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A Model of Fair Process and Its Limits

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Fair process research has shown that people care not only about outcomes, but also about the process that produces these outcomes. For a decision process to be seen as fair, the people affected must have the opportunity to give input and possibly to influence the decision, and the decision process and rationale must be transparent and clear. Existing research has shown empirically that fair process enhances both employee motivation and performance in execution. However, work to date has not addressed why fair process is so often violated in practice. This paper breaks new ground by analytically examining the subtle trade-offs involved. We develop a model of fair process in a principal-agent (i.e., manager-employee) context, rooted in psychological preferences for autonomy and fairness. We show that indeed fair process will not always be used, and why the hoped-for benefits may be insufficient to convince management to use fair process.

Key words: fair process; engagement; transparency; social preference; agency theory; motivation
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1. Introduction

The operations management community is interested in behavioral phenomena. Individual decision makers have been shown, empirically and analytically, to often deviate from neoclassically rational behavior—for example, in risk evaluation, in the discounting of future costs and benefits, or in the evaluation of losses versus gains. This article focuses on another equally important behavioral aspect of decision making, i.e., collective decision making. Every organization represents a social group; interactions among a group's members and with external parties have a social character. Evidence is mounting in the social sciences that social interactions are valued in themselves, and not solely as a way to achieve individually rational economic maximization (Fehr and Fischbacher 2003).

A particular aspect of social interaction that has been found to have a significant influence on the execution performance of an organization is *fair process*. This refers first to the *fairness of outcomes*, i.e., *distributive justice*: Although people prefer a higher payoff, what matters is not only the absolute size of the payoff, but also its relative size when compared in a peer group (Bolton and Ockenfels 2000, Fehr and Gächter 2002).

People also care about the fairness of the process or procedure through which the decision is made and the outcome reached. This refers to *procedural justice*, or *fair process* (Thibault and Walker 1975, Lind and Tyler 1988, Frey et al. 2004, Bolton et al. 2005). The nature of the decision process influences the perception of fairness by the affected parties and, through their emotional reactions, the perception of their utility (Frank 1988).

Empirical evidence suggests that the observation of fair process is a significant factor in the execution performance achieved by organizations. Studies of subsidiary managers in international organizations, product innovation teams, change management teams, and teams in partnerships with suppliers, have shown that individuals are most likely to trust and freely cooperate with organizational systems when fair process is observed (Kim and Mauborgne 1991, 1997, 1998; Cohen-Carash and Spector 2001; Colquitt et al. 2001; Van der Heyden et al. 2005). These studies also show the converse: Grave and prolonged violations of fair process result, at best, in passive resistance ("hoarding ideas and dragging one's feet") and, at worst, in overt obstruction motivated by a desire for retribution ("outright sabotage as a way of getting even"). These effects cannot be explained solely by outcome motivation: The effect persists whether the individuals involved gain or lose by participating.

However, fair process is often not used. In addition, several studies find no effect or even observe reduced performance due to the use of fair process (Cohen-Carash and Spector 2001, Colquitt et al. 2001, Brockner 2006). Empirical observations on the power of fair process have not been followed by analytical models based on preferences and decision-making principles. This lack of detailed understanding has slowed a thorough examination of the trade-offs involved. When does fair process work, and when does it not? When should a manager follow fair process? When fair process is not used, is this evidence of a lack of knowledge by management, or evidence that under certain circumstances fair process should not be used?

In this article, we build a *model of fair process*, rooted in economic rational preferences as well as psychological social preferences, that explores why and under what circumstances fair process might or might not be used in managerial practice. The application to operations management for the model's prototypical case setting is that of a manager (the principal) facing employees (the agent) who are asked to execute an operational assignment.

2. Fair Process and Social Preferences

2.1. Distributive Fairness, Procedural Fairness, and Fair Process

Distributive fairness concerns *relative* rewards in addition to absolute payoffs and rewards; it addresses our sensitivity to being shortchanged relative to others (Fehr and Schmidt 1999). It is now accepted not only in anthropology, but also in economics that fairness is a concern that enters people's utility function in its own right (Bolton and Ockenfels 2000). One reason for this is the need to prevent opportunism in repeated interactions in groups (Trivers 1971, Frank 1988).

In contrast to distributive justice, procedural justice refers to the fairness of the *decision process or procedure* by which an outcome is obtained (Lind and Tyler 1988). Bolton et al. (2005) introduce procedural justice into ultimatum game experiments by determining the split of the "pie" via a lottery rather than via a choice of the proposer (which then is accepted or refused by the decider). They observe that subjects tend to accept a split if the *outcome* is fair (close to a 50–50 split) or if the lottery, the *procedure*, is fair (even when the resulting outcome is unfair and results in an uneven split).

A broader view of procedural justice examines the *behaviors* of the actors involved in a social exchange (Lemenestrel 2001). The behavior of each party signals to the other parties their autonomy (the freedom to make decisions), competence (the ability to influence outcomes), and relatedness (to the group) in this context (Frey et al. 2004). Individuals feel better about outcomes if the decision process offers them a perception of autonomy, competence (Spector 1986, Ryan and Deci 2000, Deci and Ryan 2000), and a perception of being respected in their relationships with the group (Frank 1988, Barkow 1989, Loch et al. 2006).

The empirically derived concept of fair process has been developed specifically to study procedural justice in the context of decision making in organizational hierarchies. It asks when employees might be sufficiently motivated to fully cooperate in the execution of a decision. This literature has defined fair process by six characteristics that engender a perception of fairness on the side of those affected by a decision process (Leventhal 1980; Lind and Tyler 1988; Kim and Mauborgne 1991, 1997). These are: (i) consistency of procedure (across persons and time); (ii) suppression of bias by the decision maker; (iii) transparency (explanation of the decision logic and accuracy of information given); (iv) engagement of the affected (being listened to with the possibility of affecting the decision, and the possibility of correction through, for example, appeal procedures); (v) representativeness (consideration of the views of all parties involved); and (vi) ethicality (compatibility of the procedure with moral values) (see also Van der Heyden et al. 2005 for a definition that is connected to Kaizen, or continuous improvement, practices). In this paper, we focus particularly on engagement and transparency.

In addition to fair process literature, we also build on work in decision theory that has shown that (most) people exhibit *ambiguity aversion* when probabilities are vague or not well defined (Ellsberg 1961, Camerer and Weber 1992). Social interactions are often fraught with ambiguity; what the other side does is not stochastic but influenced with intentional attempts to free-ride (violate reciprocity). In particular, free riding in social interactions is rampant and often characterized by subtle cheating that is hard to detect. Researchers have observed that people are very sensitive to situations in which cheating is possible because they possess a psychological mechanism for detecting cheating (Cosmides and Tooby 1989, 1992; Gigerenzer and Hug 1992). This cheating module alerts them to possible violations of fairness. When possible social cheating is detected—for example, when the situation is ambiguous—malicious intent is attributed to the other side. Subtle cheating that is hard to detect and to act against should lead to ambiguity aversion: People become suspicious and tend to assume the worst case (Cao et al. 2005). This is why *transparency* is one of the empirically important drivers of fair process: If it is not ensured, people become suspicious and withhold cooperation.

Another related observation in social exchange theories is that the individual's reaction to actions of the other side is influenced by her interpretations of the *intent* behind their behavior (in addition to the outcomes from their action, Rabin 1993). For example, in ultimatum game experiments, Falk et al. (2003) observed that identical proposals were rejected at different rates depending on the proposer's forgone opportunities, and the receiver's behavior was driven not only by outcomes, but also by intentions of the other side. Other recent experiments also suggest that intentions matter (Offerman 2002, Charness and Levine 2007). The model in this paper does not explicitly include intentions. The agent in the model responds to the manager's action and its consequences. Although the model does not include intentions, it is consistent with accounts of intentionality if one assumes that actors are aware of the consequences of their actions (both with respect to payoffs and fairness) and that they attribute intent to each other (which is realistic in fairness-sensitive decisions in a hierarchical organization).

2.2. Related Models: Delegation Theory and Fair Lotteries

Our model of the fair process is related to economic models of delegation that examine when a principal might delegate formal authority to an agent (Aghion and Tirole 1997, Baker et al. 1999). We build on this work by adding preferences for fairness.

In Aghion and Tirole (1997), both a principal and an agent engage in a costly search to identify desirable projects. Both parties derive private benefits from the project (for example, individual career advantages or perks), which disaligns their interests. Moreover, each party's search might fail to identify a project. Formal authority resides with the principal who has the right to choose which project is undertaken. If the principal's search fails to identify a project, he listens to the agent's choice. If the principal has delegated formal authority, the agent has the right to choose a project; only if his search fails will the choice return to the principal. With delegation, the agent's chance of having his favorite project chosen, and with it receiving the payoff to his effort, increases. Therefore, delegation motivates the agent to search harder.

Fairness concerns are absent from Aghion and Tirole's model, in which actions are driven solely by outcome considerations. Aghion and Tirole's agent likes delegation because it increases the expected payoff (as it allows choosing a favorite project). Our model introduces preferences for distributive and procedural fairness. There is no upfront search, but an upfront choice, and all the effort to execute the project is exerted by the agent. Effort creates alignment of interest because it benefits both principal and agent. Execution is absent from Aghion and Tirole's theory, but is an essential aspect of fair process and of operations more generally.

