precisions received by different ability types tend to converge as their effort increases[1]) for all levels of e.

The ability of the worker is initially unknown to all parties. To simplify the algebra, I assume that both ability types and both states of the world are equally likely ex ante. The effort of the worker brings a disutility e and is not observable by the employer, which creates a moral hazard problem.

The employer's private payoff, Π, depends partly on the technical success of the project and partly on a random project-specific component $\psi_i \in \{\varnothing, \Psi\}$, $i \in \{A, B\}$.

$$\Pi = \begin{cases} 1 \text{ if } d = x \text{ and } \psi_d = \varnothing \\ 0 \quad \text{otherwise} \end{cases}$$

ψ_i represents the commercial possibilities of a project, which are not guaranteed by its technical viability. For instance, a technically advanced new kind of airplane (say, the Concorde) may be less

[1] As we will see this assumption implies that the marginal benefit of effort decreases in e, a condition which guarantees the uniqueness of the equilibrium. This assumption is satisfied, for instance, by the precision functions $p(e,h) = 1 - \frac{1}{(2+h)b^e}$ and $p(e,l) = 1 - \frac{1}{(2+l)b^e}$ with $h > l \geq 0$ and $b > 1$.

profitable than expected, as a result of lack of customer demand for intercontinental flights or of a higher than expected cost of fuel. The employer receives one “commercial” signal for each of the projects, indicating its profits conditional on technical success. $\psi_i = \varnothing$ can be interpreted as “observing nothing” about project i, and $\psi_i = \Psi$ can be interpreted as indicating that project i will provide 0 payoff even if it turns out to be technically successful.[2] In sum, the employer will receive a positive payoff only if the project chosen is technically successful ($d=x$) and the employer “observed nothing” about it ($\psi_d = \varnothing$). Lastly, denote λ as the probability that the employer observes $\psi_i = \Psi$, $i \in \{A, B\}$. The employer signals are independent, that is $Pr(\psi_i = \Psi | \psi_j = \Psi) = Pr(\psi_i = \Psi)\ \forall i, j$.

The raiders observe only the technical success or failure of the project following its implementation. Equivalently, they observe the project choice and the state of the world but not the worker’s private signal or the private payoff of the employer. The worker and the employer discount the future at rates δ_W and δ_E, respectively.

2.2. Contracting and wages

Following both the delegation and the career concerns literature, I assume that wages cannot be conditioned on the project choice or the employer payoff. Wages are paid up-front at the beginning of each period. In Period 2, following the observation of the project success or failure and the allocation of decision rights, the raiders makes a wage offer to the worker, with the current employer being allowed a counteroffer. The worker then decides for whom to work.

2.3. Decision rights

Two alternative decision-making arrangements are considered:

- Authority: The employer has the ultimate right to choose her preferred project, after consultation with the worker and observing $\{\psi_A, \psi_B\}$.
- Delegation: The decision-making is delegated to the worker, with no interference from the employer.

2.4. Timing

Period 1: (i) The employer offers the worker an unconditional wage and an allocation of decision rights. (ii) Following the selection of x by nature, the worker puts effort e and receives a signal about x of precision $p(e, a)$. The employer observes $\{\psi_A, \psi_B\}$. (iii) If decision rights are delegated to the worker, he chooses the project. Otherwise he communicates his signal to the employer, who then selects the project. (iv) The technical success of the project is observed by everybody and the employer receives her payoff.

Period 2: (i) The raiders makes a wage offer to the worker, after which the employer decides whether to match it or not. The worker decides for whom to work. (ii)–(iv) are as in Period 1.

[2] This benefit structure is intended to capture, in a simplified way, the notion that a technically successful project may not always be worth undertaking. The results are robust to the introduction of more complex benefit structures.

3. Analysis

Consider the first best scenario. If effort was contractible it would not be necessary to provide incentives through career concerns and it would be optimal for the employer to keep authority over the project choice. Denote $\hat{p}(e,q) = qp(e,h) + (1-q)p(e,l)$ as the expected precision of a worker undertaking effort e and with a probability q of being a high ability worker.

