Delegation with a Reciprocal Agent*

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Abstract

We consider a model in which a principal may delegate the choice of a project to a better informed agent. The preferences of the agent and the principal about which project should be undertaken may be discordant. Moreover, the agent benefits from being granted more discretion in the project choice and may be motivated by reciprocity. We find that the relationship between the agent's reciprocity and discretion crucially depends on the conflict of interest with the principal. When preferences are more congruent (discordant), discretion is broader (more limited) if the agent is more reciprocal. Hence, reciprocity mitigates (exacerbates) a mild (severe) conflict of interest. We also present supportive evidence for the predictions of our model using the German Socio-Economic Panel dataset.

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1 Introduction

Discretion in the workplace widely varies across countries and industries (see Ortega, 2004, Bloom et al., 2012, and Gallie and Zhou, 2013). For instance, in the high-tech industry delegation of decision-making authority to subordinates and extensive job autonomy are rife. A remarkable example is Google's time-off program, commonly referred to as 20 percent, which allows employees to allocate one-fifth of their time to side-projects that they can choose or even create. Over the years this policy has led to the development of successful products, such as Gmail and Google news.[1] Similar initiatives exist at 3M (15 per cent time), LinkedIn (InCubator), and Apple (Blue Sky).[2] In other sectors, such as transport, retail, construction, and manufacturing, employees generally receive little discretion (see Gallie and Zhou, 2013).

Given the prominent role of job discretion in organizations, scholars in a variety of disciplines have investigated its determinants. The economics literature has highlighted the trade-off between gain of information and loss of control that delegation of decision-making authority entails (see Holmström, 1977, Aghion and Tirole, 1997, Baker et al., 1999, and Dessein, 2002). On the one hand, delegation may be beneficial to the organization. This is because subordinates may have a better understanding of what tasks should be performed or may be in a better position to evaluate what projects should be pursued than the organizational leaders. On the other hand, the benefits of delegation may be diminished when the interests of the parties are dissonant and the superiors have limited instruments to align the employees' preferences. However, in the real-world, employees often receive a substantial degree of discretion and they do not seem to act at the detriment of their employers, although their interests are not fully aligned. As a case in point, the leading pharmaceutical company GlaxoSmithKline lets its scientists choose which projects to pursue and provides wide discretion to the different research teams on how to spend their budget. Among other things, scientists can embark on trials of promising compounds without asking for the headquarter's permission. The adoption of this approach has been successful and conducive to more innovation.[3]

In this paper we argue that one important determinant of the amount of discretion delegated by an employer may be the employee's sensitivity to reciprocity. An individual is said to be *reciprocal* if she responds to actions she perceives to be kind in a kind manner, and to actions she perceives to be hostile in a hostile manner (see Rabin, 1993, Dufwenberg and Kirchsteiger, 2004, and Falk and Fischbacher, 2006). In the last decades, experimental evidence has shown that individuals are often motivated by reciprocity (for a review, see Fehr and Schmidt, 2006).

Delegating authority can stimulate the response of a reciprocal agent thanks to its impact on job satisfaction. Psychologists have long argued for a causal link between worker discretion and happiness in the workplace as well as welfare. In particular, the seminal article by Karasek Jr (1979) posits that employees' authority over job-related decisions positively affects their health and their morale (the job-strain model), whereas the influential work by Hackman and Oldham (1976) suggests that on-the-job autonomy is one of those work characteristics which increase job satisfaction (the job characteristics model) and this hypothesis has been supported by later studies (e.g., see Fried and Ferris, 1987 and Humphrey et al., 2007). Furthermore, an increasingly large body of empirical research in other disciplines, from sociology (see Gallie and Zhou, 2013, who use data from the 5th European Working Condition Survey) to economics (see Freeman and Kleiner, 2000 and Bartling et al., 2013), supports the existence of a positive relationship between employee involvement and job satisfaction.[4] As a result, by granting more discretion, the employer can increase the employee's job satisfaction and thereby being perceived as kind.

In the model, a principal (she) may delegate the choice of a project to a better informed agent (he). The agent is better informed as he knows which project may succeed. The agent and the principal have conflicting interests about which project should be undertaken, though. In particular, the agent is biased towards larger projects. Both the principal and the agent are interested in the project being successful even though they may attach a different weight to it.

We assume that the principal can restrict the set of projects from which the agent can choose. We say that the agent is granted more *discretion* when the set of allowed projects is larger. When the agent is not motivated by reciprocity, the principal might find it profitable to exclude those projects which yield the agent the largest private benefits. Although the optimal decision will not always be available, constraining the agent's decision set ensures that he will not systematically opt for the project which gives him the maximum private benefits.

When the agent is motivated by reciprocity, the principal's choice of restricting the set of decisions can be interpreted in different ways, as it affects the agent's payoff opportunities. The agent may perceive the principal's behavior as *hostile* to him, and he may intentionally hurt the principal by choosing a suboptimal project. Alternatively, the agent may perceive the principal's decision to delegate a certain set of projects as *kind*. In that case, the principal could be better off by delegating a larger set. In both instances, the decision set found in the delegation problem when the agent has standard preferences is no longer optimal.

We find that the effect of reciprocity on the discretion granted to the agent crucially depends on the underlying conflict of interest between the parties. When the agent's and the principal's preferences about the best course of action are very dissonant, the principal can only grant the agent little discretion, which makes the principal appear unfriendly to the agent. The principal is better off restricting even more the agent's delegation set to escape his retaliation when the agent is more sensitive to reciprocity. Hence, reciprocity exacerbates a severe conflict of interest. In contrast, when the principal's and the agent's preferences are more congruent, discretion can be broad, and this makes the principal appear kind to the agent. When the agent is more prone to reciprocate, the principal can increase his delegation set, trusting that the agent will choose a project which can be successful, even if it is not his favorite one. Thus, reciprocity alleviates a mild conflict of interest.

In the baseline model we take as exogenously given the reference point against which the agent judges the principal's kindness. In the second part of the paper, we contemplate different alternatives for what may determine this reference point.

We also present supportive evidence for the predictions of our model using the German

Socio-Economic Panel (GSOEP) dataset. In the data, it is possible to distinguish between positive and negative reciprocity inclinations and there is a measure of task discretion in the workplace. We find that the employees' sensitivity to reciprocity tends to affect the level of delegation they enjoy in the workplace.

The remainder of the article is as follows. The related literature is discussed in the next section. In Section 3 the setup of the benchmark model is presented and the analysis of the optimal delegation contract without reciprocity is performed. Section 4 is devoted to the analysis of the role of reciprocity in shaping the optimal delegation set granted by the principal. In Section 5 different alternatives for the reference point are explored. In Section 6 the empirical analysis is carried out and concluding remarks are provided in Section 7.

2 Related Literature

The economics literature has long studied situations in which a principal delegates the right of taking a decision to a better informed agent. Holmström (1977) was the first to formalize the problem in terms of constrained delegation as the principal may wish to limit the agent's discretion. This occurs because the principal and the agent disagree on what project should be undertaken and the principal cannot use monetary incentives to align the agent's preferences. Building on Holmström's pioneering contribution, many authors have characterized the optimal delegation sets (see Melumad and Shibano, 1991, Martimort and Semenov, 2006, and Alonso and Matouschek, 2008).[5] We follow this tradition by developing a delegation model in which the principal must decide how much discretion to give to an agent who may be sensitive to reciprocity. We also consider a setting in which the set of the states of the world is continuous and the agent's and the principal's preferences are dissonant. In particular, we assume that the agent is biased towards larger projects.[6]

In this tradition, our setting is most closely related to Englmaier et al. (2010), who also develop a model in which the agent has a predilection for larger projects. They study how the provision of monetary incentives and discretion to an agent varies with the horizon of the relationship. The agent observes a signal about the state of the world which can be either right or wrong. Both the agent and the principal do not know whether the former has observed the right signal and the agent also derives personal benefits from taking larger actions. The authors find that the level of discretion is positively associated with stronger monetary incentives and the length of the relationship. While Englmaier et al. (2010) explore the role of repeated interaction and career concerns, we focus on the impact of reciprocity motivations on the delegation set granted to the agent.

The key assumption of our paper is that the agent is motivated by reciprocity. In the last decades, experimental evidence from the gift-exchange game and the ultimatum game has shown that individuals have reciprocity concerns (for a review, see Fehr and Schmidt, 2006).[7] Our concept of reciprocity is borrowed from Rabin (1993), Dufwenberg and Kirchsteiger (2004), and Falk and Fischbacher (2006). A reciprocal agent responds to actions he perceives to be kind in a kind manner, and to actions he perceives to be hostile in a hostile manner. In these models, preferences do not only depend on material payoffs but also on beliefs about why the other party has chosen a certain action. These models require the use of the elaborate tools of psychological game theory (see Geanakoplos et al., 1989). Having several states of the world about which only the agent is perfectly informed makes it hard to apply the more elaborate models of reciprocity. For this reason, we content ourselves with a simplified treatment of reciprocity which is still able to convey useful insights about its role in a delegation problem. We base the definition of kindness on the observation that a larger delegation set benefits the agent. The more discretion the principal grants to the agent, the higher the principal's kindness. This is in line with the results of the experiment conducted by Falk and Kosfeld (2006) where they find that agents exert less effort when principals restrict their choice set.

In our modeling approach we follow Englmaier and Leider (2012) who find a very tractable way of embedding reciprocity in a principal-agent model. Englmaier and Leider (2012) develop a moral-hazard model in which an agent has reciprocal preferences towards the principal and reciprocal motivations are a source of incentives. They find that a higher fixed wage and explicit performance-based pay are substitutes and that the optimal contract entails a mix of both incentive forms. If the agent is very sensitive towards reciprocity or output is a poor signal of effort, the use of performance-based compensation is less effective in inducing the agent to exert effort. Then the principal will pay a higher fixed wage to motivate the agent.[8] In a related vein, Dur (2009) considers a manager-employee relationship in which managers may be innately altruistic towards their employees and employees are conditionally altruistic towards their managers. While Englmaier and Leider (2012) assume that the principal induces reciprocity by leaving a monetary rent to the agent, Dur (2009) assumes that reciprocity can also be induced by the manager's attention. Dur (2009) shows that an altruistic manager always gives attention to the employee and may pay a lower wage than an egoistic manager. Dur et al. (2010) also study optimal incentive contracts paid to employees who are sensitive to reciprocity, which is stimulated by the principal's attention. In our paper, the principal stimulates the reaction of a reciprocal agent through her choice of the delegation set. Giving more (less) discretion is perceived as a kinder (more hostile) behavior because the agent benefits from having a larger delegation set from which he can select a project.

Using survey data representative for the German population, some scholars have studied the relationship between reciprocity and incentives as well as job satisfaction in the workplace. In particular, Dohmen et al. (2009) find that workers who exhibit positive reciprocity tend to earn higher wages whereas negative reciprocity has no effect on labor income. Dur et al. (2010) find that the probability of receiving promotion incentives is increasing in the workers' sensitivity to positive reciprocity. Fahn et al. (2017) find that individuals who exhibit stronger (positive) reciprocity concerns are more likely to work overtime and this propensity is higher for workers who are close to retirement.[9] In our empirical analysis, we use the same data-set and we find that there exists a significant relationship between employees' sensitivity to reciprocity and the amount of discretion they enjoy in the workplace.

3 The Model

We develop a delegation model where a principal may find it profitable to grant some discretion over the choice of a project to an agent. The benefits of delegation stem from the agent's superior information regarding the best course of action. The potential costs of delegation are associated with the conflict of interest between the principal and the agent. In particular, we assume that the agent's and the principal's favorite project may differ. Therefore, the principal faces a trade-off between the *gain of information* and the *loss of control*. We study how the principal can address this conflict of interest by limiting the agent's discretion. In what follows, we first describe and solve the model when the agent has standard preferences, and we subsequently study how the agent's reciprocity concerns affect the optimal solution.

3.1 The Basic Set-up

Information. We consider a principal who may delegate the right to choose a project (or take a decision) to a better informed agent. Specifically, the agent privately observes the state of the world, whereas the principal only knows its distribution. The state of the world is denoted by $\omega \in \Omega = [0, n]$ and is distributed according to a continuous distribution function $F(\cdot)$, with positive density $f(\cdot)$.

Payoffs and Conflict of Interest. The principal may refrain from delegating the choice of the project, assigning the agent a standard task $\tilde{d}$. This standard task generates a small payoff s for the principal and 0 for the agent with certainty.[10] If the principal delegates the choice of the project, the principal's and the agent's payoff depend on both the agent's decision and the state of the world. The decision $d \in [0, n]$ yields a success with probability $p \in (0, 1)$ if $d = \omega$, and 0 otherwise.

A successful project generates a payoff S for the principal and αS for the agent. The parameter $\alpha \geq 0$ captures how congruent the preferences of the agent and the principal are. An agent may derive some benefits, captured by αS, from having managed a successful project, e.g. a success may boost the agent's career or just make him proud. Alternatively, the parameter α may capture the agent's altruism: when choosing the project which coincides with the state of the world, the agent is taking an action that benefits the principal.[11] In addition, we assume that the agent obtains private benefits from the project, $b(d) = \underline{b} + g(d)$, irrespective of its outcome. We assume that $\underline{b} > 0$ to indicate that the agent always obtains a fixed benefit from being delegated the choice of the project, e.g. he likes to be trusted by the principal. Moreover, we assume that $g(\cdot)$ is twice continuously differentiable with $g'(\cdot) > 0$, $g''(\cdot) \leq 0$, and $g(0) = 0$. This means that the agent is biased towards larger decisions: Implementing a larger project may make the agent's resume stand out and may enrich his skills and experience. However, the marginal utility from running a larger project is diminishing. The conflict of interest between the principal and the agent on which decision should be taken is more severe when α is smaller and the projects are larger.