As we follow Aghion and Tirole, our model also presents conflicts of interest due to the possible disalignment of private benefits. The introduction of fairness introduces further conflict: The agent dislikes the principal's private benefit and is always more motivated when the principal engages him to choose the project. Our actors thus face different incentives and our conclusions are fundamentally different from Aghion and Tirole.

A second model related to our work appears in Bolton et al. (2005), which is mentioned in §2.1. In that paper procedural justice was introduced into the ultimatum game by a lottery (replacing the proposer's decision). The authors proposed a simple combination of distributive and procedural fairness: If *either* the split or the lottery are fair, the utilities of the actors are high. Our context of fair process is one of an organizational hierarchy, represented by a principal-agent model. The interaction is more complex because it necessarily involves a fairness interpretation by the agent of the principal's action (instead of a lottery). Both types of fairness are represented in our model: relative size of nonshared (private) benefits representing distributive justice, and engagement (giving the agent the choice) and transparency representing procedural justice.

3. The Model

We model fair process in a hierarchy with one principal (the manager) and one agent (the employee). The organization must achieve a certain outcome (for example, a cost reduction) and faces alternative project choices to achieve this outcome (for example, extending work hours to use machines better or implementing a process improvement project).

The decision sequence is as follows. In stage one the principal can make the choice himself (and then order the agent to execute), or he can apply fair process allowing the agent to influence the choice. In stage two, the agent is responsible for execution and must decide how much effort to expend. As is usual in principal-agent theory, effort is not contractible; i.e., it remains at the agent's discretion. Normally, to acknowledge that effort cannot be prescribed, one would introduce zero-mean noise terms into the profit and private benefit functions. However, to avoid risk-aversion effects (which are well understood and not our focus), we leave out noise and assume that effort can be deduced (albeit not enforced) by the principal based on output delivered. This is often the case in professional work; see Levin (2003).

There are two potential projects $i \in \{1, 2\}$ with differing productivity characteristics. Project i produces economic profit $\Pi_i(E)$, $i = 1, 2$, which depends on the effort, E, the agent exerts in execution. Economic profit is increasing in effort, but with decreasing marginal returns: $\Pi_i'(E) \geq 0$, $\Pi_i''(E) \leq 0$. We order the projects by productivity: $\Pi_1'(E) > \Pi_2'(E)$ and $\Pi_1(0) = \Pi_2(0)$; that is, project 1 is always more productive, at any given effort level.

Economic profit is allocated by an exogenously given linear performance contract that gives the agent an output-dependent benefit $\beta\Pi_i$, whereas the principal owns the residual $(1-\beta)\Pi_i$. Linear performance contracts are widely observed because of their simplicity and robustness (see Holmström and Milgrom 1987). The employee's compensation may also include a fixed payment w, which we normalize to zero. It does not influence our results because we do not explicitly include an outside option for the employee and therefore do not need a participation constraint.

In addition to economic profit, project i produces private benefit $V_{P,i}(E)$ for the principal, and $V_{A,i}(E)$ for the agent. Private benefits also face diminishing returns: $V_{k,i}(0) = 0$, $V_{k,i}'(E) \geq 0$, $V_{k,i}''(E) \leq 0$, $k = P, A$; $i = 1, 2$. Examples of private benefits are reputation, externalities for other projects, future career opportunities arising from the current project, and intrinsic interests. For example, an employee may prefer a project because it will give him a new skill relevant for future jobs. A manager may prefer a different project that is more easily represented as a "victory" to his peers. The key feature of private benefits is that they are not shared by the two parties and are not contractible (Aghion and Tirole 1997, Baker et al. 1999, Murdock 2002).

Private benefits represent potential conflicts of interest between principal and agent. The agent's effort, in contrast, aligns both parties—it generates economic profit *and* both sides' private benefits depend on it. Even the principal receives his private benefit (such as the "victory" to be announced to his peers) only if the project performs well. The two parties experience effort differently because the agent carries its cost alone, and because both economic profit shares and private benefits are generated with different marginal return rates.

After project choice and execution, principal and agent experience the following utilities:

$$U_A(\theta, i, E) = \beta\Pi_i(E) + V_{A,i}(E) - (1-\lambda\theta) \cdot (V_{P,i}(E) - V_{A,i}(E)) - \frac{C(E)}{1+\tau\theta}, \quad (1)$$

$$U_P(\theta, i, E) = (1-\beta)\Pi_i(E) + V_{P,i}(E). \quad (2)$$

θ represents the engagement decision by the principal who has the authority over the project. For simplicity of exposition, we treat the engagement decision as a dichotomous variable: Either the manager chooses the project ($\theta = 0$), or he engages the agent to choose ($\theta = 1$). Note that the principal's utility, U_P, is a function of the agent's effort E, although it is not the principal's decision variable.

The agent is driven by three concerns: (a) his payoff: the sum of economic profit, $\beta\Pi_i(E)$, and his private benefit, $V_{A,i}(E)$; (b) distributive fairness in private benefits: The relative comparison $(V_{P,i}(E) - V_{A,i}(E))$ demotivates the agent when he feels taken advantage of, but motivates him if he feels he comes out ahead; and (c) the procedural fairness of the decision, which has two effects. First, fair process alleviates the negative motivational effect of distributive unfairness by a factor $(1-\lambda)$, $\lambda \in [0,1]$: If the agent is allowed to choose the project, he feels less negative about private benefit inequalities because he influenced them through project choice. Thus, distributive fairness and procedural fairness interact in our model: Procedural fairness mitigates distributive unfairness.[1] Second, engagement gives the agent a voice in the decision process, and this motivates him (the ability to influence outcomes is discussed in §2.1): It reduces his disutility from exerting effort, $C(E)$, in the execution stage by a factor of $1/(1+\tau\theta)$.[2] Effort disutility is convex increasing: $C'(E) > 0$, $C''(E) > 0$; $\tau > 0$ is a scale parameter. To exclude unattractive projects, we further assume that $C'(0) < \beta\Pi_i'(0)$.

Note that in the absence of engagement ($\theta = 0$), $U_A(0, i, E) = \beta\Pi_i(E) + 2V_{A,i}(E) - V_{P,i} - C(E)/(1+\tau\theta)$: The agent equally weighs economic benefit, private benefit, and private benefit inequality. Rather than introducing a linear weighing factor ϕ here (as a factor before the private benefit difference $(V_{P,i}(E) - V_{A,i}(E))$), we introduce a more general weighing as part of the private benefit function in §4.2 (the results of §4.1 do not change).

[1] Another potential distributive fairness concern is the relative economic payoff, reflected in the payment scheme β. Since in our model the payment parameter β is exogenously determined and accepted by both parties, we focus on the fairness of relative private benefits.

[2] In an alternative model formulation, engagement boosts the perceived utility of the agent's payoff, $(1+\tau\theta)\beta\Pi_i$, instead of reducing the effort disutility. That is, motivation could also work by increasing the satisfaction derived from the outcome rather than by reducing the dissatisfaction of effort. We have analyzed this variant of the model, and the qualitative results are robust to this change.

The principal's psychology is, in principle, the same as the agent's. However, the hierarchical position is asymmetric: The principal has the authority and chooses whether to engage the agent. Because engagement is the principal's choice, he feels no loss of decision power from it, and no disutility results. Therefore, the principal cares only about his share of the economic outcome $(1-\beta)\Pi_i(E)$ and his private benefit $V_{P,i}(E)$. The principal is not concerned about social comparisons with his agent. This reflects the typical situation when the agent's potential private benefits are much smaller than the principal's. In our conclusion, we discuss the implications of introducing social concerns, such as ego and fairness, into the manager's preferences.

So far, we have emphasized *engagement*, the question of whether the agent is given the opportunity of project choice. The second aspect of fair process we model in this paper is *transparency*. This refers to whether private benefits are disclosed to or hidden from the other party. We concentrate on engagement in §4 and turn to transparency, and its interaction with engagement, in §5.

Given the decision sequence, we can solve the equilibrium solution by backward induction, starting from the agent's problem of exerting optimal effort E_i (given that project i is chosen)

$$E_i^*(\theta) = \arg\max\{U_A(\theta, i, E)\}.$$

The optimal effort level $E_i^*(\theta)$ solves the following first-order condition

$$\beta\Pi_i'(E) + V_{A,i}'(E) - (1-\lambda\theta) \cdot (V_{P,i}'(E) - V_{A,i}'(E)) - \frac{C'(E)}{1+\tau\theta} = 0, \quad i = 1, 2. \quad (3)$$

If the agent is engaged ($\theta = 1$), he compares the potential gains from the two projects and chooses a project as follows:

$$i_A^* = \arg\max_{i\in\{1,2\}}\{U_A^*(\theta = 1, i, E_i^*(\theta))\},$$

where U_A^* is his utility at the optimal effort level E_i^*. Finally, the principal's decision on engagement, θ, can be characterized as

$$\theta^* = \arg\max\big\{U_P(\theta=1, i_A^*, E_i^*(1)); U_P(\theta=0, i=1, E_1^*(0)); U_P(\theta=0, i=2, E_2^*(0))\big\}.$$

4. Analysis: When to Engage?

4.1. Base Case

The base case is defined by the absence of conflicts of interest due to differential private benefits

$$V_{P,i}(E) = V_{A,i}(E) = 0 \quad \text{for } i = 1, 2.$$

Proposition 1. *In the absence of private benefits, $V_{P,i}(E) = V_{A,i}(E) = 0$, the principal always engages the agent* ($\theta^* = 1$).