Suppose the worker gets a signal A. The employer will be happy with the worker's recommendation if he receives the signals $\{\psi_A, \psi_B\} = \{\varnothing, \varnothing\}$ or $\{\psi_A, \psi_B\} = \{\varnothing, \Psi\}$. He will be unhappy with the worker's recommendation if he gets signals $\{\psi_A, \psi_B\} = \{\Psi, \varnothing\}$, and he will be indifferent if he gets signals $\{\psi_A, \psi_B\} = \{\Psi, \Psi\}$. It is clearly optimal for the employer to overrule the worker's recommendation when he observes $\{\psi_A, \psi_B\} = \{\Psi, \varnothing\}$ and to rubberstamp otherwise. His expected payoff in each period is $(1-\lambda)[\lambda + (1-\lambda)\hat{p}(e,q)] - e$. The maximisation of this expression yields a level of optimal effort, e^{FB}, that solves:

$$\hat{p}_e\left(e^{FB}, q\right) = \frac{1}{(1-\lambda)^2}.$$

3.1. The value of the worker for an employer in Period 2

Unfortunately, effort is not contractible and the worker can only be motivated by career concerns. Period 2 is the last period in the employee's working life, so he exerts no effort and receives a signal of precision $\hat{p}(0,q)$. Since the worker cannot be motivated, it is optimal for his Period 2 employer (either his Period 1 employer or a raider) to keep the authority over decision rights. From the discussion above we have that the expected payoff obtained by his employer is $(1-\lambda)[\lambda + (1-\lambda)\hat{p}(0,q)]$. The expected payoff that his employer would have obtained without the worker would only be $(1-\lambda)[\lambda + (1-\lambda)(1/2)]$. The value $V(q)$ that a worker of ability q has for an employer at the beginning of Period 2 is therefore $V(q) = (1-\lambda)^2(\hat{p}(0,q) - 1/2)$.

The wage offered to the worker at the beginning of Period 2 depends on the likelihood that a prospective employer assigns to the worker being of high ability, which in turn depends on his performance in Period 1. Assume that the worker is believed to have put effort be and is known to have received the correct signal about the state of the world. In this case future employers will consider the likelihood that he is of high ability to be $q_S(\hat{e}) = Pr[a = h|\text{Success}, \hat{e}] = \frac{p(\hat{e},h)}{p(\hat{e},h) + p(\hat{e},l)}$. Similarly, $q_F(\hat{e}) = Pr[a = h|\text{failure}, \hat{e}] = \frac{1 - p(\hat{e},h)}{2 - p(\hat{e},h) - p(\hat{e},l)}$. It is immediate that $q_S(\hat{e}) > 1/2 > q_F(\hat{e})$. The worker's value for a prospective employer will be higher following technical success than following technical failure, with the difference in the value being $V(q_S(\hat{e})) - V(q_F(\hat{e})) = (1-\lambda)^2[\hat{p}(0, q_S(\hat{e})) - \hat{p}(0, q_F(\hat{e}))] > 0$.

3.2. The payoff of the employer under Delegation

I turn now to Period 1 and study the expected payoff of an employer who delegates decision rights over the project choice to the worker. In this case the worker is entirely responsible for the decision, so the technical success or failure of the project choice perfectly reflects the signal observed by the worker. In other words, the inference drawn by external employers about the ability of the worker is free of the noise introduced by the employer's possible interference. Furthermore, the information held by the Period 1 employer and by the raiders is identical: the success or failure of the project chosen. With symmetric information about the worker's ability, prospective employers and current employer bid at the beginning of Period 2 in a perfectly competitive fashion, and the worker is paid his value for a future employer, $V(q)$. The difference in future wages following success or failure of his Period 1 project choice in turn creates incentives for the worker. Specifically, the worker's problem in Period 1 under delegation is:

$$\max_{e} \hat{p}(e, 1/2)\delta_{\mathrm{W}}[V(q_{\mathrm{S}}(\hat{e}))-V(q_{\mathrm{F}}(\hat{e}))]-e \tag{1}$$

Denote e^D as the solution to problem (1).

