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ABSTRACT

Reciprocity and Incentive Pay in the Workplace*

We study optimal incentive contracts for workers who are reciprocal to management attention. When neither worker's effort nor manager's attention can be contracted, a double moral-hazard problem arises, implying that reciprocal workers should be given weak financial incentives. In a multiple-agent setting, this problem can be resolved using promotion incentives. We empirically examine these predictions using data from the German Socio-Economic Panel. We find that workers who are more reciprocal are significantly more likely to receive promotion incentives, while there is no such relation for individual bonus pay.

JEL Classification: D86, J41, M51, M52, M54, M55

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1 Introduction

The birth of modern management theory is often related to the Hawthorne studies (Roethlisberger and Dickson 1939). A well-known case among social scientists, in the Hawthorne plant researchers experimented with light intensity and examined its effect on worker's productivity. To their surprise, workers reacted favorably to both increases and decreases of light intensity. The conclusion of the researchers was that workers simply liked the attention of management and responded by increasing effort. This may come as no surprise to most organizational scholars today, but in the times of Taylorian scientific management with its job specialization and monetary incentives, such findings caused heated debate.

To a large extent, the debate on the importance of monetary incentives and other, non-monetary tools of management in motivating workers continues today. In economics, agency theory is characterized by a strong emphasis on monetary incentives. This is not without reason: the importance of monetary incentives for workers' motivation is confirmed in many empirical studies, see Prendergast (1999) for an overview. Strong motivational effects of monetary incentives are also found in recent field experiments (see, among others, Lazear 2000 and Shearer 2004).

However, monetary incentives are often not considered as the most important motivator by workers and managers. Many workers consider task enjoyment and moral concerns as stronger motivators than monetary incentives (Minkler 2004). In a study on managers' use of motivational tools, Agell (2004) reports that more than 60% of managers in Sweden use 'good management-worker relations' to a great or fairly great extent. In contrast, even in the sector where performance-related pay is most common (skilled services), only 17% of managers use performance pay as a motivational tool to a great or fairly great extent. Likewise, Campbell and Kamlani (1997) find that compensation executives in the US rank good management-worker relationships much higher than wages, working conditions, and supervision as determinants of workers' effort (see also Bewley 1999).

In line with these surveys, studies in organizational behavior (OB) stress the importance of so-called leader-member exchange relationships (LMX) and perceived supervisor support (PSS) for workers' motivation. A large number of empirical studies find a positive effect of the perceived quality of the management-employee relation on employee's performance, e.g. Nagin et al. (2002), Graafland and Rutten (2004), Shanock and Eisenberger

(2006), Kamdar and Van Dyne (2007), Freeman et al. (2008), and Pazy and Ganzach (2009). Moreover, several studies find that better relations between managers and employees lead to higher job satisfaction and/or reduced turnover intentions, see e.g. Babin and Boles (1996) and Wayne et al. (1997). In line with these findings, empirical work also suggests that firms with bad management-worker relationships are penalized in that they need to pay higher wages to attract and retain workers (Pfeffer 1998, Gittell 2003, and Borzaga and Depedri 2005).

This paper reconciles these two views on workers' motivation by developing a formal agency model that incorporates the OB tools of management and monetary incentives. We picture a firm where workers exert effort and managers, in addition to incentive pay, use non-monetary tools of management (attention, praise, recognition, et cetera). We make two important assumptions about these non-monetary tools, which are inspired by the empirical studies mentioned above. First, applying these tools of management – which we call management attention – raises worker's well-being but comes at a cost for the manager. Second, we assume that management attention reduces worker's marginal cost of effort, implying that effort increases with attention. In our model, the reason is worker's reciprocity: workers reciprocate management attention by providing effort. In this setting, we study the optimal provision of incentive pay for workers, the manager's incentive to apply non-monetary tools of management, and the resulting worker's behavior and productivity.

One of our key objects of study is the issue of 'congruence', important in management science, but not often studied in organizational economics. The idea is that the set up of one element of organization affects the working of other parts (see, e.g., Nadler and Tushman 1997). We argue that the strength of monetary incentives given to workers affects the extent to which managers use their other motivational tools. In particular, we will show that, when neither worker's effort nor management activities are contractible, incentive pay for workers weakens the incentive for managers to motivate workers through attention. The reason is that, by leaving a larger share of output to the worker, there is less to gain from increases in output for the manager, which dilutes his incentives to support the worker. Optimal performance pay for the worker therefore strikes a balance between motivating the worker to exert effort and preserving incentives for the manager to apply his non-monetary management tools. Our analysis thus predicts that managers will be careful with introducing or raising incentive pay for workers, and particularly so for

workers who are most responsive to management attention, that is, workers who are highly reciprocal. In equilibrium, worker's effort and manager's attention are both suboptimally low compared to the first-best.

