

# Why Do Social Skills Matter?

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## Abstract

In this paper I propose a model where social skills of a manager signal the workers that their effort is productive. In this model firms with a high productivity of effort hire a socially skilled manager and pay higher wages, and workers hired by these firms exert higher effort. In a broader context, the paper argues the employees are compensated with a higher wage and better working conditions for higher levels of effort.

## I. INTRODUCTION

To achieve success in today's world with its emphasis on collaboration, team work, motivation, and leadership one needs to develop interpersonal skills. This maxim is widely appreciated by the practitioners and numerous seminars and courses teach the techniques for improvement of the general and specific types of social skills. Popular books on social skills development become best-sellers [e. g., Carnegie 1970]. However, there exists no economic literature that incorporates social skills into a formal model. Why is it important for a top manager to show an appreciation of a subordinate's work, rather than simply provide him with an incentive contract? If the acquisition of social skills is costly, should anybody invest in them at all?

The most obvious answer to the question "Why do social skills matter?" is that employees value them. If this is the case then hiring a manager with a high level of social skills can be considered as creating good working conditions for an employee. This will allow firms to pay lower wages, which may be profitable. Another possibility is that high social skills of a manager signal the worker that the marginal product of her effort is high and induce her to exert a higher level of effort.

In this paper I develop a model that addresses these issues. I assume that

each firm has to hire a manager and a worker. The firm's expected profits depend upon the technical expertise of the manager and the worker's effort. Assume that the marginal product of worker's effort is different across the firms and is not observable by the worker. The manager's social skills, being unproductive per se, signal the worker the marginal product of her effort, and hence induces her to exert higher effort in equilibrium. This idea is broadly consistent with the explanation of social psychologists [e. g., Fontana 1990] that show to people and they then work harder.

In order to rationalize such behavior, one has to assume that the social skills of a manager are negatively correlated with her technical expertise. This assumption can be justified by postulating that a fixed amount of time should be divided between acquisition of the technical skills or the social skills. Think, for example, of a situation where a future manager fulfilled the basic course requirements of a business school and has to choose an elective, which will improve either her social or her technical skills. If technical and social skills of a manager are negatively correlated then hiring a manager with high social skills the firm forgoes some profits, and hence sends a credible signal to a worker that his effort has high a marginal product.

I will show that, under certain assumption on the parameters of the

model, there exists a separating equilibrium in which the effort sensitive firms hire socially skilled managers and the effort insensitive firms hire technically skilled managers. Hence, in a general equilibrium, the fraction of managers who invest in social skills equals the fraction of firms with high marginal product of effort. In my model firms have full bargaining power in devising contracts, so both the workers and the managers in equilibrium receive utility equal to their reservation level. In particular, this means that neither kind of managers is better off. However, if an unexpected technological change raising the marginal product of effort<sup>1</sup> suddenly occurs the managers with social skills will be in a short supply, and will be able to extract economic rents. There exists some causal evidence that this is indeed happening [Fontana, 1990].

Note that the model implies a positive correlation between wage and effort. This implies that the model is observationally equivalent to an efficiency wage model.<sup>2</sup> The crucial difference between the model developed in this paper and an efficiency wage model is that in this model a higher wage does not cause higher effort. Rather they both are caused by the higher marginal

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<sup>1</sup>Such a change is consistent with a skilled-biased technological progress, which also manifests itself in a growing premium on education [Berman, Bound, and Stephen 1998]

<sup>2</sup>For an overview of the efficiency wage models, see Katz (1986).

product of effort.

## II. THE MODEL

Assume there is a continuum of firms with total measure  $N$  and each firm needs a manager and a worker. The population contains a continuum of workers and a continuum of managers, each with total measure  $\theta N$ , where  $\theta > 1$ . The last assumption is made to give firms all the bargaining power, however  $\theta$  may be arbitrary close to one, so the equilibrium unemployment rate can be made arbitrary small. Assume that there two types of managers. A manager is of a technical type if she possesses high technical skills and low social skills, and of a social type if she possesses high social and low technical skills. The type of a manager is publicly observable. Direct contribution of a manager to the profits of a firm equals her level of technical skills  $\theta^2 f^T$ ;  $\theta^H g$ . The reservation wage of a manager is  $\bar{w}$  irrespectively of her type.<sup>3</sup> A contribution to the profits (output) of a worker who exerts effort  $e$  is

$$y = \tau e + \pi; \tag{1}$$

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<sup>3</sup>The reservation wage will be endogenized later

where  $\epsilon$  is normally distributed with zero mean and variance  $\frac{1}{4}$ . The marginal value of effort,  $\frac{\partial f_L}{\partial e} = \frac{1}{2}g$ . There are  $\gamma N$  firms with  $\theta = \theta_H$ , where  $\gamma \in [0, 1]$ . I will refer to firms with  $\theta = \theta_H$  as effort responsive firms.