We define $\nu(d) \equiv \frac{g'(d)}{f(d)}$ and we impose the following restriction:[12]
Assumption 1. $\nu'(d) > 0$ *for all* $d \in \Omega$.

As $g(\cdot)$ is concave, the above assumption implies that larger states are less likely to occur. It stands to reason that larger investment or business opportunities are more unlikely to present themselves. For instance, the chances that pursuing a technological or scientific breakthrough represents the right course of action are slimmer than those of undertaking incremental technical or research contributions, such as slight improvements on existing softwares and drugs.[13]

Contracts. We assume that the principal is able to restrict the set of decisions from which the agent can choose. In particular, the principal chooses a compact decision set $D \subseteq \Omega$ and we say that the agent is granted more *discretion* when this set encompasses more projects.

Timing of the game. *In stage 1*, the principal chooses between the set of decisions D and the standard task $\tilde{d}$. In the latter case, the agent performs the task and the game ends. Otherwise, the game proceeds as follows. *In stage 2*, the agent observes the state

ω. *In stage 3*, the agent chooses $d \in D$. *In stage 4*, payoffs are realized.

Both the principal and the agent are risk-neutral and have zero outside options. To summarize, in stage 3 the principal's and the agent's expected utilities are:

$$u_P = \begin{cases} s & \text{if } d = \tilde{d}; \\ pS & \text{if } d = \omega; \\ 0 & \text{if } d \neq \{\omega, \tilde{d}\}; \end{cases} \qquad u_A = \begin{cases} 0 & \text{if } d = \tilde{d}; \\ \alpha pS + b(\omega) & \text{if } d = \omega; \\ b(d) & \text{if } d \neq \{\omega, \tilde{d}\}. \end{cases}$$

We impose the following condition which implies that it is always socially optimal to choose the project that coincides with the state of the world, that we henceforth call *the right project*.

Assumption 2. *Throughout the paper we maintain the following:*

$$pS + \alpha pS \geq b(n) - b(0) = g(n).$$

3.2 Benchmark: Optimal Delegation without Reciprocity

The principal's problem is to choose how much discretion to grant to the agent, if any.[14] If the principal delegates, she chooses the decision set D to maximize the following expected utility:

$$E_\omega u_P(d^*(\omega, D), \omega) = pS \; Pr[d^*(\omega, D) = \omega], \tag{1}$$

subject to the agent's incentive compatibility constraint:

$$d^*(\omega, D) \equiv \arg\max_{d \in D} \; E[u_A|\omega, D]. \tag{2}$$

Let h be the maximum element of D, i.e. the largest decision the agent is allowed to take. The following lemma characterizes the optimal agent's choice.

Lemma 1. *Characterization of the optimal agent's choice:*

(i) If $\omega \in D$, the agent chooses either $d = \omega$ or $d = h$.

(ii) If $\omega \notin D$, the agent chooses h.

If the state of the world belongs to the set of allowable decisions, the agent's choice is in fact dichotomic. The agent will pick either the right project, i.e. $d = \omega$, obtaining an expected payoff of $\alpha pS + b(\omega)$, or the wrong project which gives him the maximum private benefit, i.e. the agent will choose h obtaining $b(h)$. Whenever the state of the world does not belong to D, the best the agent can do is to choose h.

As for the principal's delegation choice, the following lemma shows that this takes the form of a decision set which, without loss of generality, includes all the projects smaller than h and induces the agent to choose the right project whenever this is available.

Lemma 2. *The principal's delegation choice takes the form:*

(i) $D_{h^*} \equiv [0, h^*]$;

(ii) h^* is set in such a way that $d^*(\omega, D_{h^*}) = \omega, \quad \forall \omega \in D_{h^*}$.

The principal benefits from delegating authority only if the agent chooses the right project when available. However, the agent may find it profitable to choose the largest project even when this does not coincide with the state of the world. This conflict of interest leads the principal to exclude the largest projects because they are more appealing to the agent. Therefore, the principal will set an upper bound h to the delegation set in such a way that the agent chooses $d = \omega$ whenever $\omega \in [0, h]$. Because of Assumption 1, the principal prefers this option to providing the agent with full discretion and tolerating that the agent will select the right project only when ω is large enough. As a result, in characterizing the optimal delegation set, we can focus on the principal's choice of h. The maximization problem can be restated as follows:

$$\max_{h \in \Omega} \quad pS \int_0^h f(\omega) d\omega, \tag{3}$$

subject to the agent's incentive compatibility constraint:

$$\alpha \, p \, S + b(\omega) \geq b(h), \quad \forall \omega \in D_h. \tag{4}$$

This condition means that the agent must be weakly better off if he chooses the right project when this is available rather than the one which gives him the maximum private benefits, whose associated payoff we henceforth call the *agent's temptation*. The tightest incentive compatibility constraint occurs when $\omega = 0$ and can be written as:

$$\alpha\, p\, S + b(0) \geq b(h) \quad \Leftrightarrow \quad \alpha\, p\, S \geq g(h). \tag{5}$$

When the tightest incentive compatibility constraint is satisfied, this will also be the case for any $\omega \in (0, h]$. Therefore, the agent will always choose the right project when available. Proposition 1 shows that the principal grants full discretion unless the tightest incentive compatibility constraint binds for $h < n$, in which case discretion is limited.

Proposition 1. *The optimal maximum element of D satisfies the following:*

$$h^{*} = \min\{\gamma(\alpha\, p\, S), n\}, \tag{6}$$

where γ is the inverse of function g.

This proposition establishes that the optimal level of discretion h^* is positively correlated with the non-monetary benefits accruing to the agent from managing a successful project and with the concavity of function $g(\cdot)$. This represents the agent's private benefits for larger projects and is inversely related to the conflict of interest with the principal. If the conflict of interest between the parties is not very severe, the agent might be granted full discretion.

In stage 1 the principal compares her utility when she delegates $[0, h^*]$ and s, i.e. the payoff of the standard task $\tilde{d}$. The principal will delegate authority over the choice of the project to the agent if and only if:

$$p\, S\, F(h^{*}) \geq s. \tag{7}$$

4 Delegation with a Reciprocal Agent

In this section we augment the model developed so far by assuming that the agent may be motivated by reciprocity and we study the interaction between reciprocity and discretion. As discussed in the introduction, a reciprocal individual responds to actions he perceives to be kind in a kind manner, and to actions he perceives to be hostile in a hostile manner (see Rabin, 1993, Dufwenberg and Kirchsteiger, 2004, Falk and Fischbacher, 2006, Sebald, 2010, von Siemens, 2013, and Livio and De Chiara, 2018).

The agent's utility given the state of the world ω and a decision set D_h now consists of his material payoff and his reciprocity payoff:

$$U_A(d^*(\omega, D_h)|\omega) = \underbrace{u_A(d^*(\omega, D_h)|\omega)}_{\text{Agent's Material Payoff}} + \underbrace{\eta\, k_{PA}(D_h)\, u_P(d^*(\omega, D_h)|\omega)}_{\text{Reciprocity Payoff}}. \tag{8}$$

In the above expression, the term $\eta \in [0, 1]$ represents the agent's concern for reciprocity. The agent is more sensitive to the kindness/hostility of the principal's action when this parameter is higher. The term $k_{PA}(D_h)$ is the *principal's kindness*, or simply kindness. It captures how friendly the principal's delegation choice is perceived by the agent. This term is positive when the principal's action is perceived as kind and is negative when it is perceived as hostile. Its sign and value depend on how much discretion the principal grants to the agent. We devote the next subsection to the characterization of $k_{PA}(D_h)$. Finally, as it is standard in the literature on reciprocity, the agent takes into account how his action affects the principal's material payoff u_P.

4.1 The Principal's Kindness

In our setup the principal decides how much discretion to grant to the agent, if any. A reciprocal agent will perceive the principal as friendly or hostile depending on this action and will respond accordingly. Psychologists argue for a positive causal link between job discretion and job satisfaction (see Hackman and Oldham, 1976, and Karasek Jr, 1979). In our model, granting more discretion has a positive impact on the agent's satisfaction thanks to its positive effect on the agents' expected material payoff. Therefore, we postulate a positive relationship between discretion and the principal's kindness. In the following lemma, we formally prove the observation that more discretion increases the agent's material payoff.

Lemma 3. *If $D' \subset \hat{D} \subseteq \Omega$, it holds that*

$$E_\omega u_A(\omega, \hat{D}) \geq E_\omega u_A(\omega, D'). \tag{9}$$

Furthermore, if $D' \subset \hat{D} \subseteq \Omega$ and $h' < \hat{h}$, where h' and $\hat{h}$ are the maximum elements of D' and $\hat{D}$, respectively, then the above inequality holds strictly.

We can consider the principal's kindness as a function of the maximum element of the delegation set h. This is because it is without loss of generality for the principal to grant a delegation set of the form $D_h = [0, h]$ as the following lemma shows:

Lemma 4. *When $\eta \geq 0$ it is without loss of generality to focus on optimal delegation sets of the form: $D_{h^R} \equiv [0, h^R]$.*

We make some general assumptions on the functional form of k_{PA}. In particular, we assume that $k_{PA}(h)$ is a continuous and concave function, and belongs to the interval $[-1, 1]$, with $k'_{PA} > 0$ and $k''_{PA} < 0$. The principal's kindness takes positive values when the discretion granted by the principal is greater than some *reference point.* The reference point is a level of discretion that the agent considers to be fair. As such, it can be affected by a number of variables, like the amount of discretion an agent receives relative to his peers' or the range of possibilities of the principal. In the remainder of this section, we refrain from adopting a specific view of what the agent considers as a fair payoff, but we just suppose that the agent regards the principal as kinder the more discretion she grants him.[15] In Section 5 we will take some specific stances on what affects the reference points and we will discuss some alternative formulations.

4.2 Optimal Delegation with Reciprocity

If the agent is motivated by reciprocity, i.e. $\eta > 0$, the solution $D_{h^*} = [0, h^*]$ ceases to be optimal. If the principal continues to implement the solution without reciprocity, expecting the agent to always select the right project when available, either of the following situations may occur. For one, if the agent perceives the principal's choice of delegating D_{h^*} as *kind*, i.e. $k_{PA}(h^*) > 0$, the agent might weakly prefer $d = \omega$ to $d = h'$ when ω is very small for some $h' > h^*$. In that case, the principal would not be enjoying all the benefits of delegation. Conversely, if the agent perceives the principal's choice of delegating D_{h^*} as *hostile*, i.e. $k_{PA}(h^*) < 0$, the agent would be willing to retaliate and for ω small enough he might choose $d = h^*$.[16]

Through its effect on the agent's material payoff, the principal's choice of h also affects the agent's reciprocity payoff. Akin to the previous section, a marginal increase in h positively affects the agent's temptation, and this is captured by $g'(h)$, which makes it more difficult to satisfy incentive compatibility. On the other hand, granting more discretion has a positive impact on the reciprocity payoff as the principal is perceived by the agent as kinder or less hostile. The marginal impact of h on the reciprocity payoff is captured by $\eta k'_{PA}(h)pS$, which is increasing in η, and makes it easier for the incentive compatibility constraint to hold.

Plausibly, the agent values more the direct effect of selecting a larger project on his material payoff than the indirect effect on his reciprocity payoff, which is associated with the possibility of selecting it. For this reason, in what follows we maintain the following assumption:[17]

Assumption 3. *For all $h \in (0, n)$, it holds that $g'(h) > \eta k'_{PA}(h)pS$, and $g''(h) > \eta k''_{PA}(h)pS$.*

Note that Assumption 3 requires that η be sufficiently higher than 0, that is the reciprocal agent must display some minimum sensitivity to reciprocity. Taken along with Assumption 1, the above implies that the function $g(\cdot)$ must be significantly less concave than both $F(\cdot)$ and $k_{PA}(\cdot)$.[18]

Unlike the case in which η is equal to 0, here the principal may tolerate that for ω small enough the agent chooses the largest available project. The intuition is that the principal may decide to grant broad discretion so as to stimulate the agent's positive reaction and this will be more likely to occur when the agent's reciprocity concern is sufficiently strong. For this reason, the principal's maximization problem is no longer univariate. When the principal delegates, she solves the following problem:

$$\max_{l,h\in\Omega} \quad pS\int_{l}^{h} f(\omega)d\omega, \tag{10}$$

subject to the tightest incentive compatibility constraint:

$$\alpha\, p\, S + g(l) + \eta\, k_{PA}(h)\, p\, S \geq g(h). \tag{11}$$

Proposition 2 illustrates the optimal delegation set granted by the principal when the agent is motivated by reciprocity.

Proposition 2. *When the agent is motivated by reciprocity and the principal delegates, she sets $h^R = n$ if*

$$n \leq \gamma\big((\alpha+\eta)pS\big). \tag{12}$$

If so, $l^R = 0$. When inequality (12) is not satisfied, two solutions may arise:

(i) The principal grants $[0, h^R]$ where h^R is the maximum value of $h \in (0, n)$ which implicitly solves the following equation: $\alpha\, p\, S + \eta\, k_{PA}(h^R)\, p\, S = g(h^R)$, and $l^R = 0$.