These results change when the manager employs multiple workers doing comparable tasks. Following Carmichael (1983)'s analysis of the 'agent-agents problem,' we show that first-best profits can then be achieved through promotion incentives for workers. The reason is that, in contrast to individual performance pay, promotion incentives do not interfere with the manager's incentive to give attention, because the total amount of wage compensation to the workers is fixed in advance. This benefit of promotion incentives is particularly large when workers are highly responsive to manager's attention.

The main predictions of our theoretical analysis are thus twofold: workers who are more responsive to manager's attention are less likely to receive individual performance pay and more likely to receive promotion incentives. We empirically examine these predictions using data from the German Socio-Economic Panel (GSOEP), which contains data on compensation schemes and reciprocity for more than 2700 German workers. While we find no support for the former hypothesis, there is strong support for the latter: Worker's reciprocity significantly increases the likelihood of receiving promotion incentives.

We proceed as follows. The following section gives a brief overview of related literature. Next we introduce in section 3 our basic model. Section 4 and 5 analyze optimal contracts and the resulting manager's and worker's behavior in the first-best, the second-best with full rent extraction and with limited-liability protection, respectively. Section 6 extends the analysis to allow for multiple workers and promotion incentives. Section 7 describes the results of our empirical analysis. Section 8 concludes.

2 Related literature

The economic literature on manager-subordinate reciprocity has so far been confined to monetary gift-exchange. Starting with Akerlof (1982), economists have argued that paying generous wages may trigger effort and loyalty as workers feel a need to reciprocate the employer's gift. Numerous laboratory experiments have provided support for this monetary gift-exchange relation (an early study is Fehr, Kirchsteiger, and Riedl 1993; Fehr and Gächter 2000 provide an overview of the voluminous literature). Recent field studies,

however, are less supportive. In various natural workplace settings, Gneezy and List (2006), Kube et al. (2008), and Hennig-Schmidt et al. (2010) find only limited support for monetary gift-exchange.

As discussed in the Introduction, studies in management and organizational psychology have emphasized other managerial tools facilitating relationship-building between managers and employees, namely offering socioemotional resources that address "social and esteem needs (and are often symbolic and particularistic)." (Cropanzano and Mitchell 2005, p. 881). The main contribution of our paper is to incorporate such social exchange as a management tool into an otherwise standard agency model, which allows us to study social exchange and several forms of incentive pay in one unifying framework.[1]

Closest to our paper is Englmaier and Leider (2008)'s recent study on the implications of reciprocity for the employment relation. Their key result is that reciprocal motivations and performance-based pay are substitutes, as in section 5 of this paper. Their analysis strongly differs from ours, however. The crucial difference is that they confine their analysis to monetary gift-exchange, whereas we focus on social gift-exchange. Specifically, in their model, the principal is a passive contract-writer, inducing reciprocity by leaving a rent for the agent. In our model, feelings of reciprocity are engendered by the principal's attention. Further, we have a different approach in the empirical verification of our results. They provide empirical support by comparing the organizational form and pay structure between firms who supposedly select workers on reciprocity and those that do not. By contrast, we use the individual worker as the unit of analysis, using a direct measure of an individual's reciprocity.

Our paper builds on a rich body of literature that studies optimal contracts in the presence of double moral-hazard (e.g. Carmichael 1983, Demski and Sappington 1991, and Gupta and Romano 1998). Applications in the field of franchising are especially interesting, because some serious efforts have been made to empirically verify the theoretical predictions. For instance, Lafontaine (1992) finds that franchising contracts "are most consistent with a model based on two sided-moral hazard" (p. 263). Agrawal and Lal (1995) find "support for the hypothesis that the royalty rate balances the incentives to the franchisor to invest in brand name with those to the franchisees to invest in retail service" (p. 213). We differ from this literature in our focus

[1] In a related paper, we study social exchange and incentive provision in a common agency context, see Dur and Roelfsema (2010).

on social exchange and workers' motivation. Further, we are the first to provide some (indirect) evidence for the relevance of double moral-hazard in the workplace.

3 The model

We consider a risk-neutral principal employing a risk-neutral agent. The principal's expected payoff $E(\pi)$ is described by:

$$E(\pi) = eH + (1-e)L - (w + eb) - \frac{1}{2}\rho a^2, \tag{1}$$

where e is effort exerted by the agent, H and L are the two possible output values (high and low; $H > L$), w is the agent's base salary, b is a bonus paid to the agent in case output is high, $\rho > 0$ is a cost parameter, and a denotes the principal's attention given to the agent. The probability that output is high is increasing in the agent's effort and, for simplicity, given by e where $e \in [0, 1]$. Throughout, we assume that the parameters are such that we can rule out solutions where $e < 0$ or $e > 1$ (see the working paper version, Dur et al. (2008), for the exact conditions). Besides offering a contract describing the agent's base salary and bonus pay, the principal engages in giving attention to the agent. We assume that giving attention is costly for the principal. Allowing for some intrinsic benefits from giving attention would not change the results qualitatively.