Lemma 1. *e^D exists and is unique. e^D is strictly positive if and only if the precision functions satisfy the following condition:*

$$\frac{1}{2}[p_e(0,h)+p_e(0,l)] > \frac{[p(0,h)+p(0,l)][2-p(0,h)-p(0,l)]}{\delta_{\mathrm{W}}(1-\lambda)^2[p(0,h)-p(0,l)]^2} \tag{2}$$

Proof. Differentiating the worker's payoff with respect to e and substituting $\hat{e}$ by e (so that the employer beliefs about e are correct) yields $Z(e)=\hat{p}_e(e,\ 1/2)\delta_{\mathrm{W}}[V(q_{\mathrm{S}}(e))-V(q_{\mathrm{F}}(e))]-1$. An interior equilibrium exists if there is a e^D such that $Z(e^D)=0$.

Note first that $p(e, a)$ and $p_e(e, a)$ are differentiable functions with respect to e. It follows then that $Z(e)$ is also differentiable. Also, $\frac{\partial Z(e)}{\partial e}=\hat{p}_{ee}(e,\ 1/2)\delta_{\mathrm{W}}[V(q_{\mathrm{S}}(e))-V(q_{\mathrm{F}}(e))]+\hat{p}_e(e,\ 1/2)\delta_{\mathrm{W}}[V_e(q_{\mathrm{S}}(e))-V_e(q_{\mathrm{F}}(e))]$. It follows from the concavity of $p(e, a)$ and from $\frac{p_e(e,h)}{1-p(e,h)} \leq \frac{p_e(e,l)}{1-p(e,l)}$ that $\frac{\partial Z(e)}{\partial e} < 0$.

Lastly, $\lim_{e\to\infty} Z(e)<0$, since $\lim_{e\to\infty} p_e(e, a)=0$ and $[V(q_{\mathrm{S}}(e))-V(q_{\mathrm{F}}(e))]<1$. It follows that if $Z(0)>0$ there is a unique cutoff value e^D, with $e^D>0$, satisfying $Z(e^D)=0$. To finish the proof, note that $Z(0)>0$ if and only if (2) is satisfied. □

The intuition for (2) is very simple. When (2) is satisfied, the marginal benefit of increasing effort above 0 is higher than the marginal cost, so effort is strictly positive in an equilibrium under delegation. Henceforth I assume that (2) is satisfied.

It is easy to show that $\frac{\mathrm{d}e^D}{\mathrm{d}\delta_{\mathrm{W}}} = \frac{-1}{\delta_{\mathrm{W}} \frac{\partial Z(e^D)}{\partial e^D}} > 0$ and that $\frac{\mathrm{d}e^D}{\mathrm{d}\lambda} = \frac{2}{(1-\lambda)\frac{\partial Z(e^D)}{\partial e^D}} < 0$. These results have intuitive appeal: the worker puts more effort when future payoffs are discounted less and when he is less likely to be overruled (in the future period).

The employer payoff under delegation is

$$\Pi^D = (1-\lambda)\hat{p}(e^D, 1/2)].$$

3.3. The payoff of the employer under Authority

Under authority, the employer has the final say over the project choice. Sometimes this does not matter: the employer finds that both projects potentially deliver payoffs (i.e. $\{\psi_A, \psi_B\}=\{\oslash, \oslash\}$) so she simply chooses the one most likely to succeed, essentially rubberstamping the worker's proposal. Sometimes, however, she imposes her preferred project which does not necessarily coincide with the worker's recommendation. The possible employer's interference prevents the raiders from being able to perfectly infer the workers signal from the project's choice. By contrast, the current employer is perfectly informed of the worker's signal. This asymmetry of information about the worker's ability creates a winner's curse effect in the labour market. The existence of the winner's curse reduces the sensitivity of the worker's future wage to the precision of his private signal, dampening incentives. To illustrate, imagine that the project selected has been a technical success. The market is less than completely certain that the project has been chosen by the worker, so the worker's value for the market lies somewhere between $V(q_{\mathrm{F}}(\hat{e}))$ and $V(q_{\mathrm{S}}(\hat{e}))$. The employer, however, can compare the state of the world with the worker's proposal, and knows the worker's value to be $V_{\mathrm{S}}(q(\hat{e})$ (if $d=x$) or $V_{\mathrm{F}}(q(\hat{e})$ (if $d\neq x$). If, at the beginning of Period 2, a raider offers a wage strictly between $V_{\mathrm{F}}(q(\hat{e})$ and $V_{\mathrm{S}}(q(\hat{e})$, the employer matches the offer only when she knows the worker's value to be $V_{\mathrm{S}}(q(\hat{e})$. It follows that the raider employs the worker only when he is of lower ability, therefore making a loss on him. The only wage offer where the market does not make a loss is therefore $V_{\mathrm{F}}(q(\hat{e})$. Future wages for the worker are completely independent of the project success, and the worker exerts no effort.