(ii) The principal grants $[0, \tilde{h}^R]$ where $\tilde{h}^R \in (0, n]$ and $\tilde{l}^R$ are implicitly determined from:

$$\begin{cases} \tilde{l}^R & = \gamma\Big[g(\tilde{h}^R) - \alpha pS - \eta k_{PA}(\tilde{h}^R)pS\Big], \\ f(\tilde{h}^R)g'(\tilde{l}^R) & = f(\tilde{l}^R)\Big[g'(\tilde{h}^R) - \eta k'_{PA}(\tilde{h}^R)pS\Big]. \end{cases}$$

Let

$$\hat{\eta} \equiv \frac{g(\tilde{h}^R) - g(h^R)}{\big(k_{PA}(\tilde{h}^R) - k_{PA}(h^R)\big)pS}.$$

There exists $\tilde{\eta} \in (0, \hat{\eta}]$ such that for any $\eta \leq \tilde{\eta}$, the principal prefers to grant $[0, h^R]$ to $[0, \tilde{h}^R]$.

The principal grants full discretion as the agent always selects the right project when inequality (12) is satisfied. Otherwise, the principal has two alternatives under which the tightest incentive compatibility constraint binds. As a first option, the principal can induce the agent to always select the right project when this is available, granting $[0, h^R]$. Alternatively, the principal can grant more discretion to the agent and tolerate that the largest available project will be selected for ω small enough. Under this option, the principal grants $[0, \tilde{h}^R]$, and there is $\tilde{l}^R \in (0, \tilde{h}^R)$ above which the agent selects the right project. This second option benefits the principal when the gain stemming from having projects in the interval $[h^R, \tilde{h}^R]$ selected outweighs the loss incurred when ω belongs to the interval $[0, \tilde{l}^R]$. This occurs when the agent's sensitivity to reciprocity is sufficiently high. Intuitively, the principal appears to be kinder under the second option because the agent enjoys more discretion, and this stimulates a stronger reciprocal response. Hence, when the agent is very sensitive to reciprocity, the principal's gain, i.e. $pS[F(\tilde{h}^R) - F(h^R)]$, is substantial, whereas the loss, i.e. $pS[F(\tilde{l}^R)]$, is small. However, we must stress that the solution $[0, \tilde{h}^R]$ may be preferred by the principal only for values of the agent's sensitivity to reciprocity which are inadmissible, namely, it may be the case that $\tilde{\eta} > 1$.[19]

4.3 Effect of Reciprocity on Delegation

The agent's sensitivity to reciprocity may crucially affect the optimal delegation set. To have a better understanding of the effect of a change in η on h^R we now carry out a comparative statics analysis.

Intuitively, when the tightest incentive compatibility constraint is slack so that the principal grants full discretion, an increase in η has no impact on h^R.[20] We now focus our analysis on the solution in which the principal grants the agent $[0, h^R]$. Define h^F as the value of h such that k_{PA} evaluated at h^F is equal to 0. This means that the agent perceives h^F as the *fair* level of discretion. In other words, h^F is the reference point against which the agent judges whether and to what extent the principal is kind or hostile. A level of discretion greater than h^F is perceived by the agent as a gift because the principal is delegating more than what the agent considers as fair or equitable. In contrast, the agent perceives the principal's behavior as unfriendly if she delegates less than h^F. For the Intermediate Value Theorem, there exists an $h^F \in (0, n)$ such that $k_{PA}(h^F) = 0$. The following proposition shows how the agent's sensitivity to reciprocity affects the optimal level of discretion and thereby the principal's utility.

Proposition 3. *Consider the solution where the principal grants the agent* $[0, h^R]$.

(i) If $h^* \geq h^F$*, the principal is always weakly better off if the agent's sensitivity to reciprocity increases, i.e.* $\frac{\partial h^R}{\partial \eta} \geq 0$.

(ii) If $h^* < h^F$*, the principal is always weakly worse off if the agent's sensitivity to reciprocity increases, i.e.* $\frac{\partial h^R}{\partial \eta} \leq 0$.

Therefore, how the sensitivity to reciprocity affects the optimal level of discretion critically depends on the conflict of interest between the principal and the agent.

When the underlying conflict of interest is relatively small, i.e. $h^* \geq h^F$, the principal can grant at least h^* to a reciprocal agent.[21] Since the agent would perceive the principal as kind, he would be willing to reward her. This means that the agent would choose the smallest but right project over some projects larger than h^*. As a result, the principal finds it profitable to increase the delegation set. The higher η, the more discretion the principal will grant, up to the point where she will give full discretion.

When the underlying conflict of interest is severe, i.e. $h^* < h^F$, the principal cannot continue to grant the same level of discretion as when $\eta = 0$.[22] In this case, the agent would perceive her as unfriendly and would be willing to retaliate by choosing h^* instead of a small but right project. As a consequence, the principal is better off shrinking the delegation set. The higher the agent's sensitivity to reciprocity the less discretion the principal finds it profitable to grant. The principal cannot take advantage of the higher agent's sensitivity to reciprocity to broaden discretion because granting larger projects has a stronger impact on the agent's material payoff than on his reciprocity payoff.

To summarize, reciprocity has opposing effects on the optimal level of delegation depending on the underlying conflict of interest:

(a) Reciprocity concerns alleviate a mild conflict of interest up to the point where it disappears, thereby enabling the principal to grant full discretion.

(b) Reciprocity concerns exacerbate a severe conflict of interest, thereby rising the likelihood that the principal retains authority and assigns the agent the standard task.

Note that when η is higher, the agent places a larger weight on the reciprocity component of his utility function. Therefore, if the principal's expected gain due to the choice of the right project grows larger, i.e. pS increases, the effect of η on the equilibrium level of discretion is magnified. Corollary 1 illustrates this positive relationship between what is at stake for the principal and the agent's reaction to kindness.

Corollary 1. *When the principal grants the agent* $[0, h^R]$*, it holds that: sign* $\frac{\partial^2 h^R}{\partial \eta \partial pS} =$ *sign* $k_{PA}(h^R)$.

The other solution where the principal grants $[0, \tilde{h}^R]$, and $\tilde{l}^R$ is positive, gives rise to more intricate comparative statics results.[23] The reason is that a change in the agent's sensitivity to reciprocity will be accompanied by changes in both $\tilde{l}^R$ and $\tilde{h}^R$. In particular, if $k_{PA}(\tilde{h}^R) < 0$, so that the principal is perceived as unfriendly, an increase in η will lead the agent to retaliate more harshly. In this case, the principal finds it profitable to provide more discretion to weaken the agent's negative reaction. Despite granting more discretion, the principal does not benefit from the increase in the agent's sensitivity to reciprocity. This is because the threshold value above which the agent chooses the right project, $\tilde{l}^R$, also increases. When $k_{PA}(\tilde{h}^R) > 0$, the effect of a change in η on discretion is ambiguous. Being perceived as friendly, the principal wants to take advantage of the agent's higher sensitivity to reciprocity by increasing the likelihood that the right project will be chosen. However, this might as well be achieved by reducing discretion: This is profitable if it is followed by a reduction in $\tilde{l}^R$ and the ensuing gain stemming from having the right project selected in small and more probable states of the world outweighs the loss due to large but less probable projects that are no longer delegated. In the proof of Proposition 3, we provide the comparative statics for this case.

4.4 Two Traits of Reciprocity

So far we have assumed that we only have one parameter that captures the agent's reciprocity concerns. However, in the data it is possible to distinguish between two distinct traits of reciprocity. Namely, an agent exhibits *positive reciprocity* if he is willing to respond kindly to an action he perceives as kind and exhibits *negative reciprocity* if he is willing to respond unkindly to an action he perceives as unkind. Our model can easily be adapted when an agent responds differently to positive and negative reciprocity. To do so, consider two parameters η_1 and η_2 that represent the agent's sensitivity to positive and negative reciprocity, respectively. Equation (8) can be rewritten in the following way:

$$\begin{aligned} U_A(d^*(\omega, D_h)|\omega) = {} & u_A(d^*(\omega, D_h)|\omega) \\ & + \eta_1 \max\{k_{PA}(D_h), 0\} u_P(d^*(\omega, D_h)|\omega) \\ & + \eta_2 \min\{k_{PA}(D_h), 0\} u_P(d^*(\omega, D_h)|\omega). \end{aligned} \tag{13}$$

Positive (negative) reciprocity kicks in only when the principal's action is perceived as kind (hostile). Considering separately positive and negative reciprocity does not contradict our theoretical analysis. Specifically, negative reciprocity is more likely to negatively impact on the amount of discretion when the conflict of interest is severe. In contrast, positive reciprocity is more likely to positively impact on the amount of discretion when the conflict of interest is mild.

When we consider these two traits of reciprocity separately, our theoretical model makes two predictions that we test in our empirical analysis.

Hypothesis 1. *Employees who are more positive reciprocal should weakly receive more discretion.*

This hypothesis says that an increase in η_1 will either lead to an increase in the amount of discretion or have no impact at all.

Hypothesis 2. *Employees who are more negative reciprocal should weakly receive less discretion.*

This hypothesis says that an increase in η_2 will either lead to a reduction in the amount of discretion or have no impact at all.

5 Possible Reference Points and Principal's Kindness

In the baseline model, we have taken the reference point of the agent as exogenously given. If the agent receives an amount of discretion that is broader than the one he deems fair, he will perceive the principal's action as kind. Conversely, if the delegation set falls short of what the agent regards as fair, the principal will come across as unkind.

The level of discretion that is deemed fair represents the reference point against which the agent judges the principal's actual delegation set. Since it plays such a critical role in our analysis, in this section we explore two possible alternatives for the reference point, which are inspired by the existing literature. Additional approaches are investigated in Online Appendix C. Some of these options lead to the development of different definitions of the principal's kindness. Specifically, this may no longer depend only on the agent's payoff opportunities, but also on the agent's expected payoff, which is to some extent affected by the agent's equilibrium behavior.

5.1 Effective and Equitable Payoffs

The game-theoretical literature on reciprocity (e.g., see Rabin, 1993, Dufwenberg and Kirchsteiger, 2004) assumes that the agent perceives the principal's kindness as the difference between the agent's *effective payoff* and the *equitable payoff*, which serves as a reference point. The equitable payoff is given by the simple average between the maximum and the minimum payoff the principal might provide to the agent consistently with the actions she could take in the first stage of the game. In our model, the equitable payoff would be:

$$\pi^{eq} = \frac{1}{2}\Big[\int_{l_n}^{n} \big(\alpha p S + b(\omega)\big) f(\omega) d\omega + b(n) F(l_n)\Big], \tag{14}$$

where l_n is determined from:

$$\alpha pS + g(l_n) = g(n).$$

To understand the above equitable payoff, consider that the minimum payoff the principal can give to the agent is 0, that is obtained if the agent receives the standard task. Conversely, the maximum payoff is the one the agent achieves under full discretion, in which case he chooses the largest project n as long as this gives a higher benefit than the right project. The threshold project for which the agent is indifferent between n and the right one is l_n. The effective payoff the agent can secure himself given the actual delegation set is:

$$\pi^{eff}(h) = \int_l^h \big(\alpha pS + b(\omega)\big) f(\omega) d\omega + b(h)[1 - F(h) + F(l)],$$

where l is determined from $\alpha pS + g(l) = g(h)$. Therefore, the principal's kindness when D_h is delegated could be defined as follows:

$$k_{PA}(h) = \frac{\pi^{eff} - \pi^{eq}}{\pi^{eq}}. \tag{15}$$

In the above expression, we define kindness as the difference between effective and equitable payoffs relative to the equitable payoff, so as to normalize it. Our interpretation of kindness is based on the payoff the agent could get given the delegation set granted by the principal, and not on the actual payoff the agent will obtain at the equilibrium. Therefore, kindness is assumed to be related to the set of opportunities provided by the principal.[24] This idea appears to be in line with the existing empirical evidence. For instance, Falk and Kosfeld (2006) experimentally find that restricting the agents' opportunity set leads to a reduction in the effort levels. Further, note that the principal's kindness, k_{PA}, takes values in the interval $[-1, 1]$ when $D \subseteq \Omega$. In particular, when $h = n$, $k_{PA}(n) = 1$. When $h = 0$, $k_{PA} = -1$. Moreover, k_{PA} is increasing in h:

$$\frac{\partial k_{PA}}{\partial h} = \frac{\alpha pSf(h) + g'(h)[1 - F(h) + F(l)]}{\pi^{eq}} > 0;$$

and is concave:

$$\frac{\partial^2 k_{PA}}{\partial h^2} = \frac{\alpha p S f'(h) + g''(h)[1 - F(h) + F(l)] - f(h)g'(h)}{\pi^{eq}} < 0.$$

This specification is the closest to the one studied in the baseline model of Section 4. It simplifies the analysis and makes it fairly tractable. One potential weakness of this formulation is the lack of a strong theoretical justification for picking as reference point the average between the maximum and the minimum payoff the principal might give to the agent.[25] In the next subsection, we study an alternative specification of the reference point.

5.2 Reference Point, Rational Expectation, and Uncertainty

In this section, we take the view that the reference point depends on the amount of discretion the agent rationally expects to receive given the principal's equilibrium choice. The agent's expectation is rational because he correctly anticipates the equilibrium delegation set granted by the principal. There are several theories arguing that the agents' expectation about the outcome they should receive acts as a reference point (e.g. see Bell, 1985, Gul, 1991, Kőszegi and Rabin, 2006, Hart and Moore, 2008), and this idea is supported by abundant experimental evidence (e.g. see Abeler et al., 2011, Fehr et al., 2011, Gill and Prowse, 2012). Following this view, we posit that an agent is willing to punish or reward departures from such reference point. If we want to incorporate this notion of a reference point into our framework, it is convenient to add the following two elements. Firstly, there must be heterogeneous principals willing to grant different levels of discretion. Secondly, the agent must be uncertain about the type of the principal he will face when he forms his expectation. These ingredients give rise to variation in the agent's reciprocal response.