Workers do not know  $\theta$ . They, however, observe the type of manager. The firm can observe the type of manager and the output produced by worker. The worker's utility is given by:

$$U(w; e) = 1 - \exp\left(-\lambda\left(w - \frac{e^2}{2}\right)\right) \quad (2)$$

where  $w$  is the agent's payment (wage) conditioned on  $e$  through  $\lambda$ .

### 1. Partial Equilibrium Analysis.

In this subsection I assume that all human capital investment decisions have been made already and the proportion of managers of type with a high level of social skills is  $q$  such that  $q \in [0, 1]$  and  $1 - q \in [0, 1]$ .<sup>4</sup> I will analyze the structure of the contracts offered at this stage.

The game unfolds as follows. The firm selects a type of manager it wants to hire and offers her a wage. It also offers an incentive contract to a worker.

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<sup>4</sup>If the human capital decision of an individual is endogenized one can solve for  $q$ .

I restrict the set of possible incentive contracts to be a  $\Phi$ ne in the worker's output. The manager decides whether to accept or reject the offer. If the offer is accepted the worker observes the type of the manager and the incentive contract and chooses the effort. Then the uncertainty over output is resolved and the payoffs are realized.

The equilibrium concept we are going to use is that of the Perfect Bayesian Equilibrium (PBE). Let  $t \in \{f, g\}$  denote the type of the manager, and define  $a(t) : \{f, g\} \rightarrow \{0, 1\}$  by  $a(t) = 1$  if and only if a manager of type  $t$  accepts the firm's offer. Define a binary variable  $b$  to be equal to one if and only if the worker accepts the job. Define  $V(\theta; \tau; \pm; e) = EU(\theta - \tau e + \theta'' + \pm; e)$ .

**Definition 1**  $(t(\tau); w(\tau); \theta(\tau); \pm(\tau); a(t); b(\theta; \pm; t); p(\theta; \pm; t))$  constitute

a PBE if

1.  $a(t) = 1$  if and only if  $w \geq \bar{w}$
2.  $e \in \arg \max_e (pV(\theta; \tau_H; \pm; e) + (1 - p)V(\theta; \tau_L; \pm; e))$
3.  $b = 1$  if and only if

$$\max_e (pV(\theta; \tau_H; \pm; e) + (1 - p)V(\theta; \tau_L; \pm; e)) \geq 0 \quad (3)$$

4.  $(t(\cdot); w(\cdot); \theta(\cdot); \pm(\cdot))$  solve

$$\max_{\theta, \pm} (1 - i) e_H + i e_L - w \quad (4)$$

$$s.t: a(t) = 1; b = 1; \quad (5)$$

$$e_H = \arg \max_{e_H} (p V(\theta; \pm; e_H) + (1 - p) V(\theta; \pm; e_L)): \quad (6)$$

5.  $p(t)$  is calculated using Bayes rule whenever possible.

In words, a PBE consists of a firm's decision on what type of manager to hire and how much to pay her and what contract to propose to the worker, manager's decision of whether to accept the firm's offer, worker's decision whether to accept the contract, what effort to exert if the contract is accepted, and his belief about the firm's type. The definition of a PBE demands that all the actions are rational given the beliefs, and the beliefs are consistent with the equilibrium strategy. The following result is an immediate corollary of the definition.

**Proposition 1** In any PBE with a positive employment  $w = \bar{w}$ .

Below I will be interesting in equilibria where the firm's type is revealed in equilibrium.

**Definition 2** A PBE is called separating if  $p(\theta(\bar{w}_H); \pm(\bar{w}_H); t(\bar{w}_H)) = 1$  and

$$p(\theta_L; \pm(\theta_L); t(\theta_L)) = 0.$$

Define a function

$$H(x; y) = \frac{y^2(A^2(2x - 1) + 2xy^2 - y^2 + 2y - 2)}{2(A^2 + y^2)}.$$

**Assumption 1**  $H(\theta_L; \theta_L) < H(\theta_H; \theta_L)$ .

Let us first assume that all managers have the same technical expertise. Then a separating equilibrium does not exist. I formalize this result in Proposition 2.

**Proposition 2** Let Assumption 1 be satisfied and  $\theta_H = \theta_L = \theta$ . Then a separating equilibrium does not exist.