Proof. The optimal effort $E_i^*(\theta)$ solves the first-order condition $C'(E) = (1+\tau\theta)\beta\Pi_i'(E)$, which implies that $E_i^*(\theta)$ is increasing in θ. Therefore, $\Pi_i(E_i^*(\theta))$ is increasing in θ, which further implies that $U_P(\theta, i) = (1-\beta)\Pi_i(E_i^*(\theta))$ is increasing in θ. The principal is always better off if the agent is engaged, i.e., $\theta^* = 1$.

Proposition 1 is consistent with empirical findings that engagement tends to enhance organizational performance: If there is no conflict of interest, engagement motivates the agent to exert more effort, increasing both economic profit (Π) and individual satisfaction (utility). In the absence of conflicts of interest, fair process is a no-brainer and should be widely used.

We now turn to the effect of conflicts of interest (private benefits) on the engagement decision. To maintain readability, we first consider private benefits for the agent (§4.2) and then turn to private benefits on the side of management (§4.3).

4.2. Private Benefits for the Agent

Suppose the agent enjoys a private benefit $V_{A,1}(E)$ from pursuing the more productive project 1. One sees immediately that this situation is benign—the private benefit acts as an additional motivation. Project 1 would be chosen by either party. The only remaining question is whether the principal engages the agent.

To answer this question, we need to consider the possibility that engagement may *reduce* the agent's effort $E_1^*(\theta=1)$ if he enjoys having influence so much that working hard is no longer necessary. The principal engages the agent if $E_1^*(\theta=1) \geq E_1^*(\theta=0)$. Note that $E_1^*(\theta=1)$ solves $C'(E) = (1+\tau)(\beta\Pi_1'(E) + (2-\lambda)\cdot V_{A,1}'(E))$ and $E_1^*(\theta=0)$ solves $C'(E) = \beta\Pi_1'(E) + 2V_{A,1}'(E)$. The inequality holds when $(1+\tau)(2-\lambda) \geq 2$. This condition requires that the psychological effects of motivation from autonomy (τ) and mitigation of social comparison $(1-\lambda)$ are strong enough (note that $\tau = 1$ is sufficient). If the motivation effects are too weak, fair process is not worthwhile. This may be the case, for example, when the agent is a short-term contractor who wants the money and does not care about social considerations or how he is treated. In an organizational hierarchy, the usual context of fair process, we assume that the condition $(1+\tau)(2-\lambda) \geq 2$ holds.

It follows that the principal engages the agent, who chooses project 1 and will work harder. This is consistent with Aghion and Tirole (1997) and is intuitive: When you know the employee's interests are aligned with yours, give him the satisfaction of involvement.

The situation is more complicated when the agent has a private benefit from the less productive project 2, $V_{A,2}(E)$ (while $V_{A,1}(E) = V_{P,1}(E) = V_{P,2}(E) = 0$). Conflicts of interest arise: If engaged, the agent may pursue the wrong project from the principal's viewpoint.

To understand how the private benefit affects engagement, we now introduce a parameter ϕ that expresses the extent of project 2's private benefit productivity level (as opposed to economic productivity). This parameter can be interpreted as objective productivity (for example, a monetary side benefit) or as a subjective importance weight (as discussed in §3 under Equation (1)).

We introduce this private benefit productivity parameter to $V_{A,2}(E)$ in the following way. Let $\Phi_{A,2}$ be an index set that orders a family of private benefits $V_{A,2,\phi}(E)$ according to their rates: $V'_{A,2,\phi_1}(E) \geq V'_{A,2,\phi_2}(E)$ if $\phi_1 \geq \phi_2 \in \Phi_{A,2}$. We call $\phi > 0$ the private benefit productivity parameter (but it could also represent an importance weight). Mathematically, $V'_{A,2,\phi}(E)$ is increasing in $\phi \in \Phi_{A,2}$. With this characterization of the private benefit productivity, we can show that the agent's motivation grows not only with engagement, but also with the private benefit productivity parameter ϕ.

Lemma 1. *The agent's optimal effort $E_2^*(\theta)$ is increasing in θ and $\phi \in \Phi_{A,2}$.*

Lemma 1 shows that the agent working on project 2 is motivated, and his effort boosted, both by engagement and by private benefit. Moreover, we can show that if the agent is engaged and if project 2's private benefit productivity is above a threshold, the agent chooses project 2 (and its private benefit) over project 1 (and its economic efficiency).

Lemma 2. *If the agent is engaged* ($\theta = 1$), *there exists a unique* $\hat{\phi} \in \Phi_{A,2}$ *such that the agent chooses* $i = 1$ *if* $\phi \le \hat{\phi}$, *and* $i = 2$ *otherwise.*

Proof. Under engagement ($\theta = 1$), the agent chooses $i = 1$ if $U_A(\theta = 1, i = 1, E_1^*(1)) \ge U_A(\theta = 1, i = 2, E_2^*(1))$. Note that $U_A(\theta = 1, i = 2, E_2^*(1))$ is monotonically increasing in ϕ. Therefore, along the dimension of ϕ, $U_A(\theta = 1, i = 2, E_2^*(1))$ crosses $U_A(\theta = 1, i = 1, E_1^*(1))$ from below only once at $\hat{\phi}$.

Lemma 2 implies that, for the principal, the optimal use of engagement depends on project 2's marginal productivity ϕ. The following proposition states that this dependence is nonmonotonic.

Proposition 2. *When the agent has a private benefit from the less productive project, we have two cases.*

(a) *There exists* $\tilde{\phi} \ge \hat{\phi}$ *such that the principal engages the agent* ($\theta^* = 1$) *if* $\phi \le \hat{\phi}$ *(and the agent chooses the more productive project* 1*), or if* $\phi \ge \tilde{\phi}$ *(and the agent chooses the less productive project* 2*); if* $\hat{\phi} < \phi < \tilde{\phi}$, *the principal imposes the more productive project without engaging the agent.*

(b) *There exists* $\bar{\phi} \le \hat{\phi}$ *such that the principal engages the agent* ($\theta^* = 1$) *if* $\phi \le \bar{\phi}$ *(and the agent chooses the more productive project* 1*), or if* $\phi \ge \bar{\phi}$ *(and the agent chooses the less productive project* 2*); if* $\bar{\phi} < \phi < \hat{\phi}$, *the principal imposes the less productive project without engaging the agent.*

Proof. If $\phi > \hat{\phi}$, the agent chooses the less efficient project $i = 2$ if engaged. The principal engages the agent if $U_P(\theta = 1, i = 2, E_2^*(1)) \ge U_P(\theta = 0, i = 1, E_1^*(0))$, i.e., $(1-\beta)\Pi_2(E_2^*(1)) \ge (1-\beta)\Pi_1(E_1^*(0))$. By Lemma 1, $E_2^*(1)$ is increasing in ϕ; then there exists $\tilde{\phi}$ such that the above inequality holds when $\phi > \tilde{\phi}$. When $\tilde{\phi} \ge \hat{\phi}$, we have part (a).

If $\phi \le \hat{\phi}$, the principal engages the agent if the following conditions hold: $U_P(\theta = 1, i = 1, E_1^*(1)) \ge U_P(\theta = 0, i = 1, E_1^*(0))$ and $U_P(\theta = 1, i = 1, E_1^*(1)) \ge U_P(\theta = 0, i = 2, E_2^*(0))$. The first always holds under the condition $(1 + \tau)(2 - \lambda) \ge 2$. The second means $(1 - \beta)\Pi_1(E_1^*(1)) \ge (1 - \beta)\Pi_2(E_2^*(0))$, or $\Pi_1(E_1^*(1)) \ge \Pi_2(E_2^*(0))$. By Lemma 1, $E_2^*(0)$ is increasing in ϕ; then there exists $\bar{\phi}$ such that the above inequality holds when $\phi > \bar{\phi}$. When $\bar{\phi} \le \hat{\phi}$, we have part (b).

Proposition 2 states that the principal chooses engagement when the agent's private benefit productivity is either very high or very low. Which project the engaged agent chooses, however, depends on the private benefit productivity relative to the economic productivity. When the private benefit productivity is relatively low, the agent will pursue the more productive project, for its economic benefit. However, the agent chooses project 2 when private benefit productivity is high. The principal still chooses engagement because the agent's higher motivation makes up for the lower economic productivity.