In the remainder of this subsection, we assume that there are two types of principal. A self-interested principal who only cares about her own material payoff, exactly as in the baseline model, and an altruistic principal, denoted by the subscript a, who also cares about the agent's material payoff. Namely, the altruistic principal's expected utility is:

$$E_\omega U_{P_a}(d^*(\omega, D), \omega) = E_\omega \left[u_P(d^*(\omega, D), \omega) + \psi \; u_A(d^*(\omega, D), \omega) \right], \tag{16}$$

where $\psi > 0$ denotes the principal's altruistic parameter and $d^*(\omega, D)$ refers to the agent's optimal choice. The agent knows that with probability $q \in (0, 1)$ he will be matched with an altruistic principal, whereas with complementary probability $1 - q$ he will be matched with a selfish one.

Below, we consider a theoretical approach inspired by Hart and Moore (2008), whose predictions have received broad support by experimental evidence (Fehr et al., 2009, 2011). In Online Appendix C, we consider a somewhat different explanation where we posit that an individual feels disappointment or elation depending on whether the received outcome falls short of or exceeds expectations.

5.2.1 Reference Point and Feeling of Entitlement

Hart and Moore (2008) propose that the reference point is shaped by the individual's feeling of entitlement. Adopting this perspective in our framework, the agent will be willing to reward the principal if he gets at least what he feels entitled to, in which case $k_{PA} = 1$. In contrast, he will be willing to punish the principal if he feels shortchanged, in which case $k_{PA} = -1$. Expectations play a crucial role in determining the entitlement feeling. Hart and Moore (2008) suppose that the agent feels entitled to the best outcome permitted by the contract. In our setup, this would be the full delegation set. Hence, the agent would feel shortchanged anytime he receives limited discretion. As this could be unrealistic, we suppose that the agent feels entitled to the best outcome (for himself) given the principals' possible inclinations.[26] The agent rationally anticipates the levels of discretion that different types of principals choose in equilibrium.

Suppose first that there is no uncertainty about the principal's type at the time at which the agent forms the entitlement feeling. In this case, the agent always positively reciprocates on the equilibrium path. The agent will feel shortchanged only off-the-equilibrium path if the principal deviates by granting less discretion than her type would prescribe. The following lemma shows that if ψ is sufficiently high the agent will receive more discretion when he is paired with an altruistic principal. Intuitively, since the altruistic principal cares about the agent's well-being, she gladly tolerates that the agent chooses the largest available project for ω small enough. As a result, she will provide the agent with broader discretion than a self-interested principal. In addition, the stronger the principal's altruism the more discretion the agent will receive. The proofs of the results of this section are provided in Appendix B.

Lemma 5 (Certainty about the principal's type)**.** *The altruistic principal grants weakly more discretion than the self-interested principal and an increase in the principal's altruistic parameter (weakly) increases discretion.*

Let us now suppose that the agent does not know the principal's type and, to make the problem interesting, the altruistic principal is sufficiently generous so that the delegation sets granted by the altruistic and selfish principals differ.

Consider the following sequence of events. In stage 0 nature draws the principal's type and the agent only knows the probability distribution. In stage 1 the principal chooses the delegation set. In stage 2 the agent observes the delegation set and the state of the world. In stage 3 the agent chooses the project.

We suppose that the agent forms his expectation about the amount of discretion he should enjoy in stage 0, before knowing the type of the principal he is matched with. In other words, the reference point depends on the agent's lagged expectation.[27]

When there is uncertainty and the feeling of entitlement is formed before knowing with which principal he is matched, there is room for variation in the agent's reaction on the equilibrium path. The agent will feel entitled to the best outcome, i.e. the greatest opportunity set, given the different principals' types. The agent positively reciprocates whenever he receives the amount of discretion he feels he is entitled to, and negatively reciprocates when he feels shortchanged. Therefore, the altruistic principal will continue to grant the same level of discretion as under certainty spurring the agent's positive reaction. In contrast, the self-interested principal faces a dilemma. She can either pursue the agent's favorable response by mimicking the altruistic principal (pooling equilibrium) or suffer from the agent's retaliation by granting less discretion (separating equilibrium). The cost of the first option is that the self-interested principal must tolerate that the agent will choose h for states of the world which are small enough. As shown in Proposition 4, this option is costlier for the selfish principal the higher the altruistic parameter ψ.

Proposition 4 (Uncertainty about the principal's type)**.** *If ψ is sufficiently high, there is a separating equilibrium in which: (i) the altruistic principal grants more discretion than the selfish principal; (ii) the agent will positively (negatively) reciprocate the altruistic (selfish) principal on the equilibrium path. If ψ is small enough, there is a pooling equilibrium and the agent will always positively reciprocate on the equilibrium path.*

An increase in η has an ambiguous effect on the equilibrium delegation level when the agent positively reciprocates. This occurs when there is either a pooling equilibrium or a separating equilibrium and the agent faces an altruistic principal. The threshold value of l above which the agent chooses the right project goes down when the sensitivity to reciprocity increases. As a result, the altruistic principal may find it profitable to provide the agent with less discretion: While she loses large but unlikely states that the agent would have chosen, she can obtain the benefits stemming from smaller and more likely states that the agent is now willing to choose. Crucially, this result is due to the fact that a reduction in the level of discretion provided by the altruistic principal does not make her action less kind, namely k_{PA} continues to be equal to 1. When the threshold l is zero, an increase in η leads to more discretion. In the separating equilibrium, when the agent faces a selfish principal he feels aggrieved. Since he negatively reciprocates, an increase in η will reduce the level of discretion.

Proposition 5. *An increase in η has an ambiguous effect on discretion if the agent gets what he feels he is entitled to and a negative effect if he feels shortchanged.*

The framework developed in this section could be helpful if the principal's altruism is relevant and the agent forms expectations about the level of discretion he is entitled to. However, the predictions concerning the effect of the agent's sensitivity to reciprocity on discretion become more ambiguous. What appears to play a major role is whether the agent knows the principal's type, which is more plausible for long-lasting employment relationships.

6 Empirical Analysis

In this section we present supportive evidence for the main theoretical prediction of our model, namely the relationship between an employee's sensitivity to reciprocity and the amount of discretion he or she enjoys in the workplace.

We make use of the German Socio-Economic Panel data (GSOEP), which is a representative panel study of the resident population in Germany. The data include a wide range of information on individual and household characteristics, like employment, education, earnings, and personal attitudes.

Data on delegation. The 2001 wave of the survey asks the following question: *Do you decide how to complete the tasks involved in your work?* Respondents were asked to indicate on a 3-point scale how well the statement applies to them. An answer of 1 on the scale means "applies fully", of 2 means "applies partly", of 3 means "does not apply". This question refers to a central aspect of delegation, which is the worker's influence over decisions that affect his or her work and lies between two different levels of employee involvement, that is, task discretion and organizational participation (see Gallie and Zhou, 2013). Admittedly, this measure of delegation does not perfectly match the one we have used in the theoretical analysis. However, if we find support for the relationship between reciprocity inclinations and this "weak" form of delegation, we have reason to believe that this will also be the case with a deeper form of employee involvement.

Data on reciprocity. We merge the 2001 wave of the dataset with the 2005 one that contains questions about reciprocity. The questions on reciprocity are based on the measure developed by Perugini et al. (2003). Respondents were asked to indicate on a 7-point scale how well each of the following six statements applies to them:

1. If someone does me a favor, I am prepared to return it;

2. If I suffer a serious wrong, I will take revenge as soon as possible, no matter what the cost;

3. If somebody puts me in a difficult position, I will do the same to him/her;

4. I go out of my way to help somebody who has been kind to me before;

5. If somebody offends me, I will offend him/her back;

6. I am ready to undergo personal costs to help somebody who helped me before.

An answer of 1 means "does not apply at all", while an answer of 7 means "applies to me perfectly". Questions (1), (4) and (6) ask about positive reciprocity, while questions (2), (3) and (5) ask about negative reciprocity. Following Dohmen et al. (2009), we construct a measure of positive and negative reciprocity by taking the average responses over the three positive and negative statements, respectively.[28]

Control variables. In the regressions presented below, we control for sectors, occupations, levels of eduction, the size of the organization, gender, whether employees are white or blue collar, whether the job is full-time or part-time, permanent or temporary.[29] The 2001 wave of the survey also asks a question that allows us to control for the conflict of interest between an employee and his superior: *Do you often have conflicts with your boss?* Respondents were asked to indicate on a 3-point scale how well the statement applies to them. An answer of 1 on the scale means "applies fully", of 2 means "applies partly", of 3 means "does not apply". We create a dummy variable that takes value 0 if the worker's response was "does not apply", and 1 if the response was either "applies partly" or "applies fully". See Table 1 for more details on the independent variables of our analysis.

<<COMP: Place Table 1 about here>>

Predictions. We test Hypothesis 1 and Hypothesis 2 of our theoretical model, that we report below:

(a) Employees who are more positive reciprocal should receive weakly more discretion.

(b) Employees who are more negative reciprocal should receive weakly less discretion

Empirical Analysis. In total, 7,553 individuals responded to the questions on delegation, reciprocity, and those regarding the controls. We consider all individuals who were fully employed or worked part time, but we exclude apprentices, self-employed and those who did not provide an answer. In all regressions, we cluster standard errors at NACE 2-digit level but the results are robust if we cluster them at the occupation level.[30]

We generate a binary variable, that we call *delegation*. It takes value 0 if the worker's response was either "does not apply" or "applies partly", and 1 if the response was "applies fully".[31] Table 2 shows the distribution of answers.

<<COMP: Place Table 2 about here>>

Results. In Table 3 we report the coefficients of the Logit regression.[32] While Column 1 only considers positive and negative reciprocity and controls for size, sector, and occupation, Columns 3 considers all the independent variables. Standard errors are reported in parentheses. The results are in line with our theoretical predictions: the coefficients of positive and negative reciprocity have the predicted signs but only the former is statistically significant.

To provide an interpretation of the magnitude of the effects, in Table 3 we also report the odds ratio of the Logit model (Columns 2 and 4). We find that for a one unit increase in the scale of positive reciprocity the odds of delegation versus no delegation/some delegation are 1.09 (1.08) times greater, holding all the other variables constant.

Table 3 also shows that the variables conflict, male, fulltime, permanent, and white collar have a statistically significant impact on the dependent variable. A higher conflict of interest reduces the probability that the worker receives a large amount of delegation, as predicted by the literature on organizational economics as well as our paper. A white-collar worker is more likely to receive broad delegation in the workplace than a blue-collar worker. Moreover, if the job is fulltime and/or it is permanent, the worker receives a large amount of delegation.

In Table 4 we report the coefficients of the Logit regression for a sub-sample of the population which only includes workers who earn at least 2,000 euros gross per month.

In this sub-sample positive reciprocity continues to be highly statistically significant at the 1% level and negative reciprocity becomes statistically significant at the 5% level with the expected sign. Thus, positive reciprocity always plays a role in determining the amount of delegation granted to the employees. As for negative reciprocity, this only plays a significant role for those workers employed in occupations with a higher salary. In both cases, the effect of reciprocity is amplified when considering high-income employees.[33] One plausible explanation is that reciprocity fully plays a role in determining the scope of delegation for those workers employed in occupations which are more productive and, as a consequence, earn a higher salary.[34] Notice also that this sub-sample continues to be quite sizable, including a total number of observations of 3,778 (the distribution of answers is reported in Table 2).

To provide an interpretation of the magnitude of the effects, in Table 4 we also report the odds ratio of the Logit model (Columns 2 and 4). We find that for a one unit increase in the scale of positive reciprocity the odds of delegation versus no delegation/some delegation are 1.16 times greater, holding all the other variables constant. Note that its magnitude is close to that of the male dummy, whose impact on the likelihood of enjoying more autonomy in the workplace has received greater scholarly attention (e.g., see Wright et al., 1995). Unlike reciprocity, the effect of gender is constant across sub samples.

For a one unit increase in negative reciprocity the odds of delegation versus no delegation/some delegation are 0.95 times lower, holding all the other variables constant. The effects of conflict and white collar are still highly significant, while the variables fulltime and permanent are not statistically significant when we consider the restricted sample. The reason is that almost all the workers who earn at least 2,000 euros gross per month are permanent employees employed in full-time positions.

<<COMP: Place Table 3 about here>>

<<COMP: Place Table 4 about here>>

7 Conclusions

In this article, we have studied a delegation model in which a better informed agent is motivated by reciprocity. The preferences of the agent and the principal about which projects should be undertaken can be discordant. When the conflict of interest is mild, a more reciprocal agent will optimally receive more discretion. In contrast, when the conflict of interest is more severe, a more reciprocal agent will optimally receive less discretion and the principal may be more likely to retain authority about the choice of the project. While our model is inspired by Englmaier et al. (2010), in Online Appendix E we show that a similar relationship between discretion and reciprocity can carry over to a more traditional delegation environment with quadratic payoff functions (akin to Melumad and Shibano, 1991, and Martimort and Semenov, 2006).

Using the GSOEP dataset, we have found some support for our theoretical predictions. While we are able to relate reciprocity inclinations to task discretion, it would be interesting to study whether and to what extent reciprocity affects high-level decisions, such as investment and product development, or organizational choices. Furthermore, our dataset only concerns the German population. Interestingly, different levels of discretion are observed across countries, even after controlling for sector and type of occupations (see Ortega, 2004, and Gallie and Zhou, 2013). In Online Appendix D, we use the Global Preference Survey (see Falk et al., 2016, and Falk et al., 2018) and OECD data to explore country-level correlations between economic preferences and job discretion. While the relationships between reciprocity inclinations and discretion have the predicted sign, most results are not statistically significant. Given the small sample of this empirical exercise (22 countries), additional empirical studies which might relate socio-economic preferences to employee involvement at the individual level are required to establish the existence and relevance of the conjectured relationships.