The agent's expected utility $E(U)$ is:

$$E(U) = w + eb + \gamma ea - \frac{1}{2}\theta e^2, \tag{2}$$

where the first two terms are the agent's expected wage income and the last term represents the agent's cost of effort, $\theta > 0$. A distinguishing feature of our model is the interaction term γea, where $\gamma \geq 0$. This term captures the observations discussed in the Introduction that the agent's marginal costs of effort are decreasing and the worker's well-being is increasing in the attention given by the principal. Attention can be interpreted as kindness that evokes feelings of reciprocity, but it can also be interpreted as support by the principal which helps the agent to perform his tasks. We shall call γ the agent's reciprocity parameter.[2]

[2] Alternatively, we could assume that the principal's attention affects an agent's degree

The timing of the game is as follows. First, the principal writes a contract which the agent accepts if his expected utility is equal to or exceeds his reservation utility $\overline{U}$. In the second stage the principal decides on his attention level. Finally, the agent chooses his effort level, after observing the attention provided by the principal.

4 First-best contract

Let us first consider the benchmark case where both attention and effort are contractible. Full contractibility implies that there is no reason to pay a bonus conditional on output on top of the base salary, and so we impose $b = 0$ in this section. Thus, the principal designs a contract consisting of attention a, effort e, and base salary w, that maximizes his expected payoff given by (1), taking into account the agent's participation constraint $E(U) \geq \overline{U}$, where $E(U)$ is given by (2). After rewriting the first-order conditions for attention and effort, we obtain:

$$a = \frac{\gamma e}{\rho}, \tag{3}$$

$$e = \frac{H - L + \gamma a}{\theta}. \tag{4}$$

Note that attention is increasing in effort and vice versa. In other words, attention and effort are complements. Thus, a change in ρ, θ, $(H - L)$, or γ affects the optimal values of both attention and effort. For example, when the principal's cost of giving attention ρ increases, it is optimal to pay less attention to the agent and, as a consequence of the higher marginal cost of effort, agent's optimal effort decreases.

5 Incomplete contract with full rent extraction

Next consider the situation where neither attention nor effort are contractible. Hence, in order to induce the agent to exert effort, the principal may find

of altruism towards the principal, thus inducing the agent to exert more effort in response to attention as long as the agent is not the full residual claimant. See Dur (2009) for a model along these lines.

it optimal to offer bonus pay conditional on high output in addition to the base salary. We assume throughout that the agent's participation constraint, $E(U) \geq \overline{U}$, is binding. However, we will briefly discuss what happens when the agent is protected by limited liability at the end of this section. We solve for a subgame perfect equilibrium by backward induction. So, we start with the agent's effort choice, next we study the principal's choice of attention, and finally we consider optimal contract design.

The agent maximizes his expected utility (2) by choosing an optimal effort level, given the level of attention and the wage contract. The first-order condition for optimal effort implies:

$$e = \frac{b + \gamma a}{\theta}. \tag{5}$$

Obviously, the higher the bonus and the lower the costs of exerting effort, the higher the agent's effort. Further, effort increases with attention. Comparing (5) with (4) gives the usual result that, for a given a, the agent chooses first-best effort when the bonus equals the full marginal product ($b = H - L$).

The principal chooses attention so as to maximize his expected profits (1) taking the agent's reaction function (5) into account. The first-order condition is:

$$\frac{de}{da}(H - L - b) - \rho a = 0. \tag{6}$$

Rewriting using (5) gives optimal attention:

$$a = \frac{\gamma}{\theta\rho}(H - L - b), \tag{7}$$

which increases with the marginal product and with the agent's reciprocity, and decreases with the cost parameters. Moreover, equation (7) shows a clear negative relation between attention and the agent's bonus pay. The intuition for this result can be seen from the first-order condition (6). In the second stage of the game, the principal's only reason for giving attention is to stimulate effort. An increase in the bonus b reduces the principal's marginal payoff from the agent's effort, and hence reduces his optimal attention. In the extreme case that $b = H - L$, the full marginal product from effort accrues to the agent. In this case, no attention will be given, because there is nothing at stake for the principal. Another extreme case is $b = 0$, in which case all gains from extra effort accrue to the principal, and so giving attention is very

attractive. Still, however, attention is below the first-best level.[3] The reason is that, after the contract has been signed, the principal only takes his own welfare into account and does not care about the positive effect his attention has on the agent's utility. To reach first-best attention, the bonus should actually be negative.