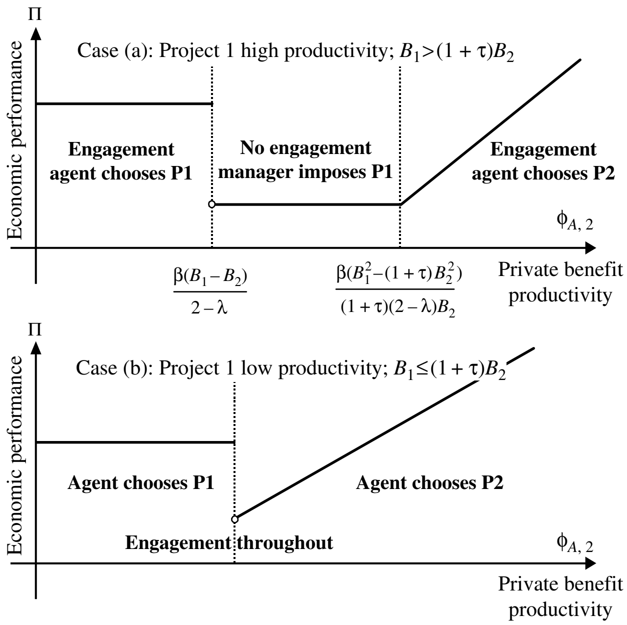
Although the principal maintains control ($\theta = 0$) when the agent's private benefit productivity falls in the medium level, the rationale of maintaining control is different in the two cases presented in Proposition 2. In part (a), the private benefit does not provide enough motivation to make up for the productivity loss, so the principal enforces the more productive project. By contrast, in part (b), the principal imposes the less productive project: The principal still gains by exploiting the agent's motivation for his private benefit from project 2, even when the agent, if engaged, would not have chosen project 2 because of a lower overall satisfaction.

To see the regions of engagement specified in Proposition 2, let us consider linear versions of the profit and private benefit functions, and a quadratic effort disutility function: $\Pi_i(E) = B_i E$; $B_1 > B_2$; $V_{A,2}(E) = \phi_{A,2} E$; and $C(E) = E^2/2$. Figure 1 illustrates the logic of the engagement decision in this linearized case.

The trade-off between the agent's private benefit and the project's economic productivity is complex: More private benefit or less productivity does not necessarily imply less engagement; engagement appears in alternating regions. The economic profit has discontinuities because at the thresholds, the principal changes the engagement decision (and thus the agent changes work effort) or the agent changes project choice, which causes a profit change.

It is interesting to note from Figure 1 that a private benefit for the agent can be economically beneficial: A high private benefit productivity strongly motivates the agent's effort, which produces high economic profit even if the agent chooses a priori the wrong project. Thus, economic profit *increases* with the agent's private benefit. However, the principal needs to pay attention to the potential middle region

Figure 1 **Profit and Decisions as Functions of Private Benefit Productivity** $\phi_{A,2}$



of private benefit productivity, where engagement leads to reduced economic performance.

Note also that in Figure 1, the $\phi_{A,2}$-range in which the principal imposes the high-productivity project is

$$\frac{\beta(B_1^2 - (1+\tau)B_2^2)}{(1+\tau)(2-\lambda)B_2} - \frac{\beta(B_1 - B_2)}{2-\lambda}.$$

This range is increasing in λ, which means that the more strongly fair process mitigates distributive justice violations (from private benefits), the less the principal will engage the agent. The reason is that when only the agent has a private benefit, distributive injustice works in his favor. He enjoys having control over project choice, but no injustice mitigation motivates him. Thus, there is less reason to engage him. Also, the principal should engage more when τ, the autonomy effect (on the agent's effort disutility) is larger. Here, the principal exploits the agent's motivation.

4.3. Private Benefits for the Principal

4.3.1. The Principal Enjoys a Private Benefit from the More Productive Project. We now turn to the situation in which only the principal has a private benefit. In §4.2, we saw that a private benefit for the agent from the productive project is largely benign. This is not the case on the principal's side.

As before, we characterize the private benefit productivity with an index set $\Phi_{P,1}$ of a family of $V_{P,1,\phi}(E)$ such that $V'_{P,1,\phi}(E) \ge 0$, and $V'_{P,1,\phi_1}(E) \ge V'_{P,1,\phi_2}(E)$ if $\phi_1 \ge \phi_2 \in \Phi_{P,1}$. In other words, $V_{P,1,\phi}(E)$ is ordered by $\Phi_{P,1}$ according to its marginal value, and $V'_{P,1,\phi}(E)$ is increasing in $\phi \in \Phi_{P,1}$. Since $U_A(\theta, i=1, E)$ is not necessarily concave in E in this case, $E_1^*(\theta) = \arg\max_E\{U_A(\theta, i=1, E)\}$ here refers to the largest maximizer of $U_A(\theta, i=1, E)$. Then we can again characterize the decision structure (as in Lemmas 1 and 2).

Lemma 3. *The optimal effort level $E_1^*(\theta)$ is decreasing in $\phi \in \Phi_{P,1}$.*

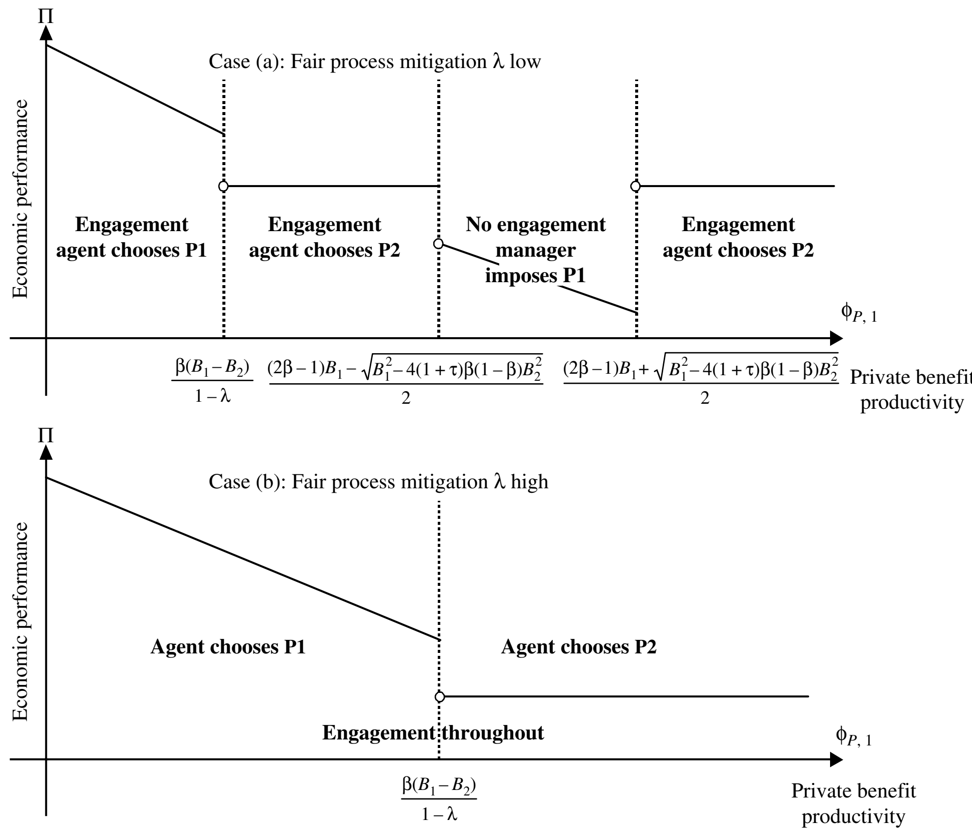
Lemma 4. *If the agent is engaged $(\theta = 1)$, there exists a unique $\hat{\phi}_P \in \Phi_{P,1}$ such that the agent chooses $i=1$ if $\phi \le \hat{\phi}_P$, and $i=2$ otherwise.*

In contrast to Lemma 1, the agent is now demotivated by the private benefit because it violates distributive justice. If engaged, the agent chooses the more productive project when the private benefit to the principal is not too high. Otherwise, the agent chooses the *less* productive project, even at the cost of reduced economic profit. The following proposition describes the principal's engagement decision in this case.

Proposition 3. *When the principal has a private benefit from the more efficient project 1, there exist $\bar{\phi}_P < \tilde{\phi}_P \in \Phi_{P,1}$, such that the principal engages the agent if $\phi \le \bar{\phi}_P$ or $\phi \ge \tilde{\phi}_P$. The engaged agent chooses project 1 when $\phi \le \bar{\phi}_P$ and project 2 when $\phi \ge \tilde{\phi}_P$.*

Proof. To show the existence of $\bar{\phi}_P$, consider $\phi \le \hat{\phi}_P$ when the engaged agent chooses $i=1$. Clearly, when $V'_{P,1,\phi}(E) = 0$, $U_P(\theta=1, i=1, E_1^*(1)) > U_P(\theta=0, i=2, E_2^*(0))$. Then there exists a function $V_{P,1,\phi'}(E)$ such that for all $V'_{P,1,\phi}(E) \le V'_{P,1,\phi'}(E)$, we have $U_P(\theta = 1, i=1, E_1^*(1)) \ge U_P(\theta=0, i=2, E_2^*(0))$. For $\phi \le \min\{\phi', \hat{\phi}_P\} = \bar{\phi}_P$, we have $U_P(\theta=1, i=1, E_1^*(1)) \ge U_P(\theta=0, i=2, E_2^*(0))$ and $\theta^*=1$, $i^*=1$. If $\theta=0$, $i=1$, the agent solves the following first-order condition, $\beta\Pi_1'(E) - V'_{P,1,\phi}(E) = C'(E)$. Then there exists $V_{P,1,\tilde{\phi}_P}$ such that $\beta\Pi_1'(0) - V'_{P,1,\tilde{\phi}_P}(0) \le C'(0)$, and the optimal effort $E_1^*(\theta=0) = 0$. In this case, the principal optimally chooses to engage the agent. Furthermore, for all $\phi \ge \tilde{\phi}_P$, we have $\beta\Pi_1'(0) - V'_{P,1,\phi}(0) \le C'(0)$ and $\theta^*=1$, $i^*=2$.