In the model, the agent always benefits from being granted more discretion and this captures the idea that the agent enjoys autonomy in the workplace (see Freeman and Kleiner, 2000, and Bartling et al., 2013). However, sometimes delegation occurs because the principal wants or needs to get off her plate some extra-work or responsibility. In these instances, the agent cannot perceive delegation as a kind action and, as a result, the principal may be willing to find a mechanism to eschew or minimize his retaliation.[35] In general, the view of delegation as beneficial to the employee who feels empowered and trusted by his superiors and enjoys having authority over job-related decision seems predominant. This is also supported by our empirical analysis, which shows that employees who display more positive (negative) reciprocity are indeed more likely to receive more (less) job autonomy.

We have blunted the impact that negative reciprocity plays in the model by limiting the harm that a disgruntled agent can cause to the principal. In particular, since the minimum payoff the agent can give to the principal is zero, the agent can never benefit from hurting a hostile principal.[36] This avoids paradoxical situations in which the agent enjoys working with an unfriendly principal as he has the chance to treat her unkindly.

We leave for future research some potential extensions of the current set-up. First, employees may respond differently to the delegation decisions and therefore firms need to adjust the amount of discretion depending on the composition of the workforce. Indeed, this might explain why Google has recently decided to reduce the leeway it traditionally used to give to its employees.[37] To incorporate this aspect in our model, we could assume that the agent's sensitivity to reciprocity is his private information while the principal only knows the distribution from which this parameter is drawn. Second, typically in workplaces there is more than one employee and therefore it might be worthwhile to analyze the delegation choice granted to a team of workers. Finally, in this paper we have focused on a single job aspect, the leeway the agent enjoys in choosing the project, and we have assumed that this is all the agent takes into account when he judges the principal's kindness. In a more general model, other factors can affect the employee's job satisfaction and how he views his boss, such as monetary incentives and the degree of monitoring.

Appendix A

Proof of Lemma 1

Let $\omega \neq h' < h$ and $\omega, h', h \in D$. Suppose that the agent prefers h' to ω. Then, he obtains $b(h')$ which is lower than what he could get by selecting h, i.e. $b(h)$. Suppose that the agent prefers ω to h, i.e. $\alpha pS + b(\omega) \geq b(h)$. In that case, he strictly prefers ω to any h' lower than h and different from ω. If ω does not belong to D, the agent is always better off choosing h than h'. $\square$

Proof of Lemma 2

(i) Take $h^* \leq n$ and suppose that there exists $l^* > 0$ such that $b(l^*) + \alpha pS = b(h^*)$, that is l^* is the minimum element of D such that for all $\omega \in D$ the agent picks the right project. Then, for all $\omega < l^*$ the agent picks h^* irrespective of whether ω belongs to D or not. The principal is then indifferent as to whether or not to include projects lower than l^* in the delegation set. If it holds that $b(0) + \alpha pS \geq b(h^*)$, then 0 is included in the delegation set.

Let us show that the principal does not want to exclude any project in the interval $[l^*, h^*]$. Suppose for example that the principal grants the agent $[l^*, j] \cup [k, h^*]$ with $l^* < j < k < h^*$. Then, the principal would expect to get $[F(h^*) - F(k) + F(j) - F(l^*)]pS$ which is strictly lower than $[F(h^*) - F(l^*)]pS$, that she would get by granting the agent $[l^*, h^*]$, since $F(k) > F(j)$.

(ii) First, notice that the principal grants the agent full discretion if $\alpha pS + b(0) \geq b(n)$. Now, we show that h^* is such that $\alpha pS + b(0) = b(h^*)$ if $h^* < n$. Suppose that this is not true and h^* is such that $\alpha pS + b(0) > b(h^*)$. But then the principal will find it profitable to give more discretion to the agent, which leads to a contradiction. Consider then the case where $\alpha pS + b(0) < b(h^*)$. Then, there exist $\epsilon > 0$ and $l > 0$ such that $\alpha pS + b(0) = b(h^* - \epsilon)$ and $\alpha pS + b(l) = b(h^*)$. If the principal grants the agent $[0, h^* - \epsilon]$, the agent always picks the right project when available. In contrast, if the principal gives the agent $[0, h^*]$, the agent picks the right project only when $\omega \in [l, h^*]$. We show that the principal's expected payoff is greater if she delegates the former rather than the latter interval, i.e.

$$pS \int_0^{h^*-\epsilon} f(\omega)d\omega > pS \int_l^{h^*} f(\omega)d\omega.$$

As pS appears on both sides of the inequality, we can leave it out. Consider that $g(h^* - \epsilon) = \alpha pS = g(h^*) - g(l)$. Therefore,

$$\int_0^{\gamma[g(h^*)-g(l)]} f(\omega)d\omega > \int_{\gamma[g(h^*)-g(h^*-\epsilon)]}^{\gamma[g(h^*-\epsilon)+g(l)]} f(\omega)d\omega$$

$$\Leftrightarrow F(\gamma[g(h^*) - g(l)]) > F(\gamma[g(h^* - \epsilon) + g(l)]) - F(\gamma[g(h^*) - g(h^* - \epsilon)]).$$

After defining $H = F \circ \gamma$, we can rewrite the above inequality as follows:

$$H(g(h^*) - g(l)) > H(g(h^* - \epsilon) + g(l)) - H(g(h^*) - g(h^* - \epsilon))$$

$$\Leftrightarrow H(g(h^* - \epsilon)) > H(g(h^*)) - H(g(h^*) - g(h^* - \epsilon))$$

$$\Leftrightarrow H(g(h^*) - g(h^* - \epsilon)) > H(g(h^*)) - H(g(h^* - \epsilon)).$$

Where the last inequality holds because $H(\cdot)$ is concave owing to Assumption 1. To see this, note that Assumption 1 requires that $g''(\omega)f(\omega) - g'(\omega)f'(\omega) > 0$ for any ω, which implies:

$$-\frac{f'(\omega)}{f(\omega)} > -\frac{g''(\omega)}{g'(\omega)}. \quad \text{(A1)}$$

Let $g(\omega) = y$ and $\omega = g^{-1}(y) = \gamma(y)$. $H = (F \circ \gamma)(y)$ is concave if the second derivative is negative, that is:

$$f'(\gamma(y))(\gamma'(y))^2 + f(\gamma(y))\gamma''(y) < 0.$$

This is the case when

$$-\frac{f'(\gamma(y))}{f(\gamma(y))} > \frac{\gamma''(y)}{(\gamma'(y))^2}. \quad \text{(A2)}$$

Notice that the left-hand sides of (A1) and (A2) are the same. To see that also the right-hand sides coincide, consider that

$$g'(\omega) = \frac{1}{\gamma'(g(\omega))} \quad \text{and} \quad g''(\omega) = -\frac{\gamma''(g(\omega))}{[\gamma'(g(\omega))]^3}.$$

□

Proof of Proposition 1

The principal wants to set the highest h that induces the agent to always choose the right project when this is available. To see this, notice that (3) is strictly increasing in h. Then h^* is the maximum element of the decision set that satisfies the agent's tightest incentive compatibility constraint, i.e. when $\omega = 0$. So it must be that $\alpha pS + \underline{b} \geq \underline{b} + g(h^*)$. The principal grants full discretion to the agent when this condition is satisfied at $h^* = n$. In contrast, if the tightest incentive compatibility constraint binds, $h^* = g^{-1}(\alpha pS)$. □

Proof of Lemma 3

Suppose that the principal grants the agent $\hat{D}$ instead of D', where $\hat{D} = D' + \{j\}$, and consider the following agent's decision rule. When $\omega \in D'$, $d(\omega, \hat{D}) = d^*(\omega, D')$, while when $\omega \notin D'$, $d(\omega, \hat{D}) = \max\{j, h'\}$, where h' is the largest project in set D'. If $j \leq h'$, then $\hat{h} = h'$ and the agent's expected material payoff is the same under D' and under $\hat{D}$. Since the decision rule for $\hat{D}$ may be suboptimal, the agent can expect to derive a weakly higher material payoff under $\hat{D}$ than D'. If $j > h'$, $j = \hat{h}$, and the agent's expected material payoff is strictly higher under $\hat{D}$. To see this, consider that the agent expects to get exactly the same payoff when $\omega \in D'$ and to get $b(\hat{h}) > b(h')$ when $\omega \notin D'$. □

Proof of Lemma 4

Consider $D_{h^R} \equiv [0, h^R]$, with $h^R < n$ and let $D_{h'} \equiv [l', h^R]$, with $0 < l' < h^R$. Let $l^R \in (l', h^R)$ be such that:

$$\alpha pS + b(l^R) + \eta k_{PA}(D_{h'})pS = b(h^R), \tag{A3}$$

that is, l^R is the minimum element of $D_{h'}$ such that for all $\omega \in [l^R, h^R]$ the agent picks the right project. Therefore, the principal's expected utility when she grants $D_{h'}$ is

$pS \int_{l^R}^{h^R} f(\omega)d\omega$. If the principal delegates projects lower than l', her expected utility cannot decrease. To see this, consider that $D_{h'} \subset D_{h^R}$ and, as a result, $E_\omega u_A(\omega, \hat{D}_{h'}) \leq E_\omega u_A(\omega, D_{h^R})$. Since we have posited a non-negative relationship between an agent's expected material payoff and the principal's kindness, $k_{PA}(D_{h^R}) \geq k_{PA}(D_{h'})$. It follows that:

$$\alpha pS + b(l^R) + \eta k_{PA}(D_{h^R})pS \geq b(h^R), \tag{A4}$$

and the principal's expected utility may only increase.

Let us now show that the principal does not want to exclude any project in the interval $[l^R, h^R]$. Suppose for example that the principal grants the agent $\tilde{D} = [l', j] \cup [k, h^R]$ with $l' \leq l^R < j < k < h^R$. Then, the principal would expect to get at most $[F(h^R) - F(k) + F(j) - F(l^R)]pS$ which is strictly lower than $[F(h^R) - F(l^R)]pS$, that she would get by granting the agent $D' \equiv [l', h^R]$ because $F(k) > F(j)$.[38] Hence, there is no loss of generality in restricting attention to delegation sets of the form $[0, h^R]$. □

Example of Functions Satisfying All the Assumptions

Here we provide an example of strictly concave functional forms for $F(\cdot)$, $g(\cdot)$, and $k_{PA}(\cdot)$ satisfying assumptions 1-3. Assume that $n = 1$, so that $\Omega = [0, 1]$, and let the states of the world be distributed according to the Beta distribution with shape parameters $(1, 2)$. Hence, $f(\omega) = 2(1-\omega)$, and $f'(\omega) = -2$. We assume that $k_{PA}(h) = \frac{1}{4} - \frac{1}{2}(1-h)^2$, whereas $g(\omega) = \frac{1}{16} + 2\omega - \frac{1}{16}(1-\omega)^2$. Note that $g(0) = 0$. We also set $pS = 2$.[39] Assumption 1 is satisfied as:

$$g''(d)f(d) - f'(d)g'(d) = -\frac{1}{4}(1-d) + 2\left[2 + \frac{1-d}{8}\right] > 0,$$

for all $d \in [0, 1]$. Assumption 2 is satisfied if $2[1+\alpha] > g(1) = \frac{33}{16}$, which requires $\alpha > \frac{1}{32}$. Finally, Assumption 3 holds for all $h \in [0, 1]$ provided that $\eta \in (1/16, 1]$:

$$g'(h) = 2 + \frac{1-h}{8} > 2\eta(1-h) = \eta k'_{PA}(h)pS;$$
$$g''(h) = -\frac{1}{8} > -2\eta = \eta k''_{PA}(h)pS.$$

Proof of Proposition 2

Let us consider the principal's maximization problem:

$$\max_{l,h} \quad pS\int_l^h f(\omega)d\omega,$$

subject to

$$h \leq n; \quad \alpha pS + g(l) + \eta k_{PA}(h)pS \geq g(h),$$

and the non-negativity constraints for l and h.