Anticipating the behavior of the principal and the agent in stage two and three of the game as described by equations (5) and (7), the principal writes a profit-maximizing contract in the first stage by choosing w and b, taking into account the agent's participation constraint $E(U) \geq \overline{U}$. After some rewriting we obtain the following first-order condition describing optimal bonus pay:

$$\frac{de}{db}(H - L - b) + \frac{da}{db}\gamma e = 0, \tag{8}$$

where, using (5) and (7), $de/db = 1/\theta$ and $da/db = -\gamma/\theta\rho$. The first-order condition clearly reveals the trade-off the principal faces when writing the contract. The bonus has a positive effect on effort, which increases profits as long as $b < H - L$.[4] On the other hand, the bonus reduces the amount of attention, which reduces the agent's utility by γe, and so increases total wage compensation. As a result, the optimal bonus is smaller than the marginal product if $\gamma > 0$. Using (5) and (7), it follows from (8) that the optimal bonus is given by:

$$b^* = \frac{\left(\theta^2\rho^2 - \gamma^4\right)(H - L)}{\theta^2\rho^2 - \gamma^4 + \gamma^2\theta\rho}, \tag{9}$$

which decreases in the agent's reciprocity γ for two reasons. First, when γ is higher, attention is more valuable to the agent. Second, when γ is higher, the principal's attention is more responsive to changes in the bonus. It is easily verified that the resulting levels of attention and effort are below their first-best levels. Clearly, the problem of having only one instrument (the bonus) for two conflicting goals (incentivizing the agent and the principal) implies that both attention and effort are suboptimally low.

[3] This is easily verified by solving (3) and (4) for a, and comparing with (7), substituting $b = 0$.

[4] As we have seen, a higher bonus implies higher effort for a given level of attention (see equation (5)), but leads to a reduction in attention (see equation (7)), which in turn reduces effort. Overall, effort increases in the bonus. This can be easily verified by substituting (7) into (5) and noting that $\gamma < \sqrt{\theta\rho}$, which ensures finite attention and effort in the first-best.

Finally, consider the case where the agent is protected by limited liability: the agent's compensation must at least be equal to $\overline{w}$.[5] The results for the third and second stage of the game are identical, but the outcome of the contracting stage differs. In the full-rent-extraction case, the binding participation constraint makes it optimal for the principal to take the agent's welfare into account in the contracting stage, because the agent's welfare is reflected in the base salary. By contrast, when the limited-liability constraint is binding, bonus pay and attention do not reduce the base salary (which is fixed at $\overline{w}$), but increase the agent's rent. Therefore, the principal faces the standard trade-off between stimulating effort and leaving a rent to the agent.[6] Again, the bonus is decreasing in the agent's reciprocity γ, but for a different reason than in the full-rent-extraction case. When the agent is more reciprocally inclined, effort is higher for given values of attention and bonus pay. Therefore, the probability that the bonus actually has to be paid is higher, implying that providing a bonus is a more costly instrument when workers are more reciprocal (see Besley and Ghatak 2005 for a similar argument in the context of motivated workers). Hence, the optimal bonus decreases in agent's reciprocity.

6 Promotion incentives

This section examines the possibility of overcoming the double moral-hazard problem identified in the previous section through provision of promotion incentives (or relative performance pay).[7] Clearly, for this to be feasible, the principal must employ at least two agents. For convenience, suppose the principal hires two identical agents, denoted by index numbers 1 and 2, who perform identical tasks. The agents compete for a single promotion prize, which is denoted by P. We assume that the agent who achieves highest output wins the prize P. In case of equal outputs, a random draw determines

[5] For brevity, we abstract from the case where both the participation constraint and the limited-liability constraint are binding. Our main results carry over to this case, however.

[6] The first-order condition describing optimal bonus pay is: $\frac{de}{db}(H - L - b) - e = 0$.

[7] An alternative way to overcome the double moral-hazard problem is to hire a middle-manager and to provide incentives so that he gives optimal attention to the worker. This, however, is more costly than promotion incentives, since the middle-manager needs to be compensated for his outside option. Option contracts a la Nöldeke and Schmidt (1995) do not solve the double moral-hazard problem, because we deal with a case of two-sided direct externalities.

the winner. Thus, the probability of winning the prize for agent 1 is given by $\frac{1}{2}(1 + e_1 - e_2)$, where the subscripts denote effort provided by the indicated agent. Expected utility for agent 1 is described by:

$$E(U_1) = w + e_1 b + \frac{1}{2}(1 + e_1 - e_2) P + \gamma e_1 a_1 - \frac{1}{2}\theta e_1^2. \tag{10}$$

The principal's payoff is described by

$$E(\pi) = (H - L - b)(e_1 + e_2) + 2L - (2w + P) - \frac{1}{2}\rho(a_1 + a_2)^2. \tag{11}$$

Note that the cost of the promotion prize does not depend on effort, because the principal awards the prize to one of the agents independent of the levels of output.