**Proof of Proposition 2.** Assume that a separating equilibrium exists. Since there is no necessity to induce any effort on the part of the manager, she will always get the wage  $\bar{w}$ . The worker, on the other hand, will face an incentive contract. In the equilibrium the worker knows the marginal product of his effort. Given the assumptions on the worker's preferences and noise, it can be shown (Holmström and Milgrom, 1991) that the firm of type  $\theta \in \{\theta_L, \theta_H\}$  will maximize the total certainty equivalent (TCE)

$$TCE = e_i \frac{e^2}{2} i \frac{Ae^{2\frac{3}{4}^2}}{2^{-2} i} \quad (7)$$

The optimal effort is then given by

$$e = \frac{-2}{A^{\frac{3}{4}^2} + -2 i} \quad (8)$$

It can be implemented by an affine contract

$$W = \textcircled{R} i + \pm \quad (9)$$

with

$$\textcircled{R} = \frac{-i}{A^{\frac{3}{4}^2} + -2 i}; \pm = \frac{-i(A^{\frac{3}{4}^2} + -2 i) 2^{-i}}{A^{\frac{3}{4}^2} + -2 i} \quad (10)$$

It is straightforward to check that the profits net of wages for a firm of type

$\bar{e}_i$  are given by

$$E(\bar{e}_i | w) = H(\bar{e}_i; \bar{e}_i) + \theta_i w \quad (11)$$

However, if the firm with low marginal product of effort deviates and offers the same contract as a firm with a high marginal product of effort its profit will be  $H(\bar{e}_H; \bar{e}_L) | w$ . Hence, under Assumption 1, there exists a profitable deviation and a separating equilibrium does not exist.

Q. E. D.

By continuity, Proposition 2 still holds if  $\theta_H$  only slightly exceeds  $\theta_L$ . This implies that for a separating equilibrium to exist it should be sufficiently costly for a firm to hire a socially skilled manager, so only firms with high marginal product of effort will select this option.

**Assumption 2**

$$\begin{aligned} \theta_L + H(\bar{e}_H; \bar{e}_H) &> \theta_H + H(\bar{e}_L; \bar{e}_H) \\ \theta_H + H(\bar{e}_L; \bar{e}_L) &> \theta_L + H(\bar{e}_H; \bar{e}_L): \end{aligned}$$

Assumption 2 states that the technical expertise of a manager is valuable

enough. Hence only the effort sensitive firms will be willing to hire a manager with a low level of technical expertise for the sake of increasing effort.

**Proposition 3** Assume that Assumption 2 is satisfied. Then there exists a separating equilibrium in which the managers of the social type are employed by the effort sensitive firms, the managers of the technical type are employed by the effort insensitive firms. Workers assign probability one of them being at an effort sensitive firm if the manager is of the social type, and probability zero otherwise. They face an incentive contract

$$w_i = \beta_i \theta_i + \alpha_i \quad (12)$$

with

$$\beta_i = \frac{\theta_i}{\theta_i \Delta_i^2 + \alpha_i^2} \theta_i = \frac{\theta_i (\Delta_i^2 + \alpha_i^2)}{\Delta_i^2 + \alpha_i^2} \quad (13)$$

and exert effort

$$e = \frac{e_i^{-2}}{A^{3/4} + e_i^{-2}} \quad (14)$$

**Proof of Proposition 3.** First, assume that managers of social type are employed by the effort sensitive firm and managers of technical type are employed by the effort insensitive ones. Then, on the equilibrium path, workers should assign probability one of them being on an effort sensitive firm if the manager is of social type, and probability zero otherwise. Hence, in the equilibrium, the worker knows the type of firm and the firm faces a standard principal-agent problem. Again, in a firm of type  $i$  can be assumed to choose the implemented effort by maximizing TCE

$$TCE = e_i \frac{e^2}{2} + \frac{Ae^{2/4}}{2e_i^{-2}} \quad (15)$$

Following the same logic as in the proof of Proposition 2, one can verify that the optimal effort is given by (10) and can be implemented by incentive contract (8)-(9). The net of wages profit of the effort insensitive firm is given by  $\pi_H + H(\bar{L}; \bar{L}) - \bar{w}$ , while the profit of the effort sensitive firm is given

by  $\omega_L + H(\bar{H}; \bar{H}) \leq \bar{w}$ . By Assumption 2 these profit levels are incentive compatible.

Q. E. D.

Proposition 3 implies that if there is a sufficiently big differential in technical skills of the two types of managers and a sufficiently big difference in the marginal product of effort across firms, managers with different skills will be hired by the different types of firms. Given that there are more managers than firms and managers are indifferent about what skills to acquire and where to be employed it can be also assumed that there are enough managers of each type to satisfy the firms' demands.

In the separating equilibrium described above, beliefs of the workers depend only on the type of the manager, not on the wage contract received. It is the unique separating equilibrium with this property. Note that it is also the only equilibrium which is constraint Pareto efficient and in which workers earn zero rent.