Figure 2 **Profit and Decisions as Functions of Private Benefit Productivity** $\phi_{P,1}$



Proposition 3 implies that the principal can engage the agent and maintain his private benefit if it is relatively low; then the agent tolerates it and pursues economic efficiency. When the principal's private benefit is very high, he should engage the agent and let him choose project 2. The reason is that the private benefit strongly de-motivates the agent and therefore becomes unachievable in execution anyway. When the private benefit is in the medium range, the principal imposes project 1, because he would lose more from the engaged agent's unwanted choice than he would gain from the agent's effort motivation.

Thus, we again have a nonmonotone effect of the private benefit. However, the situation is less benign than before because the private benefit demotivates the employee. To see the effects, in Figure 2 we show the regions of engagement for the linearized model where $V_{P,1}(E) = \phi_{P,1}E$ and the effort cost is quadratic.

Figure 2 illustrates the results of Proposition 3. Case (a) in Figure 2 refers to the situation in which the fair process mitigation factor λ is low, and case (b) to the situation in which λ is high.[3] In case (b), the principal chooses engagement throughout—at first, because economic profit outweighs procedural justice, and then to maintain procedural justice, because the demotivating effect of imposing project 1 would be too grave.

In case (a), the principal engages the agent, who then chooses the more productive project, when the private benefit is relatively small. Whenever project 1 with the private benefit is chosen, economic profit decreases because the distributive unfairness demotivates the agent. The principal, of course, gains his private benefit as well as the economic profit. As the private benefit becomes too large, the engaged agent switches to the less productive project because it makes him feel better.

[3] The border condition between cases (a) and (b) is $\beta(B_1 - B_2)/(1-\lambda) = ((2\beta-1)B_1 - \sqrt{B_1^2 - 4(1+\tau)(1-\beta)\beta B_2^2})/2$.

The principal may secure a medium-sized private benefit by imposing project 1 when it does not excessively reduce the agent's motivation. When the private benefit is very large, avoiding demotivation from social comparison by engaging the agent brings more profit for the agent, although the engaged agent will work on the less productive project.

Similarly, we can examine the fair process effect on the engagement decision. The range where the principal maintains control is decreasing both in τ and in λ. Both a higher motivation from having a voice (τ) and a higher mitigation of distributive injustice by procedural justice (λ) encourage engagement.

4.3.2. The Principal Has a Private Benefit from the Less Productive Project. Now we consider the situation in which the principal has a private benefit from the less productive project 2. As before, $\Phi_{P,2}$ is an index set of a family of $V_{P,2,\phi}(E)$ such that $V'_{P,2,\phi_1}(E) \geq V'_{P,2,\phi_2}(E)$ if $\forall \phi_1 \geq \phi_2 \in \Phi_{P,2}$. In other words, $V_{P,2,\phi}(E)$ is ordered by $\Phi_{P,2}$ according to its marginal value. Mathematically, $V'_{P,2,\phi}(E)$ is increasing in $\phi \in \Phi_{P,2}$. Then the decision structure is similar to §4.3.1:

Lemma 5. *When $\theta = 0$, the optimal effort level $E_2^*(\theta)$ is decreasing in $\phi \in \Phi_{P,2}$.*

As in Lemma 3, the agent is demotivated by the principal's private benefit and expends less effort if the principal's marginal private benefit is higher. However, this only happens when the principal enforces the less productive project. If the agent is engaged, he chooses project 1, which provides a higher economic benefit as well as satisfaction from distributive fairness.

Proposition 4. *When the principal has a private benefit from the less efficient project, there exists $\bar{\phi}_2$, $\tilde{\phi}_2 \in \Phi_{P,2}$, such that if $\phi \leq \bar{\phi}_2$ or $\phi \geq \tilde{\phi}_2$, the principal engages the agent ($\theta^* = 1$), and the engaged agent chooses the more productive project* 1.

Proof. If $\theta = 1$, the agent chooses $i = 1$. The principal engages the agent if $U_P(\theta = 1, i = 1, E_1^*(1)) \geq U_P(\theta = 0, i = 2, E_2^*(0))$. Clearly, when $V'_{P,2,\phi}(E) = 0$, $U_P(\theta = 1, i = 1, E_1^*(1)) > U_P(\theta = 0, i = 2, E_2^*(0))$. Then there exists a function $V_{P,2,\bar{\phi}_2}(E)$ such that for all $V'_{P,2,\phi}(E) \leq V'_{P,2,\bar{\phi}_2}(E)$, we have $U_P(\theta = 1, i = 1, E_1^*(1)) \geq U_P(\theta = 0, i = 2, E_2^*(0))$. If $\theta = 0$, the agent solves the following first-order condition, $\beta\Pi'_2(E) - V'_{P,2,\phi}(E) = C'(E)$. Then there exists $V_{P,2,\tilde{\phi}_2}$ such that $\beta\Pi'_2(0) - V'_{P,2,\tilde{\phi}_2}(0) \leq C'(0)$, and the optimal effort $E_2^*(\theta = 0) = 0$. In this case, the principal optimally chooses to engage the agent. Furthermore, for all $\phi \geq \tilde{\phi}_2$, we have $\beta\Pi'_2(0) - V'_{P,2,\phi}(0) \leq C'(0)$ and $\theta^* = 1$.

Proposition 4 implies that the principal should forego his private benefit if it is too low or too high. When it is too low, it is not worth pursuing. The principal should also let the agent choose project 1 when his private benefit is very high, because of its demotivating effect, which makes execution elusive. These results are similar to Proposition 3. We again illustrate the effects with the linearized example in Figure 3, where $V_{P,2}(E) = \phi_{P,2}E$.

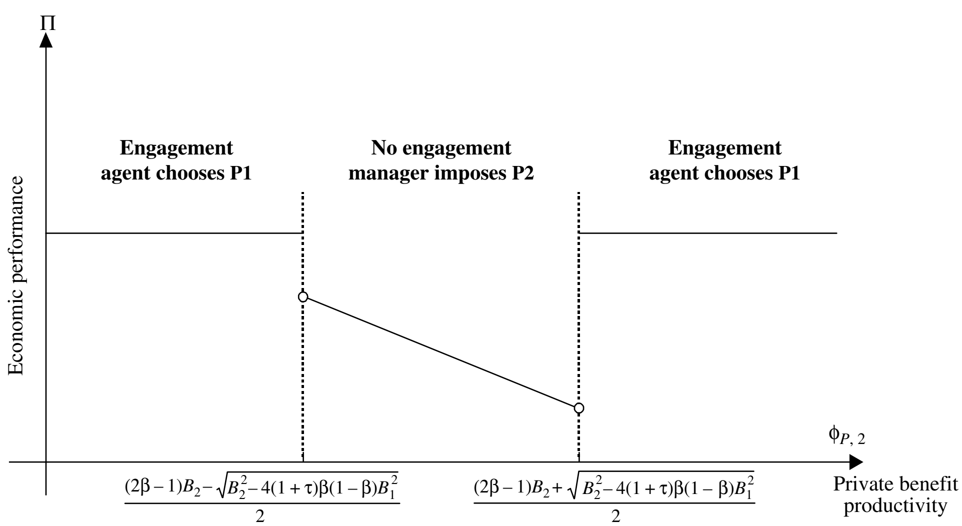
The figure shows that the principal forgoes his private benefit when it is very small or very large, focusing on economic profit and on execution motivation by allowing the agent to choose project 1. As before, the principal imposes his pet project when the private benefit is medium, too large to ignore and too small to completely destroy motivation. The private benefit reduces economic performance (because execution motivation is reduced) whenever project 2 (carrying the private benefit) is chosen.

We summarize the important difference between the effects of the principal's and the agent's private benefits as follows: A political agenda on the side of management is damaging, while a private agenda on the side of the employee can be productive. The reason is that employee private benefits act as an additional motivating force, whereas management private agendas violate distributive fairness and demotivate employees if not counteracted by procedural fairness (engagement).