The analysis proceeds in the same way as in the previous section. Optimal third-stage behavior follows from the maximization of the agent's utility function (10) which results in:

$$e_1 = \frac{b + \frac{1}{2}P + \gamma a_1}{\theta}; \quad e_2 = \frac{b + \frac{1}{2}P + \gamma a_2}{\theta}. \tag{12}$$

These expressions are similar to our earlier findings (see equation (5)); the difference is that the agent is now also motivated by the possibility of winning the promotion prize P.

Optimal behavior in the second stage follows from maximization of the principal's payoff function (11) with respect to a_1 and a_2. Assuming that the principal gives the same level of attention to each of the two agents,[8] optimal attention provision is given by:

$$a_1 = a_2 = \frac{\gamma}{2\theta\rho}(H - L - b). \tag{13}$$

Equations (12) and (13) already make clear that the double moral-hazard problem can be solved by using promotion incentives. The promotion prize P incentivizes the agents, but does not impair the principal's incentives to give

[8]It is easy to verify that in our set-up the distribution of a given level of attention over the agents does not influence agents' total effort and, hence, the principal's profits in the second stage of the game. Obviously, if agent's responsiveness to attention would decrease in the level of attention, it would be profit-maximizing to distribute attention evenly, as we assume.

attention. Therefore, it is possible to set the bonus b such that the principal's incentives to provide attention are optimal, whereas the promotion prize P provides the agents with incentives to put in effort. Solving for the optimal contract, we obtain:

$$b^* = \left(1 - \frac{2\theta\rho}{2\theta\rho - \gamma^2}\right)(H - L),$$

$$P^* = \frac{4\theta\rho}{2\theta\rho - \gamma^2}(H - L).$$

Clearly, when $\gamma > 0$, it is optimal for the principal to offer promotion incentives to the agents along with negative individual bonus pay. Given our previous discussion in section 5, this result is not surprising. In the second stage, the principal does not take the agent's welfare into account. Therefore, in order to internalize this externality, the principal sets a negative bonus. This obviously gives perverse incentives to the agents, but this is corrected for by offering the promotion prize. By substituting the expressions for the optimal bonus and promotion prize into the equations for effort and attention (equations (12) and (13) respectively), it is easily verified that the first-best is reached.[9] As before, the bonus is decreasing in γ. The reason is that the size of the externality increases in γ, necessitating a lower bonus to reach first-best attention. Consequently, promotion incentives are also increasing in the agent's reciprocity so as to restore incentives to exert effort.

Next consider the case where the limited-liability constraint is binding. It is easy to verify that, in this case, the principal optimally sets the same bonus as in section 5 (corrected for the number of agents) and does not use promotion incentives. The reason is twofold. First, the problem that promotion incentives resolve in case the agent's participation constraint is binding is non-existent when the limited-liability constraint binds, as the principal cannot recoup the agent's happiness gains from attention. Second, under limited-liability, promotion incentives are a more expensive instrument than bonus pay. The reason is that the principal always awards the promotion prize to one of the agents (even when both produce low output), which is costly when the limited-liability constraint binds.

[9] It should be taken into account that with two agents, first-best attention per worker is given by: $a = \frac{(H-L)\gamma}{2\theta\rho - \gamma^2}$.

7 Empirical analysis

This section empirically examines our theoretical predictions on the relationship between an employee's reciprocity and the type of incentive pay offered by his employer. Unfortunately, our data do not allow us to observe the strength of incentives workers receive. All that we know is *whether* workers receive a particular type of incentive. Therefore, we use our theoretical framework to derive predictions regarding an individual's likelihood of receiving a certain type of incentive scheme.

Our theory makes a clear prediction regarding promotion incentives: All else equal, workers who are more reciprocal should be more likely to receive promotion incentives. The reason is that promotion incentives do not dilute the principal's incentives to provide attention, and this advantage is particularly important for workers who are more reciprocal. We expect this relation to be particularly strong for workers in small firms, since then the manager is more likely to be residual claimant.[10]

Our theoretical predictions regarding individual bonus incentives are most clear for workers who do not receive promotion incentives. As we have seen in sections 5, bonus pay dilutes the principal's incentive to provide attention, implying a negative relation between reciprocity and the likelihood of receiving bonus incentives. We expect this relation to be particularly strong in small firms, as managers in small firms are more likely to be residual claimant.

We thus examine the following predictions:[11]

1. Workers who are more reciprocal are more likely to receive promotion incentives.

[10] If the manager is not a residual claimant, our results need not change qualitatively when the manager's income depends on his unit's profits. In large organizations, a lack of attention provision at the highest levels (from CEO to middle managers) may trickle-down to lower levels (from middle managers to workers). Shanock and Eisenberger (2006) find evidence for such effects.