Consider the following Lagrangian where we denote by λ_1 and λ_2 the Lagrangian multipliers of the inequality constraints:

$$\mathcal{L}(h, l, \lambda_1, \lambda_2) = pS\int_l^h f(\omega)d\omega + \lambda_1(n-h) + \lambda_2\big(\alpha pS + g(l) + \eta k_{PA}(h)pS - g(h)\big).$$

Karush-Kuhn-Tucker (KKT) conditions for the optimizing variables h and l, and for the KKT multipliers yield, respectively:

$$h^R\left[\frac{\partial\mathcal{L}(h^R, l^R, \lambda_1^R, \lambda_2^R)}{\partial h}\right] = 0 \Leftrightarrow h^R\Big[pSf(h^R) - \lambda_1^R - \lambda_2^R\big(g'(h^R) - \eta k'_{PA}(h^R)pS\big)\Big] = 0; \tag{A5}$$

$$l^R\left[\frac{\partial\mathcal{L}(h^R, l^R, \lambda_1^R, \lambda_2^R)}{\partial l}\right] = 0 \Leftrightarrow l^R\Big[-pSf(l^R) + \lambda_2^R g'(l^R)\Big] = 0; \tag{A6}$$

$$\lambda_1^R\left[\frac{\partial\mathcal{L}(h^R, l^R, \lambda_1^R, \lambda_2^R)}{\partial \lambda_1}\right] = 0 \Leftrightarrow \lambda_1^R\Big[n - h^R\Big] = 0; \tag{A7}$$

$$\lambda_2^R\left[\frac{\partial\mathcal{L}(h^R, l^R, \lambda_1^R, \lambda_2^R)}{\partial \lambda_2}\right] = 0 \Leftrightarrow \lambda_2^R\Big[\alpha pS + g(l^R) + \eta k_{PA}(h^R)pS - g(h^R)\Big] = 0. \tag{A8}$$

If $h \in (0, n)$, $\lambda_1^R = 0$ and (IC) binds for otherwise (A5) cannot be satisfied. If $l^R > 0$, then from (A6) $\lambda_2^R = \frac{pSf(l^R)}{g'(l^R)}$. Substituting λ_2^R into (A5) and from (A8), we can recover l^R and h^R, which are jointly determined by the following system of equations (note that we use the tilde to refer to this specific solution):

$$\begin{aligned}\tilde{l}^R =&\gamma\Big[g(\tilde{h}^R) - \alpha pS - \eta k_{PA}(\tilde{h}^R)pS\Big],\\ f(\tilde{h}^R)g'(\tilde{l}^R) =&f(\tilde{l}^R)\Big[g'(\tilde{h}^R) - \eta k'_{PA}(\tilde{h}^R)pS\Big].\end{aligned} \tag{A9}$$

Note that Assumption 3 guarantees that this solution is viable. If $h \in (0, n)$ and $l^R = 0$, h^R is implicitly determined from:

$$\alpha pS + \eta k_{PA}(h^R)pS = g(h^R). \tag{A10}$$

Supposing that both solutions are feasible, the principal will prefer to set $l^R = 0$ if:

$$pS\int_0^{h^R} f(\omega)d\omega \;\geq\; pS\int_{\tilde{l}^R}^{\tilde{h}^R} f(\omega)d\omega. \tag{A11}$$

Note that $g(h^R)-\eta k_{PA}(h^R)pS = \alpha pS = g(\tilde{h}^R)-g(\tilde{l}^R)-\eta k_{PA}(\tilde{h}^R)pS$. Therefore, condition (A11) can be rewritten as follow:

$$\int_0^{\gamma\left[g(\tilde{h}^R)-g(\tilde{l}^R)-\eta\left(k_{PA}(\tilde{h}^R)-k_{PA}(h^R)\right)pS\right]} f(\omega)d\omega > \int_{\gamma\left[g(\tilde{h}^R)-g(h^R)-\eta\left(k_{PA}(\tilde{h}^R)-k_{PA}(h^R)\right)pS\right]}^{\gamma\left[g(h^R)+g(\tilde{l}^R)+\eta\left(k_{PA}(\tilde{h}^R)-k_{PA}(h^R)\right)pS\right]} f(\omega)d\omega.$$

Since $H = F\circ\gamma$, we can rewrite the above inequality as follows:

$$\begin{aligned} H\Big(g(\tilde{h}^R) - g(\tilde{l}^R) - \eta\big(k_{PA}(\tilde{h}^R) - k_{PA}(h^R)\big)pS\Big) >&H\Big(g(h^R) + g(\tilde{l}^R) + \eta\big(k_{PA}(\tilde{h}^R) - k_{PA}(h^R)\big)pS\Big)\\ &-H\Big(g(\tilde{h}^R) - g(h^R) - \eta\big(k_{PA}(\tilde{h}^R) - k_{PA}(h^R)\big)pS\Big)\\ \Leftrightarrow H\Big(g(\tilde{h}^R) - g(h^R) - \eta\big(k_{PA}(\tilde{h}^R) - k_{PA}(h^R)\big)pS\Big) >&H\Big(g(h^R) + g(\tilde{l}^R) + \eta\big(k_{PA}(\tilde{h}^R) - k_{PA}(h^R)\big)pS\Big)\\ &-H\Big(g(\tilde{h}^R) - g(\tilde{l}^R) - \eta\big(k_{PA}(\tilde{h}^R) - k_{PA}(h^R)\big)pS\Big)\end{aligned}$$

$$\Leftrightarrow H\Big(g(\tilde{h}^R) - g(h^R) - \eta\big(k_{PA}(\tilde{h}^R) - k_{PA}(h^R)\big)pS\Big) = H(g(l^R)) > H(g(\tilde{h}^R)) - H(g(h^R)).$$

Recall that when $\eta = 0$ the above inequality always holds as $H(\cdot)$ is concave owing to Assumption 1. When the agent is reciprocal, an increase in η makes the inequality more difficult to satisfy as it decreases the LHS and increases the RHS. As $H(\cdot)$ is continuous in η for $\eta \in [0, \hat{\eta})$ where

$$\hat{\eta} \equiv \frac{g(\tilde{h}^R) - g(h^R)}{\big(k_{PA}(\tilde{h}^R) - k_{PA}(h^R)\big)pS},$$

there exists $\tilde{\eta} \in (0, \hat{\eta}]$ such that for any $\eta \leq \tilde{\eta}$ the above inequality is satisfied and the principal prefers to grant $[0, h^R]$ to $[0, \tilde{h}^R]$. Note that there may not be an admissible level of η for which the principal prefers to grant $[0, \tilde{h}^R]$.

If $h^R = n$, and then $\lambda_1 \geq 0$, it follows that

$$l^R = \begin{cases} \gamma\big[g(n) - (\alpha + \eta)pS\big], & \text{if } g(n) > (\alpha + \eta)pS \\ 0, & \text{otherwise.} \end{cases}$$

For the solution in which $l^R = 0$, the principal's problem is univariate and only depends on h. Note that this solution is a maximum because the principal's objective function is concave in h and the inequality constraint $g(h) - \alpha pS - \eta k_{PA}(h)pS$ is convex in h since $g''(h) - \eta k''_{PA}(h)pS > 0$.

For the second solution, $(\tilde{l}^R, \tilde{h}^R)$, compute the matrix of the second-order derivatives of $\mathcal{L}$ with respect to h and l:

$$\nabla^2_{\tilde{h}^R, \tilde{l}^R}\mathcal{L}(\tilde{h}^R, \tilde{l}^R, \lambda_1, \lambda_2) = \begin{pmatrix} psf'(\tilde{h}^R) - \lambda_2\big(g''(\tilde{h}^R) - \eta k''_{PA}(\tilde{h}^R)pS\big) & 0 \\ 0 & -pSf'(\tilde{l}^R) + \lambda_2 g''(\tilde{l}^R) \end{pmatrix}$$

For the candidate optimum to be a local maximum it must be that $z^T \nabla^2_{\tilde{h}, \tilde{l}}\mathcal{L}z < 0$ for any $z \neq 0$ such that, for any inequality constraint $G_j(\cdot)$, $\nabla G_j(\tilde{h}^R, \tilde{l}^R)^T z \leq 0$ with strict equality if constraint G_j binds. For the first constraint, it must be that

$$\begin{pmatrix} -1 & 0 \end{pmatrix} \begin{pmatrix} z_1 \\ z_2 \end{pmatrix} \leq 0 \Leftrightarrow -z_1 \leq 0.$$

For the second constraint, it must hold that

$$\begin{pmatrix} \eta k'_{PA}(\tilde{h}^R)pS - g'(\tilde{h}^R) & g'(\tilde{l}^R) \end{pmatrix} \begin{pmatrix} z_1 \\ z_2 \end{pmatrix} \leq 0,$$

that is:

$$-z_1\big(g'(\tilde{h}^R) - \eta k'_{PA}(\tilde{h}^R)pS\big) + z_2 g'(\tilde{l}^R) \leq 0.$$

The candidate optimum must be such that:

$$z_1^2\Big(psf'(\tilde{h}^R) - \lambda_2\big(g''(\tilde{h}^R) - \eta k''_{PA}(\tilde{h}^R)pS\big)\Big) - z_2^2\Big(pSf'(\tilde{l}^R) - \lambda_2 g''(\tilde{l}^R)\Big) < 0.$$

Because (IC) binds, $\lambda_2^R = \frac{f(\tilde{l}^R)pS}{g'(\tilde{l}^R)}$. Therefore, we can write:

$$z_1^2\Big(f'(\tilde{h}^R) - \frac{f(\tilde{l}^R)}{g'(\tilde{l}^R)}\big(g''(\tilde{h}^R) - \eta k''_{PA}(\tilde{h}^R)pS\big)\Big) - z_2^2\Big(f'(\tilde{l}^R) - \frac{f(\tilde{l}^R)g''(\tilde{l}^R)}{g'(\tilde{l}^R)}\Big) < 0.$$

As $\tilde{h}^R < n$, $z_1 \leq 0$, whereas:

$$z_2 = \frac{g'(\tilde{h}^R) - \eta k'_{PA}(\tilde{h}^R)pS}{g'(\tilde{l}^R)} z_1,$$

since the incentive constraint binds. Therefore, the inequality holds if

$$\Big(f'(\tilde{h}^R) - \frac{f(\tilde{l}^R)}{g'(\tilde{l}^R)}\big(g''(\tilde{h}^R) - \eta k''_{PA}(\tilde{h}^R)pS\big)\Big) - \frac{(g'(\tilde{h}^R) - \eta k'_{PA}(\tilde{h}^R)pS)^2}{(g'(\tilde{l}^R))^2}\Big(f'(\tilde{l}^R) - \frac{f(\tilde{l}^R)g''(\tilde{l}^R)}{g'(\tilde{l}^R)}\Big) < 0.$$

This is the difference of two terms which are always negative. Therefore, for this solution to be a maximum, the former term must be greater than the latter. □

Proof of Proposition 3

Consider the solution $[0, h^R]$. For $h^R \in (0, n)$, the tightest incentive compatibility constraint binds and determines h^R. Therefore, to study how a marginal change in η affects h^R we can make use of the Implicit Function Theorem. We can rewrite the tightest incentive compatibility constraint as an implicit function:

$$T(h^R(\eta), \eta) = \alpha pS + \eta k_{PA}(h^R)pS - g(h^R) = 0.$$

By totally differentiating this function with respect to η:

$$\frac{\partial T}{\partial h^R}\frac{\partial h^R}{\partial \eta}+\frac{\partial T}{\partial \eta}=0.$$

Since $\frac{\partial T}{\partial \eta}=k_{PA}(h^R)pS$ and $\frac{\partial T}{\partial h^R}=\eta k'_{PA}(h^R)pS-g'(h^R)$, the impact of an increase in η on h^R is:

$$\frac{\partial h^R}{\partial \eta}=-\frac{k_{PA}(h^R)pS}{\eta k'_{PA}(h^R)pS-g'(h^R)} \tag{A12}$$

Notice that the denominator is the difference between the marginal impacts of a change in h^R on the agent's reciprocity payoff and on his temptation to choose the largest available project. Because of Assumption 3 is always negative. Therefore, the sign of the derivative only depends on the sign of the numerator. That is, it depends on the sign of $k_{PA}(h^R)$.

When $k_{PA}(h^R)>0$, that is the principal is perceived as friendly, $\frac{\partial h^R}{\partial \eta}>0$. When $k_{PA}(h^R)<0$, that is the principal is perceived as unfriendly, $\frac{\partial h^R}{\partial \eta}<0$. As a result, if $h^*\geq h^F$, the impact of η on h^R is always non-negative, whereas if $h^*<h^F$, the impact of η on h^R is always non-positive.

Suppose that the principal grants $[0,\tilde{h}^R]$ with $\tilde{l}^R>0$. To determine the impact of a change in η on the level of discretion, we invoke once again the Implicit Function Theorem. Consider the system of two equations in three parameters in a neighbourhood of $(\tilde{h}^R,\tilde{l}^R)$:

$$T_1(h(\eta),l(\eta);\eta)=0\Leftrightarrow f(h)g'(l)-f(l)\big[g'(h)-\eta k'_{PA}(h)pS\big]=0;$$
$$T_2(h(\eta),l(\eta);\eta)=0\Leftrightarrow \alpha pS+g(l)+\eta k_{PA}(h)pS-g(h)=0.$$

Compute the Jacobian matrix of this system with respect to (h,l):

$$J_T(h,l)=\begin{pmatrix} f'(h)g'(l)-f(l)\big[g''(h)-\eta k''_{PA}(h)pS\big] & f(h)g''(l)-f'(l)\big[g'(h)-\eta k'_{PA}(h)pS\big] \\ -g'(h)+\eta k'_{PA}(h)pS & g'(l) \end{pmatrix}$$

In order to apply the implicit function theorem the determinant of the Jacobian matrix must be different from zero. This is given by:

$$g'(l)\Big(f'(h)g'(l) - f(l)\big[g''(h) - \eta k''_{PA}(h)pS\big]\Big)$$
$$+\big[g'(h) - \eta k'_{PA}(h)pS\big]\Big(f(h)g''(l) - f'(l)\big[g'(h) - \eta k'_{PA}(h)pS\big]\Big).$$

Since in this solution

$$\lambda_2 = \frac{f(l)pS}{g'(l)} = \frac{f(h)}{g'(h) - \eta k'_{PA}(h)pS},$$

the previous inequality can be rewritten as:

$$\Big(f'(\tilde{h}^R) - \frac{f(\tilde{l}^R)}{g'(\tilde{l}^R)}\big(g''(\tilde{h}^R) - \eta k''_{PA}(\tilde{h}^R)pS\big)\Big) + \frac{(g'(\tilde{h}^R) - \eta k'_{PA}(\tilde{h}^R)pS)^2}{(g'(\tilde{l}^R))^2}\Big(\frac{f(\tilde{l}^R)g''(\tilde{l}^R)}{g'(l)} - \frac{f'(\tilde{l}^R)g'(\tilde{l}^R)}{g'(\tilde{l}^R)}\Big),$$

which coincides with the second order condition. Therefore, this is negative when this solution is possible.