While authority is bad for incentives, it has two advantages. The first one is that it allows the employer to impose a particular project if she finds that the other one is ex post unattractive for her. The second advantage is that, when the worker is of high value, the employer can retain him at depressed wages, thus earning a rent on him. The employer's payoff under delegation is

$$\Pi^A = (1-\lambda)\lambda + (1-\lambda)^2\hat{p}(0,1/2)\{1+\delta_{\mathrm{E}}[\hat{p}(0,q_{\mathrm{S}}(0))-\hat{p}(0,q_{\mathrm{F}}(0))]\}.$$

3.4. Authority versus Delegation

In this final section I compare the employer's payoffs under both decision-making arrangements and show that delegation is sometimes preferred to authority. The difference in payoffs between delegation and authority is given by the expression:

$$\Pi^D-\Pi^A = (1-\lambda)[\hat{p}(e^D,1/2)-\lambda-(1-\lambda)\hat{p}(0,1/2)\{1+\delta_{\mathrm{E}}[\hat{p}(0,q_{\mathrm{S}}(0))-\hat{p}(0,q_{\mathrm{F}}(0))]\}]$$

It is immediate to see that $\frac{\mathrm{d}(\Pi^D-\Pi^A)}{\mathrm{d}\delta_{\mathrm{W}}} = \frac{\partial\Pi^D}{\partial e^D}\frac{\mathrm{d}e^D}{\mathrm{d}\delta_{\mathrm{W}}} > 0$ and $\frac{\mathrm{d}(\Pi^D-\Pi^A)}{\mathrm{d}\delta_{\mathrm{E}}} = -(1-\lambda)^2\,\hat{p}(0,1/2)\,[\hat{p}\,(0,q_{\mathrm{S}}(0))-\hat{p}(0,q_{\mathrm{F}}(0))<0]$. The intuition for these results is the following. When δ_{W} is large the worker is very motivated by the perspective of a future higher wage, so giving him decision rights increases his effort and delegation becomes very attractive relative to authority. When δ_{E} is large, the future rent that the employer receives from having the option of re-hiring the worker at a wage below his productivity is of great value to him. This increases the attractiveness of authority relative to delegation.

Obtaining comparative statics with respect to λ we have that

$$\begin{aligned}\frac{\mathrm{d}(\Pi^D-\Pi_A)}{\mathrm{d}\lambda} &= -\hat{p}\left(e^D,1/2\right) + (1-\lambda)\frac{\partial\hat{p}(e^D,1/2)}{\partial e^D}\frac{\mathrm{d}e^D}{\mathrm{d}\lambda} + (2\lambda-1)\\ &\quad + 2(1-\lambda)\hat{p}(0,1/2)\{1+\delta_{\mathrm{E}}[\hat{p}(0,q_{\mathrm{S}}(0))-\hat{p}(0,q_{\mathrm{F}}(0))]\}\end{aligned}$$

The sign of the expression above is ambiguous. Note for instance that $\frac{\mathrm{d}(\Pi^D-\Pi^A)}{\mathrm{d}\lambda}>0$ when $\lambda=1$ and that $\frac{\mathrm{d}(\Pi^D-\Pi^A)}{\mathrm{d}\lambda}<0$ when $\lambda=0$ and $\delta_{\mathrm{E}}=0$. The reason for this ambiguity is that an increase in λ decreases the employer's payoffs both under delegation and under authority. Depending on which payoff decreases faster, the difference will increase or decrease in λ.

I finish the paper by showing that the improvement in worker incentives caused by the reduction of the winner's curse effect is sometimes enough to make delegation the preferred arrangement.

Proposition 2. *Under some parameter values it is profitable for the employer to delegate decision-making rights to the worker.*

Proof. Make δ_E and λ arbitrarily close to 0. It is straightforward to see that $\Pi^D - \Pi^A = \hat{p}(e^D, 1/2) - \hat{p}(0, 1/2) > 0$. □

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