[11] As we have seen in the previous section, our theory also predicts that when a limited-liability constraint is binding, the relation between reciprocity and the likelihood of receiving promotion incentives will be weaker. We analyze this in the working paper version of the paper (see Dur et al. 2008). Using union-membership and low income as proxies for limited-liability, we find evidence in line with these predictions. However, we should be careful with interpreting these results, because the proxies for limited liability may also pick up other differences in unobserved characteristics.

2. The relationship as described in prediction 1 is particularly strong for workers in small firms.

3. Among workers who do not receive promotion incentives, workers who are more reciprocal are less likely to receive bonus incentives.

4. The relationship as described in prediction 3 is particularly strong for workers in small firms.

For the empirical analysis we make use of the 2004 and 2005 waves of the German Socio-Economic Panel (GSOEP), a survey representative for the German population.[12] This dataset is unique in that it contains data on both worker's performance pay and worker's reciprocity. Reciprocity is measured by asking how well each of the three following statements applies: (1) If someone does me a favor, I am prepared to return it; (2) I go out of my way to help somebody who has been kind to me before; (3) I am ready to undergo personal costs to help somebody who helped me before. The extent of agreement with these statements is indicated on a 7-point scale, where 1 indicates profound disagreement and 7 means that the statement applies perfectly. Following Dohmen et al. (2009), we construct a measure of reciprocity by taking the average score on the three statements.[13] Our dependent variable (the worker's performance pay) is measured by asking whether people's job performance is regularly assessed by a supervisor and whether this performance evaluation has consequences for promotion and/or for receiving a yearly bonus.[14] A value of 1 indicates a positive answer. In our analysis, we leave out those individuals who indicate that they do not get a regular performance evaluation by their supervisor. The reason is that some of these individuals, although lacking a formal performance evaluation, in fact may receive bonus or promotion incentives, which we cannot observe in the

[12] Detailed information about the GSOEP can be found at www.diw.de/gsoep/.

[13] Dohmen et al. (2009) distinguish between positive reciprocity and negative reciprocity, where the former refers to the inclination to reciprocate kind acts and the latter to reciprocation of unkind acts. Because we consider attention as a gift to the agent, we focus on positive reciprocity. For further discussion of these measures of reciprocity, see Dohmen et al. (2009).

[14] Unfortunately, the survey question does not rule out that a bonus is awarded based on relative performance evaluation instead of an absolute criterion. This may lead to an upward bias in the estimates of the relation between reciprocity and the use of bonus pay.

data.[15] For example, we cannot observe whether an individual receives bonus incentives based on objective criteria. We provide some summary statistics of the two key variables in figure 1 and table 1, the control variables are described in table 2.

We examine the first prediction by estimating two Probit-equations, as shown in the first two columns of table 3.[16] The difference between the two equations is that in the second column, we do not control for firm size, industry, and occupation. In line with prediction 1, the coefficient for reciprocity is positive and statistically significant at the 1% level. Also, the effect of reciprocity is economically significant: a 1-point increase on the scale of reciprocity increases the probability of getting promotion incentives by more than 5 percentage points on average (the mean marginal effect follows from multiplying the coefficient with the appropriate reduction factor). Taking into account the fact that about 45% of the sample used in the regression gets promotion incentives, this is quite a large effect. The effect remains highly significant but reduces somewhat in size when we do not control for firm size, industry, and occupation. This suggests that if sorting mechanisms are present, they are rather subtle: reciprocal workers do not sort on the basis of occupation, industry or firm size.

We examine the second prediction by re-estimating the equations for a sample of small and large firms. A firm is considered 'small' if it has less than 100 employees and 'large' if it has 100 employees or more. The results are shown in columns (3) and (4) of table 3. Clearly, reciprocity has a larger effect on the probability of receiving promotion incentives in small firms than in large firms, which is supportive of prediction 2. However, the difference between the coefficients is not statistically significant. A similar picture arises when we leave out some of the controls and when we replicate the regression for firms with less than 20 employees (approximately 260 observations).

The third prediction is that among workers who do not receive promotion

[15] The main conclusions are qualitatively robust to inclusion of individuals who do not get a performance evaluation. However, the picture often becomes blurred in the sense that the t-values of the coefficient for the reciprocity variable fall, which is not surprising if, indeed, some workers who do not get a performance evaluation do receive performance pay. We also checked whether our results are sensitive to inclusion of other personality characteristics (the Big 5 and locus of control), additional regional dummies, hours of work, and wage income. Including these variables does not change our results.