Consider the Cramer's rule to determine the effect of a increase in η on $\tilde{h}^R$ and $\tilde{l}^R$:

$$\frac{\partial \tilde{h}^R}{\partial \eta} = \frac{-\frac{\partial T_1}{\partial \eta}\frac{\partial T_2}{\partial l} + \frac{\partial T_2}{\partial \eta}\frac{\partial T_1}{\partial l}}{\frac{\partial T_1}{\partial h}\frac{\partial T_2}{\partial l} - \frac{\partial T_2}{\partial h}\frac{\partial T_1}{\partial l}}; \quad \text{and} \quad \frac{\partial \tilde{l}^R}{\partial \eta} = \frac{-\frac{\partial T_1}{\partial h}\frac{\partial T_2}{\partial \eta} + \frac{\partial T_2}{\partial h}\frac{\partial T_1}{\partial \eta}}{\frac{\partial T_1}{\partial h}\frac{\partial T_2}{\partial l} - \frac{\partial T_2}{\partial h}\frac{\partial T_1}{\partial l}};$$

where

$$\frac{\partial T_1}{\partial \eta} = f(l)k'_{PA}(h)pS > 0; \quad \frac{\partial T_2}{\partial \eta} = k_{PA}(h)pS.$$

If $k_{PA}(\tilde{h}^R) > 0$, then both derivatives have ambiguous sign, whereas if $k_{PA}(\tilde{h}^R) < 0$, both $\tilde{h}^R$ and $\tilde{l}^R$ increase in η. □

Proof of Corollary 1

It directly follows from: $\frac{\partial^2 h^R}{\partial \eta \partial pS} = \frac{g'(h^R)k_{PA}(h^R)}{\left(\eta k'_{PA}(h^R)pS - g'(h^R)\right)^2}$. □

Proof of Hypothesis 1

We focus on the solution where $l^R = 0$. Suppose that the agent's initial level of discretion is h^R and assume there is an increase in η_1. If $h^R \geq h^F$, then $k_{PA}(h^R) \geq 0$. Hence,

$\frac{\partial h^R}{\partial \eta_1} > 0$, and $\frac{\partial h^R}{\partial \eta_1} = 0$ if $h^R = n$. If $h^R < h^F$, then $k_{PA}(h^R) < 0$. Hence, $\frac{\partial h^R}{\partial \eta_1} = 0$. □

Proof of Hypothesis 2

We focus on the solution where $l^R = 0$. Suppose that the agent's initial level of discretion is h^R and assume there is an increase in η_2. If $h^R \geq h^F$, then $k_{PA}(h^R) \geq 0$. Hence, $\frac{\partial h^R}{\partial \eta_2} = 0$. If $h^R < h^F$, then $k_{PA}(h^R) < 0$. Hence, $\frac{\partial h^R}{\partial \eta_2} < 0$ if $h^R > 0$, and $\frac{\partial h^R}{\partial \eta_2} = 0$ if $h^R = 0$. □

Appendix B

Proof of Lemma 5

Consider a general case where $\psi \geq 0$. Under certainty, the agent always reciprocates on the equilibrium path, i.e. $k_{PA} = 1$. The Lagrangian for this new problem is:

$$\begin{aligned} L(h, l, \lambda_1, \lambda_2) =& pS \int_l^h f(\omega)d\omega + \psi\Big[g(h)F(l) + \int_l^h [g(\omega) + \alpha pS]f(\omega)d\omega + g(h)[1 - F(h)]\Big] \\ &+ \lambda_1[n - h] + \lambda_2[(\alpha + \eta)pS + g(l) - g(h)], \end{aligned}$$

where λ_1 is the Karush-Kuhn-Tucker (KKT) multiplier of the inequality constraint $h \leq n$ and λ_2 is the KKT multiplier of the incentive compatibility constraint. The complementarity slackness conditions for the optimizing variables h and l, and for the KKT multipliers yield, respectively:

$$\begin{aligned} h^R\left[\frac{\partial \mathcal{L}(h^R, l^R, \lambda_1^R, \lambda_2^R)}{\partial h}\right] = 0 \Leftrightarrow h^R\Big[pSf(h^R) + \psi\Big[g'(h^R)[1 - F(h^R) + F(l^R)] + \alpha pSf(h^R)\Big] + \\ - \lambda_1^R - \lambda_2^R[g'(h^R)]\Big] = 0; \end{aligned} \tag{B1}$$

$$l^R\left[\frac{\partial \mathcal{L}(h^R, l^R, \lambda_1^R, \lambda_2^R)}{\partial l}\right] = 0 \Leftrightarrow l^R\Big[-pSf(l^R) + \psi\Big[g(h) - g(l) - \alpha pS\Big]f(l) + \lambda_2^R g'(l^R)\Big] = 0; \tag{B2}$$

$$\lambda_1^R\left[\frac{\partial \mathcal{L}(h^R, l^R, \lambda_1^R, \lambda_2^R)}{\partial \lambda_1}\right] = 0 \Leftrightarrow \lambda_1^R\Big[n - h^R\Big] = 0; \tag{B3}$$

$$\lambda_2^R\left[\frac{\partial \mathcal{L}(h^R, l^R, \lambda_1^R, \lambda_2^R)}{\partial \lambda_2}\right] = 0 \Leftrightarrow \lambda_2^R\Big[(\alpha+\eta)pS + g(l^R) - g(h^R)\Big] = 0. \tag{B4}$$

If $h \in (0, n)$, $\lambda_1^R = 0$ and (IC) binds. Then, if $l^R > 0$, from (B2)

$$\lambda_2^R = \frac{pS\,f(l^R) - \psi f(l^R)[g(h^R) - g(l^R) - \alpha pS]}{g'(l^R)}.$$

Substituting λ_2^R into (B1), we obtain:

$$pS\left[f(h^R) - \frac{f(l^R)g'(h^R)}{g'(l^R)}\right](1+\psi\alpha)+\psi\, g'(h^R)\left[(1 - F(h^R) + F(l^R)) + \frac{f(l^R)}{g'(l^R)}[g(h^R) - g(l^R)]\right] = 0. \tag{B5}$$

Note that if the principal is selfish, i.e. $\psi = 0$, l^R cannot be strictly positive because

$$f(h^R) - \frac{f(l^R)g'(h^R)}{g'(l^R} < 0.$$

Hence, the selfish principal grants the delegation set $[0, h^R]$ with $l^R = 0$. In contrast, if the principal is altruistic, i.e. $\psi > 0$, (B5) can be satisfied which allows $l_a^R > 0$.

We now show that $D_{h^R} \subseteq D_{h_a^R}$. Suppose that $l_a^R = 0 = l^R$. Then

$$h_a^R = \gamma\big((\alpha+\eta)pS\big) = h^R,$$

and the two delegation sets coincide. Suppose conversely that $l_a^R > 0$. Then,

$$h_a^R = \gamma\big((\alpha+\eta)pS + g(l_a^R)\big) > \gamma\big((\alpha+\eta)pS\big) = h^R,$$

and the delegation set is larger when the principal is altruistic.

We assume that the second order condition is satisfied so that the solution $[0, h_a^R]$ is indeed a maximum.[40] We now appeal to the implicit function theorem to determine how a change in ψ affects equilibrium discretion when $l_a^R > 0$. Consider the following implicit function:

$$T(h_a^R;\psi) = pS\left[f(h) - f(l)\frac{g'(h)}{g'(l)}\right][1+\psi\alpha]+\psi g'(h)\left([1-(F(h)-F(l))] + [g(h)-g(l)]\frac{f(l)}{g'(l)}\right) = 0,$$

where $l = \gamma\big[g(h) - (\alpha+\eta)pS\big]$. Consider the effect of an increase in the principal's altruism: $\frac{\partial h_a^R}{\partial \psi} = -\frac{\frac{\partial T(\cdot)}{\partial \psi}}{\frac{\partial T(\cdot)}{\partial h}}$. Since the denominator is the SOC of the principal's objective function, this is negative by assumption. Therefore, the sign of $\frac{\partial h_a^R}{\partial \psi}$ will coincide with the sign of $\frac{\partial T(\cdot)}{\partial \psi}$.

$$\frac{\partial T(\cdot)}{\partial \psi} = g'(h)\left([1-(F(h)-F(l))] + \frac{\big(g(h)-g(l)\big)f(l)}{g'(l)}\right) + \alpha pS\left[f(h) - f(l)\frac{g'(h)}{g'(l)}\right]. \tag{B6}$$

When $l_a^{\bar{R}} > 0$, the first term is equal to

$$-pS\left[f(h) - f(l)\frac{g'(h)}{g'(l)}\right]\left(\frac{1+\psi\alpha}{\psi}\right),$$

because of equation (B5). Therefore, we can rewrite (B6) as follows:

$$-\frac{pS}{\psi}\left[f(h) - f(l)\frac{g'(h)}{g'(l)}\right] > 0,$$

because of Assumption 1. Hence, an increase in ψ unequivocally leads to an increase in $h_a^{\bar{R}}$ when $l_a^{\bar{R}} > 0$. □

Proof of Proposition 4

We focus on the solution in which the altruistic principal grants the delegation set $[0, h_a^{\bar{R}}]$, with $l_a^{\bar{R}} > 0$ and $h_a^{\bar{R}} < n$. The altruistic principal grants the same delegation set as when there is certainty about her type. The self-interested principal cannot find it profitable to grant the same level of discretion as when there is certainty about her type. This is because the agent will negatively reciprocate. If the selfish principal adjusts the delegation set accordingly (separating equilibrium), she gets:

$$u_P = \max\left\{pS\int_0^{h^{SS}} f(\omega)d\omega, s\right\},$$

where $h^{SS} = \gamma\big((\alpha-\eta)pS\big)$, if $\alpha > \eta$. Otherwise, she could mimic the altruistic principal (pooling equilibrium). In this case, she obtains:

$$pS[F(h_a^{\bar{R}}) - F(l_a^{\bar{R}})].$$

As ψ goes up, the pooling equilibrium becomes increasingly unattractive for the selfish principal. To see this, suppose that ψ marginally increases to ψ'. As shown in Lemma 5, when ψ rises both $l_a^{\bar{R}}$ and $h_a^{\bar{R}}$ increase. Let us call the new optimal levels $l_a^{\bar{R}'}$ and $h_a^{\bar{R}'}$. Note that the change in ψ does not directly affect the constraints. As the agent receives more discretion, his expected material utility goes up, i.e. $E_\omega u_A(d^*(\omega, D), \omega)$ increases. But then the expected material payoff of the principal, i.e. $E_\omega u_P(d^*(\omega, D), \omega)$, must necessarily decrease, or else $l_a^{\bar{R}}$ and $h_a^{\bar{R}}$ would not be optimal for the initial level ψ. □

Proof of Proposition 5

If both principals grant $[0, h_a^R]$, the agent feels that he gets what he is entitled to. In this case, an increase in η has a positive effect on discretion, since $h_a^R = \gamma\Big((\alpha+\eta)pS\Big)$.

If the altruistic principal grants $[0, h_a^{\bar{R}}]$ with $l_a^{\bar{R}} > 0$, we use the Implicit Function Theorem to study the impact of η on discretion. Consider the following implicit function:

$$T(h_a^{\bar{R}};\eta) = \left[pSf(h_a^{\bar{R}}) - pS\frac{f(l_a^{\bar{R}})g'(h_a^{\bar{R}})}{g'(l_a^{\bar{R}})}\right](1+\psi\alpha) + \psi\, g'(h_a^{\bar{R}})[1 - F(h_a^{\bar{R}}) + F(l_a^{\bar{R}})]$$
$$+ \psi\, f(l_a^{\bar{R}})\left[\frac{g'(h_a^{\bar{R}})}{g'(l_a^{\bar{R}})}[g(h_a^{\bar{R}}) - g(l_a^{\bar{R}})]\right] = 0,$$

where $l_a^{\bar{R}} = \gamma\big(g(h_a^{\bar{R}}) - (\alpha+\eta)pS\big)$. Recall that $\frac{\partial T}{\partial h} < 0$ or else the second-order condition would not be satisfied. Therefore, $sign\frac{\partial h}{\partial \eta} = sign\frac{\partial T}{\partial \eta}$.

$$\frac{\partial T}{\partial \eta} = \frac{pSg'(h)}{[g'(l)]^3}\big[g''(l)f(l) - g'(l)f'(l)\big]\big[\psi(g(h) - g(l)) - (1 + \psi\alpha)pS\big] < 0,$$

because the first term in brackets is positive from Assumption A1, while the second term in brackets is negative since $\psi(g(h) - g(l)) = \psi(\alpha + \eta)pS < (1 + \psi\alpha)pS$. To understand this result, notice that an increase in η also reduces $l_a^{\bar{R}}$. Therefore, at the margin the altruistic principal is substituting larger and less likely states for smaller but more likely states of the world. It follows that if the selfish principal mimics the altruistic principal, she will also reduce discretion if η increases.

If the selfish principal does not mimic the altruistic one, she grants $[0, h^{SS}]$. In this case, the agent will feel aggrieved and an increase in η will reduce discretion, since $h^{SS} = \gamma\Big((\alpha - \eta)pS\Big)$. □

Notes

[1]See *The Google Way: Give Engineers Room*, The New York Times on October 21, 2007.