5. Analysis: When to Offer Transparency?

So far, we have focused on engagement, assuming that all private benefits are known to both parties. An important aspect of fair process is that private agendas often remain hidden, causing suspicion and defensive behavior. If one side does not reveal its private agenda, the other side will guess what it is. In §2.1 we discussed how uncertainty in social relationships leads to the perception of cheating, or violating fairness,

Figure 3 **Profit and Decisions as Functions of Private Benefit Productivity $\phi_{P,2}$**



and generates suspicion. We now introduce the extent of suspicion as a parameter. To maintain tractability, profits and private benefits are linearized in this section: $\Pi_i(E) = B_i E$; $V_{k,i}(E) = V_{k,i}E$, $k = P, A$, $i = 1, 2$, and effort disutility is quadratic, $C(E) = E^2/2$.

5.1. Transparency About the Principal's Private Benefit

If the principal's private benefit is unknown to the agent, the agent becomes ambiguity averse, or suspicious. We represent suspicion with the following linearized utility function

$$\bar{U}_A(\theta, i, E) = \beta\Pi_i + V_{A,i}E - (1-\lambda\theta) \cdot (\gamma\bar{V}_{P,i} - V_{A,i})E - \frac{E^2}{2(1+\tau\theta)}. \quad (4)$$

$\bar{V}_{P,i}$ is the expected benefit based on the agent's belief, and $\gamma \geq 1$ is a suspicion parameter, which corresponds to risk aversion towards the principal's private benefit. $\gamma > 1$ implies that the agent's belief about the principal's private benefit is shifted toward the worst case. In other words, the negative effect of $V_{P,i}$ on the agent's well-being is enlarged if he is not well informed. The agent is not suspicious if $\gamma = 1$.[4]

This simplified risk-aversion model is consistent with models of ambiguity aversion (where ambiguity refers to the case of an unknown probability distribution). Denote the worst-case private benefit with $V_{P,i}^{\max}$. The ambiguity aversion can be modeled by $\alpha V_{P,i}^{\max} + (1-\alpha)\bar{V}_{P,i}$; here, $\alpha \in [0,1]$. If $\alpha = 1$, the employee is highly ambiguity averse and assumes the worst; if $\alpha = 0$, the employee is indifferent to ambiguity (see Eichberger et al. 2007). Our formulation is consistent with this ambiguity-aversion model.

Given a chosen project and the utility function (4), the optimal effort is $E_i^*(\theta) = (1+\tau\theta)\beta B_i + V_{A,i} - (1-\lambda\theta)(\gamma\bar{V}_{P,i} - V_{A,i})$, and the resulting utilities are

$$\bar{U}_A(\theta, i, E_i^*(\theta)) = \frac{1+\tau\theta}{2}[\beta B_i + V_{A,i} - (1-\lambda\theta)(\gamma\bar{V}_{P,i} - V_{A,i})]^2,$$

$$\bar{U}_P(\theta, i, E_i^*(\theta)) = ((1-\beta)B_i + V_{P,i})[(1+\tau\theta)\beta B_i + V_{A,i} - (1-\lambda\theta)(\gamma\bar{V}_{P,i} - V_{A,i})].$$

[4] This is a simplified way of modeling the risk-averse agent. In general, risk aversion is modeled by the agent's utility being concave in $V_{P,i}$. We can make U_A concave by squaring all private benefits: $U_A = \beta\Pi_i + V_{A,i}^2 E - (1-\lambda\theta)(V_{P,i}^2 - V_{A,i}^2)E - E^2/(2(1+\tau\theta))$. Then the agent's expected utility takes the following form: $\bar{U}_A = \beta\Pi_i + V_{A,i}^2 E - (1-\lambda\theta)(\bar{V}_{P,i}^2 + \sigma_{P,i}^2 - V_{A,i}^2)E - E^2/(2(1+\tau\theta))$. Here, $\sigma_{P,i}^2$ is the variance of $V_{P,i}$. Uncertainty in this utility is expressed by $\bar{V}_{P,i}^2 + \sigma_{P,i}^2 = \bar{V}_{P,i}^2(1 + \sigma_{P,i}^2/\bar{V}_{P,i}^2)$. By letting $\gamma^2 = 1 + \sigma_{P,i}^2/\bar{V}_{P,i}^2$, we assume the coefficient of variance $\sigma_{P,i}^2/\bar{V}_{P,i}^2$ to remain constant for different beliefs, and we have $\bar{U}_A = \beta\Pi_i + V_{A,i}^2 E - (1-\lambda\theta)(\gamma^2\bar{V}_{P,i}^2 - V_{A,i}^2)E - E^2/(2(1+\tau\theta))$. All qualitative results remain unchanged in the full quadratic model. To simplify exposition and to keep the model parsimonious, we use the linear model, expressing risk aversion in the form of $\gamma\bar{V}_{P,i}$ in this section.

We focus on the case where the principal has a private benefit from the less productive project, $V_{P,2} > 0$. The value of $V_{P,2}$ is unknown to the employee who has an unbiased expectation $\overline{V}_{P,2}$. In other words, the employee is biased only by his suspicion γ, but not by other systematic influences.[5]

Proposition 5. *When the principal has a private benefit from the less productive project, and transparency is lacking, we have two cases.*

(a) *Project* 2 *is highly unproductive,*

$$B_2 \leq \frac{B_1(2\sqrt{\gamma(1+\tau)(1-\beta)\beta})}{\gamma(1-\beta)+\beta}$$

or $\beta \leq \gamma/(1+\gamma)$. *The principal then always engages the agent, and the agent chooses the more productive project* 1.

(b) *Project* 2 *is only slightly less productive,*

$$B_2 > \frac{B_1(2\sqrt{\gamma(1+\tau)(1-\beta)\beta})}{\gamma(1-\beta)+\beta}$$

and $\beta > \gamma/(1+\gamma)$. *The principal then engages the agent if*

$$\overline{V}_{P,2} \leq \frac{(\beta-\gamma(1-\beta))B_2 - \sqrt{(\gamma(1-\beta)+\beta)^2B_2^2 - 4\gamma(1-\beta)\beta(1+\tau)B_1^2}}{2\gamma}$$

or

$$\overline{V}_{P,2} \geq \frac{(\beta-\gamma(1-\beta))B_2 + \sqrt{(\gamma(1-\beta)+\beta)^2B_2^2 - 4\gamma(1-\beta)\beta(1+\tau)B_1^2}}{2\gamma},$$

and the engaged agent chooses the more productive project 1. *If*

$$\frac{(\beta-\gamma(1-\beta))B_2 - \sqrt{(\gamma(1-\beta)+\beta)^2B_2^2 - 4\gamma(1-\beta)\beta(1+\tau)B_1^2}}{2\gamma} < \overline{V}_{P,2} < \frac{(\beta-\gamma(1-\beta))B_2 + \sqrt{(\gamma(1-\beta)+\beta)^2B_2^2 - 4\gamma(1-\beta)\beta(1+\tau)B_1^2}}{2\gamma},$$

the principal secures his private benefit by choosing the less productive project 2 *without engaging the agent*. Moreover, the range of $\overline{V}_{P,2}$ where engagement is offered ($\theta^* = 1$) increases in the suspicion parameter γ.

The proofs of Propositions 5 and 6 are presented in the appendix for better readability. Proposition 5 states that the structural (nonmonotone) form of the equilibrium remains unchanged from Proposition 4. Thus, there is a medium range in the private agenda $V_{P,2}$ where the manager chooses to impose a project, while he chooses engagement for high and low private benefits. The fundamental trade-off remains. However, the ranges are not only shifted toward the left, the *range of private benefit for which the principal offers engagement also increases with the amount of uncertainty and suspicion present*. Because of suspicion, the principal engages in a larger set of circumstances. When transparency is assured (and suspicion mitigated), *less* engagement is necessary. Thus, the two fair process components that we discuss in this paper, *transparency and engagement, are substitutes*.[6]

5.2. Transparency About the Agent's Private Benefit

We now turn to the agent's private information. If the agent has a private benefit from the more productive project, there is no problem (as in §4.2): The agent's private benefit motivates him and, thus, benefits the principal as well.

The question becomes more complicated when the agent has a secret private benefit $V_{A,2} > 0$. In this situation, the principal's knowledge about $V_{A,2}$ can be represented by a probability function $F(V_{A,2})$ with support $[0, \widehat{V}]$. The principal needs to make the engagement decision without knowing which project the agent will choose. Since the agent himself knows the private benefit, the principal can obtain his expected utility of engagement based on the agent's decision rule from §4.2: If $V_{A,2} \leq \beta(B_1 - B_2)/(2-\lambda)$,[7] an engaged agent chooses $i = 1$; otherwise, he chooses $i = 2$.

$$\begin{aligned}\overline{U}_P(\theta=1) &= \mathbb{E}_{V_{A,2} > \beta(B_1-B_2)/(2-\lambda)}[U_P(\theta=1, i=2, E_2^*(1))] \\ &\quad + \mathbb{E}_{V_{A,2} \leq \beta(B_1-B_2)/(2-\lambda)}[U_P(\theta=1, i=1, E_1^*(1))]\end{aligned}$$

[5] Additional biases can be included in the model with additional parameters. For example, if the agent has a bias proportional to the exact value, we can model the agent's belief as $\overline{V}_{P,2}(1+\delta)$, where δ can be either positive (overestimate) or negative (underestimate). Our results remain unchanged when $\delta > 0$.