## 2. General Equilibrium Analysis.

In this subsection I am going to analyze the decision of agents to invest in human capital. Individuals live for two periods. In period one they have to decide whether to acquire any kind of skills at cost  $c$  or to remain unskilled.

In period two some of them are hired. The hired managers earn a salary and workers face an incentive contract that leaves them no rents. There is no discounting. Firms maximize their time average profits. Assume that at each moment new agents with a measure  $2N^{\circ}$  are born.

To proceed further we need the following assumption.

### Assumption 3

$$\beta_L + H(\bar{h}; \bar{h}) > 0$$

$$\beta_H + H(\bar{l}; \bar{l}) > 0:$$

Assumption 3 states that both types of firms will prefer to be in business rather than shut down.

**Proposition 3** Let Assumptions 2-3 be satisfied. There exists a symmetric stationary sequential equilibrium in which effort sensitive firms hire a manager with high social skills, while effort insensitive firms hire a manager with a low social skills. Both types of firms offer a manager a salary

$$w = \frac{1}{\bar{A}} \ln \frac{1}{1 - \beta^{\circ} + \beta^{\circ} \exp(\beta \bar{A} c)} \quad (16)$$

Workers are offered an incentive contract described in Proposition 3. If almost all firms offered a salary no lower than (14) at every date prior to  $t$ , each individual acquires high social skills with probability  $\frac{1}{2}$ , acquires technical skills with probability  $(1 - \frac{1}{2}) = \frac{1}{2}$ , and acquires no skills at all with probability  $1 - \frac{1}{2} = \frac{1}{2}$ , otherwise nobody invests in any skills. Workers' effort level and beliefs are given by Proposition 3.

**Proof of Proposition 4.** First, note that once the human capital investment decisions are made contracts offered by the firm and the effort chosen by the workers represent an equilibrium in this subgame due to Proposition 3. To analyze the investment decisions note that a skilled individual is matched with a firm with probability  $\frac{1}{2}$ . If firms offer to a manager a salary  $w$  her expected utility is

$$\frac{1}{2}(1 - \exp(-\beta(w - c))) + (1 - \frac{1}{2})(1 - \exp(-\beta c)). \quad (17)$$

If an individual acquires no skills he gets expected utility zero. The wage that makes the individual indifferent between the options is given by (14). Firms never offer a salary higher than (14), since offering salary (14) will be

sufficient to induce at least  $N$  individuals to invest in skills with at least  $\cdot N$  investing in social and at least  $(1 - \cdot)N$  in technical skills. They will also never offer a salary below (14) because in this case there will be no skilled labor from the next period on and the time average profits will become zero.

Q. E. D.

Note that as  $\lambda \rightarrow 0$  (14) implies  $w = c$ , that is, that expected salary equals the cost of investment in the human capital.

### III. DISCUSSION AND CONCLUSIONS

In this paper I developed a model where workers did not know the marginal product of their effort. Hence, in addition to providing an incentive contract the firms have to signal their type. In this model they do it choosing what type of manager to hire. In practice they may use other signalling devices. Any arrangement that is provided at a sufficient cost at the firm's side can serve this purpose.

The discussion in the previous paragraph allows us to look at the results obtained in this paper from a broader perspective and consider them as a contribution into the compensating differentials debate. The idea of compensating differentials, first formulated by Adam Smith [1776/1976], states

that individuals have to be compensated for bad working conditions. Despite its plausibility, no empirical support for this idea has been found so far. As noted by Duncan and Stafford [1980] “a positive relation between bad working conditions and wages is not typical for cross-sectional analysis.” On the contrary, a positive correlation between good working conditions and wages is typically observed. This observation led Doeringer and Piore [1982] to formulate a dual labor market hypothesis.

A lack of empirical evidence is typically explained either by unobserved workers' heterogeneity [Gibbons and Katz 1992, Hwang, Reed, and Hubbard, 1992] or by measurement problems [Hamermesh, 1978]. Duncan and Holmud [1983] showed, however, that the problem persisted after they controlled for heterogeneity using panel data. Measurement problems generally will cause the estimate of the magnitude of compensated differentials to be biased downward, but it is unlikely that the effect will completely disappear or even reverse sign.

The model proposed in this paper can explain a positive correlation between wages and good job characteristics in a population of homogeneous workers. Note that even though workers earn different wages in equilibrium they get the same utility. This is because the workers enjoying better working

conditions and earning higher wages also exert higher effort in equilibrium. This distinguishes this model from models with heterogeneous ability, where workers earn rent on their ability. Hence, one might conclude that after all the compensating differentials do exist, but instead of compensating by better wages for worse working conditions, workers are compensated by higher wages and better working conditions for higher effort.

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