[16] Except for the inclusion of the reciprocity parameter and the distinction between promotion incentives and bonus pay, the specification is similar to Grund and Sliwka (2010).

incentives, workers who are more reciprocal are less likely to receive bonus incentives. In the first two columns of table 4, we regress the likelihood of receiving bonus pay on reciprocity for these workers. Controlling for firm size, industry, and occupation, the coefficient for reciprocity has the predicted sign but is highly insignificant (see the first column). The significance does not improve if we drop the controls, as can be seen from the second column of table 4. Worse still, the coefficient now also has the wrong sign. We learn two things from these regressions. First, just as in the regression of promotion incentives on reciprocity, sorting seems to play no role. Second, we find no evidence in favor of prediction 3. Next, we split the sample into small and large firms, where 100 employees is again taken as the cut-off point. The third and fourth column of table 4 show the results. The reciprocity coefficients are insignificant and the signs are opposite to prediction 4. These findings are robust to dropping (sets of) controls, considering firms with less than 20 employees, as well as to adding workers who do receive promotion incentives to the sample.

8 Concluding remarks

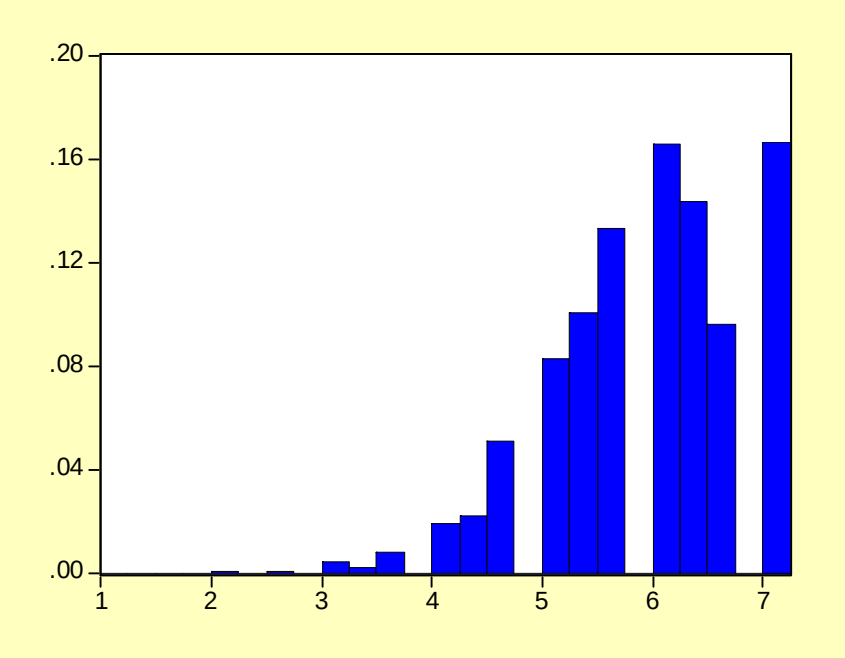
We have analyzed how incentives for a worker and his superior interact using a gift-exchange model where the worker is reciprocal to attention of his superior. In our model, attention is the superior's input in the exchange relation, whereas the worker reciprocates with higher effort. This reciprocity directly links the inputs of a manager to that of his worker, so that production becomes a joint effort. We have studied a common trade-off in models of double moral-hazard, where stronger incentives for one of the partners weaken those for the other. The central result is that bonus pay for the worker weakens the incentives for his superior to provide attention. We have seen that promotion incentives are particularly helpful when workers are reciprocal, since it takes away the commitment problem for the superior in providing attention. This last result is supported by data from the German Socio-Economic Panel, which show a clear positive relation between a worker's reciprocity and the likelihood of receiving promotion incentives, even after controlling for a rich set of observable characteristics.

Obviously, in practice, several other aspects of organizational life need to be taken into consideration when choosing the type of incentives offered to workers. While our analysis has focused on the quality of relationships

between managers and workers, the quality of co-worker relationships may also be very important for worker's job satisfaction and, hence, for an organization's ease in attracting and retaining workers. Promotion incentives may hurt or help in this respect, see among others Grund and Sliwka (2005) and Dur and Sol (2010).

9 Tables and figures

Figure 1: Frequency distribution of reciprocity for employees who get a regular performance appraisal



Note: the frequency distribution for all employees (including those not receiving a regular performance appraisal) is very similar to the one shown above. Details are available upon request.

Table 1: Summary statistics on performance pay

Subgroup		Frequency			Subtotal
No performance appraisal		72% (8179)			
Performance appraisal		28% (3159)			
Appraisal has consequences for:	Bonus only	Promotion only	Bonus and Promotion	Neither	
Total	14% (452)	25% (803)	19% (586)	42% (1318)	100% (3159)
Small firms (<100 employees)	14% (102)	17% (123)	12% (84)	57% (405)	100% (714)
Large firms ($\geq$100 employees)	14% (316)	29% (634)	22% (481)	35% (769)	100% (2200)