[6] Similar analyses show the same result when the principal has a private benefit from the more productive project: Transparency and engagement remain substitutes.

[7] In this linear case, the closed-form expression of the threshold value in Lemma 2 is $\hat{\phi} = \beta(B_1 - B_2)/(2-\lambda)$.

$$\begin{aligned}
&= \int_{\beta(B_1-B_2)/(2-\lambda)}^{\hat{V}} [(1+\tau)(1-\beta)B_2 \\
&\qquad \cdot (\beta B_2 + (2-\lambda)V_{A,2})]\,dF(V_{A,2}) \\
&\quad + \int_0^{\beta(B_1-B_2)/(2-\lambda)} [(1+\tau)(1-\beta)\beta B_1^2]\,dF(V_{A,2}) \\
&= (1+\tau)(1-\beta)B_2(\beta B_2 + (2-\lambda)\overline{V}_{A,2}) + (1+\tau) \\
&\quad \cdot \int_0^{\beta(B_1-B_2)/(2-\lambda)} [(1-\beta)\beta B_1^2 - (1-\beta)B_2 \\
&\qquad \cdot (\beta B_2 + (2-\lambda)V_{A,2})]\,dF(V_{A,2}) \\
&= \mathbb{E}_{V_{A,2}}[U_P(\theta=1, i=2, E_2^*(1))] \\
&\quad + \mathbb{E}_{V_{A,2}\le \beta(B_1-B_2)/(2-\lambda)} \Delta\Pi,
\end{aligned}$$

where

$$\begin{aligned}
&\mathbb{E}_{V_{A,2}}[U_P(\theta=1, i=2, E_2^*(1))] \\
&\qquad = (1+\tau)(1-\beta)B_2(\beta B_2 + (2-\lambda)\overline{V}_{A,2})
\end{aligned}$$

is the expected payoff if the agent is engaged and $i=2$ is chosen, and

$$\begin{aligned}
&\mathbb{E}_{V_{A,2}\le \beta(B_1-B_2)/(2-\lambda)} \Delta\Pi \\
&\quad = (1+\tau)\int_0^{\beta(B_1-B_2)/(2-\lambda)} \big[(1-\beta)\beta B_1^2 - (1-\beta)B_2 \\
&\qquad \cdot (\beta B_2 + (2-\lambda)V_{A,2})\big]\,dF(V_{A,2})
\end{aligned}$$

is the expected extra profit if the agent chooses project 1 instead of project 2, which he does when his private benefit is $V_{A,2} \le \beta(B_1 - B_2)/(2-\lambda)$.

Since the principal has only probabilistic information about $V_{A,2}$, his engagement decision must be based on the properties of the probability density function $F(V_{A,2})$. To study the effect of transparency, suppose that $F(\beta(B_1 - B_2)/(2-\lambda)) \ge \delta > 0$. In other words, there is a probability of at least δ that the agent chooses project 1, if engaged. If this assumption is not fulfilled (the agent chooses project 2 almost surely), and further transparency will not matter very much. With this assumption, the principal's engagement decision depends only on his expectation about the agent's private benefit, $\overline{V}_{A,2}$.

Proposition 6. *When the agent has a private benefit from the less productive project, and transparency is lacking, we have two cases:*

(a) *Project 2 is almost as productive as project 1, $B_1 \le (1+\tau)B_2$. The principal then always engages the agent ($\theta^* = 1$).*

(b) *Project 2 is much less productive than project 1, $B_1 > (1+\tau)B_2$. The principal then engages the agent $\theta^* = 1$ if $\overline{V}_{A,2} \ge V_{P,2}^u$, and*

$$V_{P,2}^u < \frac{\beta(B_1^2 - (1+\tau)B_2^2)}{(1+\tau)(2-\lambda)B_2}.$$

Part (a) shows that the unknown information does not affect the principal's engagement decision when project 2 is close to project 1 in productivity. This is a direct result of the linear case in §4.2 (shown in Figure 1(b)), where the principal optimally engages the agent irrespective of the agent's private benefit. When project 2 is much less productive than project 1, in the linear case where transparency is given (see Figure 1(a)), the principal engages the agent if $V_{A,2} \ge \beta(B_1^2 - (1+\tau)B_2^2)/((1+\tau)(2-\lambda)B_2)$. Now, when the principal makes his engagement decision based on expectation, the threshold is lower, implying that he is offering engagement already at a relatively lower value of $\overline{V}_{A,2}$. In other words, a lack of transparency about the agent's private benefit acts like a rent-producing information asymmetry: The principal must widen the range of private benefits over which he offers the agent engagement.

6. Discussion and Conclusion

We have developed a model of fair process in a principal-agent hierarchy. The principal has the authority to choose among several projects available to the organization. The agent executes the chosen project, investing effort to do so. Effort is noncontractible and cannot be enforced. Although the project produces an economic benefit that is shared, the interests of the principal (the manager) and the agent (the employee) are not fully aligned; both sides have private benefits riding on some projects (such as political advantage or career success for the manager, and skill qualification or a union victory for the employee).

The agent cares about his absolute payoff, distributive fairness (relative payoffs), and procedural fairness (the decision procedure). The model explicitly represents the agent's psychological preferences concerning procedural fairness: The principal *engages* the agent by giving him a voice in the project choice (autonomy). Having a voice, a possibility to influence project choice, motivates the agent to exert higher execution effort. The principal offers *transparency* by disclosing the private benefits at stake for him. Transparency avoids uncertainty, and therefore suspicion, about the distributive fairness of the private benefits. This suspicion demotivates the agent.

Based on this explicit representation of social preferences, we formulated the benefits and the tradeoffs offered by fair process. Without any conflicts of interest (in the form of private benefits), fair process is a no-brainer: It motivates the agent to work hard and enhances economic performance as well as satisfaction for both sides. Fair process should always be used in such cases.

The limit of fair process lies in conflicts of interest. Consider a private benefit on the side of management. It has a nonmonotone and nonintuitive effect: If management's private benefit is small, it does not distort the engagement decision; the benefit from the agent's motivation produced by engagement outweighs management's private agenda. If the private benefit is very large, the manager should forego it and engage the employee anyway, even if the employee does not choose the manager's pet project: The demotivating effect of imposing a project on the agent, who would then see the other side obtain a huge private benefit, would crush execution performance. This corresponds to subtle sabotage and outright resistance behavior observed in empirical studies, such as Brockner (2006).

It is in the medium range of private benefits where a manager may rationally decide *not* to use fair process, but rather to impose a project: The demotivation effect is not so high that it negates the value of the private benefits. Whenever engagement is not used (and a project is imposed), an increase in the *private agenda destroys economic profit* because it further demotivates the employee and dulls execution effort. The broader suggestion here is that it is precisely the everyday organizational politics of medium range that may hamper, if not devastate, execution performance, because they tempt management to forego the motivational and performance benefits of fair process. Large political stakes are so visible and may be seen to have such a destructive effect on organizational performance that they are more easily resisted.

A private benefit on the side of the agent has a similar nonmonotone effect on the engagement decision: Continue to engage him (give him a voice in the project choice) when his private agenda is small or large, and impose a project when the private agenda is of medium size. However, the effects of employee private benefits are less damaging: Even when a project is imposed, an increase in the private benefit at least encourages execution effort (and may further increase it if the imposed project happens to be the one preferred by the agent).

The results so far hold when full transparency is assured, that is, when both parties are informed about the private benefits enjoyed by the other side. Transparency acts as a substitute for engagement: The more uncertainty the employee faces with respect to the manager's private agenda, the more engagement the manager must offer to ensure motivation and high execution performance. Lack of transparency causes ambiguity in the social exchange, where outcomes cannot be described by probabilities (risk), but depend on unpredictable choices by the other side, with the possibility of violating reciprocity in subtle hard-to-detect ways (i.e., subtle cheating). This causes ambiguity aversion, or suspicion, on the side of the employee, who will then assume the worst (that is, a high private benefit for the manager) and become demotivated. Engagement counters this suspicion (because the employee can now influence project choice). The degree of suspicion (parameterized in the model by γ) is an empirical question that requires further research. One can imagine experimental designs that would allow quantitatively estimating the suspicion effect (i.e., the shift of expectations toward the worst case).

If transparency about the employee's private benefit is lacking, it acts like a rent-producing information asymmetry: The manager must widen the range of private benefits over which he engages the employee.

The results of our fair process model deviate significantly from the recommendations of delegation theory in economics (e.g., Aghion and Tirole 1997), which ignores the presence of social preferences. Our conclusions allow the formulation of testable hypotheses about when we would expect fair process to be used by competent managers. These hypotheses may offer the beginning of an explanation of why fair process has not always shown performance benefits in empirical studies.