[2]For 3M see *The innovation mindset in action: 3M corporation* on Harvard Business Review, August 6, 2013. *The 15 per cent time* has been used since 1948 and it numbers the Post-It among its inventions. In the program adopted by LinkedIn, engineers have up to 3 months to develop products out of their own ideas. See *LinkedIn Gone Wild: 20 Percent Time to Tinker Spreads Beyond Google* on Wired June 12, 2012. And finally for Apple see *Apple Gives In to Employee Perks* on the Wall Street Journal November 12, 2012.

[3]See *Bureaucracy Buster? Glaxo Lets Scientists Choose Its New Drugs*, The Wall Street Journal on March 27, 2006.

[4]Employee involvement is a broader concept which refers to the employees' opportunity to actively participate in decisions that impact on their work. It distinguishes between three different levels of an employee's authority, i.e. task discretion, organizational participation, and strategic participation.

[5]Melumad and Shibano (1991) characterize the solution to the delegation problem when preferences are quadratic and the state of the world is uniformly distributed. Martimort and Semenov (2006) determine a sufficient condition on the distribution of the state of the world for interval delegation to be optimal. Alonso and Matouschek (2008) provide a comprehensive characterization of the optimal delegation set allowing for general distributions and more general utility functions.

[6]In this way we can capture the conflict of interest existing within firms when it comes to project decisions. While employers are interested in maximizing the firm's profit or market value, employees may favor larger projects, with which larger private benefits are typically associated as in the case of empire-building preferences.

[7]The gift-exchange game introduced by Fehr et al. (1993) shows that workers are willing to reward actions that are perceived as kind. In this experiment, workers increase their level of effort if they receive a higher wage. Despite the presence of selfish workers, the relation between average effort and wages is sufficiently steep as to make a high-wage policy profitable. In addition, experimental evidence on the ultimatum game indicates that a substantial fraction of agents is willing to punish behavior that is perceived as hostile (see for example Güth et al., 1982, Gale et al., 1995, and Roth and Erev, 1995).

[8]The idea explored by Englmaier and Leider (2012) is based on the works of Akerlof (1982) and Akerlof and Yellen (1990). Akerlof (1982) assumes that if a firm pays wages above the market clearing price, i.e. the firm gives its employees a gift, employees reciprocate by increasing their effort provision. In a similar way, Akerlof and Yellen (1990) argue that employees reduce their effort whenever they are

paid less than a fair wage. These articles are implicitly focused on a moral hazard situation even if asymmetric information and incentives do not play an important role.

[9]These empirical findings are in line with the theoretical predictions the authors derive in a repeated-game model where relational incentives are gradually replaced by reciprocal incentives over the course of a worker's career.

[10]The payoff the principal attains when she assigns a standard task to the agent may also include the intrinsic value that she attaches to holding the decision right. The existence of a taste for control has recently found support in experimental research (Fehr et al., 2013, and Bartling et al., 2014).

[11]Notice that, unlike reciprocity, altruism is a form of unconditional kindness, i.e. it does not depend on the action taken by the other party (e.g., see Cox, 2004). Following this interpretation, in our model the agent would exhibit both altruism and reciprocity concerns.

[12]Note that there is a close relationship with Assumption 1 in Englmaier et al. (2010).

[13]It is also true that larger investments may turn out to be more profitable, that is they may have a larger S. However, they may also have a lower probability of begin successful, that is they may have a lower p. Hence, the product pS might well remain constant over projects. For simplicity, throughout our model we keep these two parameters fixed.

[14]Notice that the problem can also be stated in terms of a direct mechanism design problem where the agent is asked to report the state of the world and the principal commits to a decision rule which maps the report to the selection of a project. The equivalence is due to the inability of the principal to observe the true state of the world.

[15]Notice also that in our model the agent does not take into account the underlying intention of the principal to evaluate her kindness. In other papers in the literature on reciprocity, intentions play a fundamental role (e.g. Rabin, 1993; Dufwenberg and Kirchsteiger, 2004). Though less sophisticated, our modeling approach is still able to convey some of the key features of reciprocity, namely that an individual's perception of how he has been treated by the others affects his well-being and consequently his actions. In this respect, there are close similarities with the approach followed by Englmaier and Leider (2012).

[16]It is worth stressing that the agent's ability to retaliate by selecting a project different from the right one shields him from the principal's unkindness. When this occurs, the principal's material utility, u_P, is equal to zero and so is the agent's reciprocity payoff. It follows that the agent's expected utility is always non-negative.

[17]The latter inequality in Assumption 3 is needed to ensure the convexity of the incentive compatibility constraint.

[18]However, the function $g(\cdot)$ need not be linear as shown in an example provided in the appendix.

[19]We also need to point out that the solution $[0, h^R]$ is always a maximum, whereas the solution $[0, \tilde{h}^R]$ does not always satisfy the second-order conditions for a maximum. See the proof of Proposition 2 for more details.

[20]To see this, consider that when $h^R = n$, $k_{PA}(n) = 1$, and therefore a marginal increase in η has a positive impact on the left-hand side and no effect on the right-hand side of the tightest incentive compatibility constraint. This constraint continues to be slack.

[21]This is a situation in which the agent would get broad discretion even if $\eta = 0$, e.g. the agent's and the principal's interests are substantially aligned.

[22]This is a situation in which the agent would get little discretion when $\eta = 0$, e.g. the agent's and the principal's interests are dissonant.

[23]As stressed at the end of the previous subsection, this solution arises for η large enough but may not satisfy the second-order condition for a maximum.

[24]For a somewhat similar approach see Le Quement and Patel (2017).

[25]This issue is also acknowledged by both Rabin (1993) and Dufwenberg and Kirchsteiger (2004).

[26]One mechanism which could justify this assumption is the presence of ex-ante competition for the job among several homogeneous agents. Thanks to competition, the agent may perceive limited discretion as legitimate. We thank a referee for suggesting this mechanism.

[27]Experimental evidence highlights that the timing at which the individuals form their expectation is critical to determine the reference point. For instance, in studying the effects of emotional cues associated with wins and losses by local NFL teams, Card and Dahl (2011) show that the relevant reference point for the final outcome is the pregame expectation, and not the one that the viewers can form while the game is in progress.

[28]The questions on reciprocity have also been included in the 2010 wave of the dataset. It is worth noting that the measures of positive and negative reciprocity in 2005 are strongly correlated with the same measures in 2010. In particular, the correlation coefficient between the measures of positive reciprocity in 2005 and 2010 is equal to 0.3682, while the correlation coefficient between the measures of negative reciprocity in 2005 and 2010 is equal to 0.48. This suggests that an individual's reciprocity is likely to be stable even over the 5 year gap. In Online Appendix D, we show that our results are indeed robust when we use the 2010 wave of the dataset.

[29]Schütte and Wichardt (2012) theoretically and empirically (using the GSOEP) show that employees who have temporary jobs are less likely to receive discretion.

[30]We believe that the unobservables of the individuals who work in the same sector (or occupation) are likely to be correlated. This is because there are apparent similarities in the business operations and practices pursued by firms belonging to the same sector.

[31]As a robustness check, we also generate an alternative variable, that we call *discretion*, and takes value 0 if the worker answered "does not apply" to the question on delegation, 1 if he or she answered "applies partly", and 2 if he or she answered "applies fully". We regress the variable discretion on our measures of reciprocity. In this case, we cannot use the Ordered Logit Model because some of the independent variables (e.g. male) violate the Parallel-lines assumption (i.e. the requirement that the coefficients be the same for all categories). Therefore, we turn to the Generalized Ordered Logit Model and we use the GOLOGIT2 Stata program provided by Williams (2006). By using this alternative variable, our results still hold and are available under request.

[32]Our results still hold if we consider a Probit model.

[33]A similar pattern arises when we consider the 2010 wave of the dataset (see Online Appendix D). In that case, the coefficient of negative reciprocity is also statistically significant when we consider the full sample.

[34]To reconcile this empirical result with our model, one should have to make the reasonable assumption that an employee earns a higher wage when the project is more valuable to the principal. Since a higher pS amplifies the effect of η on discretion (as shown in Corollary 1) there would be a positive relationship between the worker's salary and the magnitude of his reciprocal reaction to the principal's kindness.

[35]Aldashev et al. (2017) show that the use of an explicit and credible randomization device reduces the demoralization associated with an unpleasant task and thereby enhances performance.

[36]Moreover, in our model the agent does not compare the utility he gives to the principal with any alternative, which amounts to having set the reference point for return kindness equal to zero.

[37]See *Google's "20% time", which brought you Gmail and AdSense, is now as good as dead* on Quartz, August 16, 2013.

[38]Consider that $k_{PA}(\tilde{D}) \leq k_{PA}(D')$ because $E_\omega u_A(\omega, \tilde{D}) \leq E_\omega u_A(\omega, D')$. As a consequence,

$$\alpha pS + b(l^R) + \eta k_{PA}(\tilde{D})pS \leq b(h^R).$$

[39]Note that $k_{PA}(h)$ takes value between $\left[-\frac{1}{4}, \frac{1}{4}\right]$. Broadening the interval of $k_{PA}(h)$ requires setting a higher lower bound for α, shrinking the interval of allowed values for η, and make some adjustments to the functional forms to simultaneously satisfy all the conditions.

[40]Note that this is not always true but it depends on parameter values.

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Tables

Table 1: Description of independent variables.

Positive Reciprocity	Average responses over the three positive statements on reciprocity.
Negative Reciprocity	Average responses over the three negative statements on reciprocity.
Conflict	Dummy variable: 1=conflict.
Male	Dummy variable: 1=male.
Education	Dummy variable: 1= higher education.
Fulltime	Dummy variable: 1=full-time jobs, 0= part-time jobs.
Permanent	Dummy variable: 1= permanent jobs, 0= temporary jobs.
White Collar	Dummy variable: 1= white collar, 0= blue collar.
Size	Firm size is controlled by 5 dummy variables. Firms with less than 5 employees serve as a baseline.
Sector	Sectors correspond to the classification of economic activities of the European Community (NACE code). It is controlled by 12 dummies. Agriculture, forest and mining sectors serve as a baseline.
Occupation	The International Standard Classification of Occupations (ISCO). ISCO-1 Digit Classification. It is controlled by 9 dummies. Armed forces serve as a baseline.

Table 2: Distribution of Answers. The table reports the distribution of answers for the entire sample and for a restricted sample of the population that only considers employees who earn at least 2,000 euros gross per month.

	Full Sample			Restricted Sample		
Delegation	Obs.	Percent	Cumulative	Obs.	Percent	Cumulative
Applies fully	2,782	36.83	36.83	1,666	44.10	44.10
The rest	4,771	63,17	100.00	2,112	55.90	100.00
Total	7,553	100.00		3,778	100.00	

Table 3: The table reports the coefficients and odds ratio of the Logit regression considering the entire sample. While Columns 1 and 2 only consider positive and negative reciprocity and control for size, sector, and occupation, Columns 3 and 4 consider all the independent variables. In all regressions, standard errors are clustered at NACE 2-digit level.

	Dependent Variables: Delegation			
	Logit (1)	Odds Ratio (2)	Logit (3)	Odds Ratio (4)
Positive reciprocity	0.085***	1.09***	0.081***	1.08***
	(0.024)	(0.026)	(0.024)	(0.026)
Negative reciprocity	-0.024	0.98	−0.021	0.98
	(0.021)	(0.020)	(0.021)	(0.021)
Conflict			−0.29***	0.75***
			(0.055)	(0.041)
Male			0.185***	1.20***
			(0.047)	(0.057)
Education			0.104	1.11
			(0.097)	(0.108)
Fulltime			0.172**	1.19**
			(0.071)	(0.085)
Permanent			0.40***	1.49***
			(0.078)	(0.116)
White Collar			0.44***	1.56***
			(0.093)	(0.145)
Observations	7,553	7,553	7,553	7,553
Pseudo R^2	0.044	0.044	0.058	0.058
Size	Yes	Yes	Yes	Yes
Sector	Yes	Yes	Yes	Yes
Occupation	Yes	Yes	Yes	Yes

*** Denotes significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Standard errors are reported in parentheses.

Table 4: The table reports the coefficients and odds ratio of the Logit regression considering a sub-sample of the population which only includes workers who earn at least 2,000 euros gross per month. While Columns 1 and 2 only consider positive and negative reciprocity and control for size, sector, and occupation, Columns 3 and 4 consider all the independent variables. In all regressions, standard errors are clustered at NACE 2-digit level.

	Dependent Variables: Delegation			
	Logit (1)	Odds Ratio (2)	Logit (3)	Odds Ratio (4)
Positive reciprocity	0.15***	1.16***	0.15***	1.16***
	(0.039)	(0.046)	(0.041)	(0.048)
Negative reciprocity	−0.052**	0.95**	−0.05**	0.95**
	(0.022)	(0.021)	(0.023)	(0.022)
Conflict			−0.36***	0.70***
			(0.079)	(0.055)
Male			0.19***	1.21***
			(0.061)	(0.073)
Education			0.02	1.02
			(0.113)	(0.114)
Fulltime			0.02	1.02
			(0.116)	(0.118)
Permanent			-0.09	0.91
			(0.191)	(0.174)
White Collar			0.37***	1.45***
			(0.101)	(0.146)
Observations	3,778	3,778	3,778	3,778
Pseudo R^2	0.045	0.045	0.053	0.053
Size	Yes	Yes	Yes	Yes
Sector	Yes	Yes	Yes	Yes
Occupation	Yes	Yes	Yes	Yes

*** Denotes significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Standard errors are reported in parentheses.