Table 2: Description of independent variables used in regression

Risk Attitude	Willingness to take risks on a scale $0-10$, where 0 is extremely risk averse.
Female	Dummy variable: 1=female.
Age	Age in years.
Years of education	Years of education.
Tenure	Years employed by the firm.
Part-time	Dummy variable: 1=part-time job.
East-Germany	Dummy variable: 1 if the place of work is in East-Germany or East-Berlin.
Firm size dummies	Number of employees n in whole company, categorized as follows: (1) $n < 5$ (basis) (2) $5 \leq n < 20$, (3) $20 \leq n < 100$, (4) $100 \leq n < 200$, (5) $200 \leq n < 2000$, (6) $n \geq 2000$.
Industry dummies	One-digit industry code: 1=Agriculture, 2=Energy, 3=Mining, 4=Manufacturing, 5=Construction, 6=Trade, 7=Transport, 8=Bank and Insurance, 9=Services, 10=Other (basis).
Occupational dummies	The individual's occupation and occupational level: Blue collar worker (5 levels), white collar worker (6 levels) or civil servant (4 levels).

Table 3: Effect of reciprocity on the probability of receiving promotion incentives. (Robust standard errors in parentheses)

Dependent variable:	Promotion incentives		Promotion incentives Sample: Firm size<100	Promotion incentives Sample: Firm size≥100
	(1)	(2)	(3)	(4)
Reciprocity	0.154***	0.100***	0.227***	0.139***
	(0.032)	(0.029)	(0.072)	(0.037)
Risk attitude	-0.013	-0.005	-0.045*	-0.002
	(0.013)	(0.012)	(0.027)	(0.016)
Female	-0.117*	-0.197***	-0.190	-0.105
	(0.068)	(0.057)	(0.152)	(0.076)
Age	0.057***	0.093***	0.048	0.063**
	(0.021)	(0.015)	(0.041)	(0.025)
Age squared	-0.001***	-0.001***	-0.001*	-0.001***
	(0.000)	(0.000)	(0.001)	(0.000)
Years of education	0.005	0.111***	-0.026	0.012
	(0.013)	(0.009)	(0.032)	(0.015)
Tenure	0.002	0.025***	-0.013	0.004
	(0.004)	(0.003)	(0.009)	(0.004)
Part-time	-0.178*	-0.208**	-0.106	-0.175
	(0.092)	(0.081)	(0.189)	(0.107)
East-Germany	-0.392***	-0.533***	-0.505***	-0.364***
	(0.072)	(0.065)	(0.143)	(0.085)
Constant	-2.499***	-3.557***	-2.227**	-2.601***
	(0.513)	(0.365)	(0.895)	(0.560)
Firm size dummies	Yes	No	Yes	Yes
Industry dummies	Yes	No	Yes	Yes
Occupational dummies	Yes	No	Yes	Yes
Observations	2726	2829	631	2088
Pseudo R^2	0.228	0.097	0.246	0.207
Log likelihood	-1452.96	-1761.42	-291.25	-1146.39
Reduction factor	0.369	0.362	0.372	0.372

***,**,* indicate significance at 1%, 5%, and 10% level respectively.

Table 4: Effect of reciprocity on the probability of receiving bonus pay. (Robust standard errors in parentheses)

Dependent variable:	Bonus pay		Bonus pay Sample: Firm size<100	Sample: Firm size≥100
	(1)	(2)	(3)	(4)
Reciprocity	-0.011	0.001	0.102	-0.056
	(0.044)	(0.042)	(0.092)	(0.053)
Risk attitude	0.015	0.021	-0.031	0.003
	(0.019)	(0.018)	(0.035)	(0.023)
Female	-0.193**	-0.362***	-0.226	-0.159
	(0.094)	(0.082)	(0.186)	(0.111)
Age	0.074***	0.110***	0.097**	0.058*
	(0.027)	(0.02)	(0.048)	(0.034)
Age squared	-0.001**	-0.001***	-0.001**	-0.001
	(0.000)	(0.000)	(0.001)	(0.000)
Years of education	0.043**	0.058***	0.060	0.029
	(0.019)	(0.013)	(0.041)	(0.023)
Tenure	0.007	0.008*	0.013	0.003
	(0.005)	(0.004)	(0.010)	(0.006)
Part-time	-0.182	-0.345***	0.001	-0.276*
	(0.127)	(0.119)	(0.231)	(0.156)
East-Germany	-0.094	-0.176**	-0.216	-0.017
	(0.094)	(0.086)	(0.161)	(0.120)
Constant	-2.993***	-3.761***	-4.230***	-2.930***
	(0.649)	(0.512)	(1.145)	(0.794)
Firm size dummies	Yes	No	Yes	Yes
Industry dummies	Yes	No	Yes	Yes
Occupational dummies	Yes	No	Yes	Yes
Observations	1461	1474	448	1013
Pseudo R^2	0.160	0.078	0.196	0.165
Log likelihood	-714.88	-793.83	-186.17	-512.29
Reduction factor	0.3766	0.3785	0.3698	0.3883

***,**,* indicate significance at the 1%, 5%, and 10% level respectively.

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