1. Fair process engagement (of employees by managers) is expected to be widely used when private (nonshared) benefits are small.
2. Fair process engagement is also expected to be widely used when private (nonshared) benefits are visible and large.
3. Fair process engagement is not expected to be widely used when there are medium-sized private benefits at stake on either side.
4. Fair process engagement is expected to be widely used when transparency is low provided that management acknowledges existing suspicion. If management does not acknowledge this suspicion, it may abstain from engaging the employees, but low motivation and execution performance may result.
5. Fair process engagement and transparency are substitutes: Engagement is used more when the level of transparency is low (e.g., when employees perceive uncertainty and are suspicious about management's private benefits).

Of course, our model is stylized and makes simplifications that should be relaxed in future work. For example, our conclusion that employees' private benefits are less damaging than management politics rests on the assumption that management is insensitive to a social comparison, feeling no frustration when the employees enjoy private satisfaction. This is probably true in many situations (where the scope for employees' private benefits is limited). Yet there are situations where management does care about social comparison—for example, when the relationship is very personal, or where the employee side is represented by a loathed union or other disliked party. This case can be incorporated into our model by including a social comparison term in the manager's utility function when engagement is granted to the employee. Management dissatisfaction would then reduce the range of situations in which fair process is used. Similar model modifications for specific circumstances may be relevant for future work.

Despite its simplifications, this model offers a first critical examination of the effects of fair process resulting from underlying social preferences. It allows the examination of trade-offs and suggests cases where fair process is not advisable. This sort of analysis has been missing from fair process literature. Successive refinements of theoretical work such as the current model should allow the formulation of sharper hypotheses about the effectiveness and limits of fair process in organizations, to be tested in future empirical work.

Appendix

Proof of Proposition 5. If $\theta=1$, the agent chooses $i=1$. The principal engages the agent if $U_P(\theta=1, i=1, E_1^*(1)) \geq U_P(\theta=0, i=2, E_2^*(0))$, i.e.,

$$\gamma \overline{V}_{P,2}^2 + (\gamma(1-\beta)-\beta)B_2\overline{V}_{P,2} + (1-\beta)\beta((1+\tau)B_1^2 - B_2^2) \geq 0.$$

The inequality always holds when

$$B_2 \leq \frac{2\sqrt{\gamma(1+\tau)(1-\beta)\beta}}{\gamma(1-\beta)+\beta} \quad \text{or} \quad \beta \leq \frac{\gamma}{1+\gamma}.$$

Otherwise, the solution of this inequality is

$$\overline{V}_{P,2} \leq \frac{(\beta-\gamma(1-\beta))B_2 - \sqrt{(\gamma(1-\beta)+\beta)^2 B_2^2 - 4\gamma(1-\beta)\beta(1+\tau)B_1^2}}{2\gamma}$$

or

$$\overline{V}_{P,2} \geq \frac{(\beta-\gamma(1-\beta))B_2 + \sqrt{(\gamma(1-\beta)+\beta)^2 B_2^2 - 4\gamma(1-\beta)\beta(1+\tau)B_1^2}}{2\gamma}.$$

For the last statement, we can check the range for $\theta^*=0$ instead. Let $R=((1-\beta)+\beta/\gamma)^2B_2^2 - (4/\gamma)(1-\beta)\beta(1+\tau)B_1^2$, then $\sqrt{R}$ is the range for $\theta^*=0$. To show that the range for engagement is increasing, we need to show R is decreasing in γ.

$$\begin{aligned}
\frac{dR}{d\gamma} &= \frac{1}{\gamma^2}\left[4(1-\beta)\beta(1+\tau)B_1^2 - 2\left((1-\beta)+\frac{\beta}{\gamma}\right)\beta B_2^2\right] \\
&= \frac{1}{\gamma^3}[4\gamma(1-\beta)\beta(1+\tau)B_1^2 - 2(\gamma(1-\beta)+\beta)\beta B_2^2] \\
&< \frac{1}{\gamma^3}[(\gamma(1-\beta)+\beta)^2 - 2(\gamma(1-\beta)+\beta)\beta]B_2^2 \\
&= \frac{1}{\gamma^3}(\gamma^2(1-\beta)^2-\beta^2)B_2^2 < 0.
\end{aligned}$$

The inequalities come from the conditions of part (b).

Proof of Proposition 6. Part a follows the linear case results (see Figure 1(b)). Engagement is beneficial for the principal for any $V_{A,2}$ when $B_1 \leq (1+\tau)B_2$. Thus, uncertainty of $V_{A,2}$ does not affect the engagement decision.

When $B_1 > (1+\tau)B_2$, the principal engages the agent if $\overline{U}_P(\theta=1) \geq \overline{U}_P(\theta=0, i, E_i^*(0))$, where

$$\overline{U}_P(\theta=0, i=1, E_1^*(0)) = (1-\beta)\beta B_1^2,$$

and

$$\overline{U}_P(\theta=0, i=2, E_2^*(0)) = (1-\beta)B_2(\beta B_2 + 2\overline{V}_{A,2}).$$

Since $(1+\tau)(2-\lambda) \geq 2$, we have $\mathbb{E}_{V_{A,2}}\Pi(\theta=1, i=2, E_2^*(1)) \geq \overline{U}_P(\theta=0, i=2, E_2^*(0))$, and thus $\overline{U}_P(\theta=1) \geq \overline{U}_P(\theta=0, i=2,$

$E_2^*(0)$). Therefore, it is optimal for the principal to engage the agent when $\bar{U}_P(\theta=1) \geq U_P(\theta=0, i=2, E_2^*(0))$.

If
$$\bar{V}_{A,2} \geq \frac{\beta(B_1^2-(1+\tau)B_2^2)}{(1+\tau)(2-\lambda)B_2},$$
from the proof of Proposition 2, we know $\mathbb{E}_{V_{A,2}}U(\theta=1, i=2, E_2^*(1)) \geq U_P(\theta=0, i=1, E_1^*(0))$. Therefore, it is optimal to engage the agent.

Next we show that there exists a
$$V_{A,2}^u < \frac{\beta(B_1^2-(1+\tau)B_2^2)}{(1+\tau)(2-\lambda)B_2}$$
so that $\theta^*=1$ when $\bar{V}_{A,2} \geq V_{A,2}^u$ in spite of the probability distribution function $F(V_{A,2})$.

First, we have
$$\begin{aligned}
&\mathbb{E}_{V_{A,2}\leq\beta(B_1-B_2)/(2-\lambda)}\Delta\Pi \\
&= (1+\tau)\int_0^{\beta(B_1-B_2)/(2-\lambda)}[(1-\beta)\beta B_1^2-(1-\beta) \\
&\qquad \cdot B_2(\beta B_2+(2-\lambda)V_{A,2})]\,dF(V_{A,2}) \\
&> (1+\tau)\int_0^{\beta(B_1-B_2)/(2-\lambda)}\bigg[(1-\beta)\beta B_1^2-(1-\beta)B_2 \\
&\qquad \cdot\left(\beta B_2+(2-\lambda)\frac{\beta(B_1-B_2)}{2-\lambda}\right)\bigg]\,dF(V_{A,2}) \\
&= (1+\tau)(1-\beta)\beta B_1(B_1-B_2)F\left(\frac{\beta(B_1-B_2)}{2-\lambda}\right) := \Lambda F\left(\frac{\beta(B_1-B_2)}{2-\lambda}\right),
\end{aligned}$$
and since $F(\beta(B_1-B_2)/2-\lambda) \geq \delta > 0$, we have
$$\begin{aligned}
\bar{U}(\theta=1) &= \mathbb{E}_{V_{A,2}}[U_P(\theta=1, i=2, E_2^*(1))] + \mathbb{E}_{V_{A,2}\leq\beta(B_1-B_2)/(2-\lambda)}\Delta\Pi \\
&> \mathbb{E}_{V_{A,2}}[U_P(\theta=1, i=2, E_2^*(1))] + \Lambda F\left(\frac{\beta(B_1-B_2)}{2-\lambda}\right) \\
&\geq \mathbb{E}_{V_{A,2}}[U_P(\theta=1, i=2, E_2^*(1))] + \Lambda\delta \\
&= (1+\tau)(1-\beta)(\beta B_2+(2-\lambda)\bar{V}_{A,2}) + \Lambda\delta.
\end{aligned}$$

When $(1+\tau)(1-\beta)(\beta B_2+(2-\lambda)\bar{V}_{A,2})+\Lambda\delta \geq U_P(\theta=0, i=1, E_1^*(0)) = (1-\beta)\beta B_1^2$, or
$$\bar{V}_{A,2} \geq \frac{\beta(B_1^2-(1+\tau)B_2^2-(\beta/(1-\beta))\Lambda\delta)}{(1+\tau)(2-\lambda)B_2},$$
we have $\bar{U}_P(\theta=1) \geq U_P(\theta=0, i=1, E_1^*(0))$, i.e. $\theta^*=1$. The existence of $V_{A,2}^u < \beta(B_1-(1+\tau)B_2^2)/(2-\lambda)$ is ensured by setting
$$V_{A,2}^u = \frac{\beta(B_1^2-(1+\tau)B_2^2-(\beta/(1-\beta))\Lambda\delta)}{(1+\tau)(2-\lambda)B_2}.$$

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