Econometrica Supplementary Material

SUPPLEMENT TO "FAIRNESS AND CONTRACT DESIGN": APPENDIX[1]

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IN THIS APPENDIX we provide a more detailed theoretical analysis of Section 5. The propositions in the main part of the paper follow immediately from the propositions proved here. We also provide some additional experimental data at the end of the appendix.

In the following discussion we analyze the experimental game by using the theory of inequity aversion of Fehr and Schmidt (1999). We assume that there are only two types of players: There are "selfish types," who are interested only in their own material payoffs and have $\alpha_i = \beta_i = 0$, and there are also "fair types," who are inequity averse and have $\alpha_i = 2$ and $\beta_i = 0.6$. These players are prepared to give away material resources to the other player in the experiment so as to reduce inequality. We assume that 60% of the population are selfish and 40% are fair-minded. This distribution of types is a simplification of the distribution we used in Fehr and Schmidt (1999).[2] Furthermore, we abstract from integer problems and assume that all variables can be chosen continuously.

TRUST CONTRACTS

Suppose that the principal can only offer a trust contract.

PROPOSITION S1—Trust Contract: *In equilibrium*:

(a) *The fair principal offers* $w = 5$, *which is accepted by both agents who both choose* $e = 1$, *and yields* $M^P = M^A = 5$.

(b) *The selfish principal offers either* $w = 0$, *which is accepted only by the selfish agent* (*who chooses* $e = 1$) *and rejected by the fair agent*, *or* $w = 4$, *which is accepted by both agents*. *In any case*, *the expected monetary payoff of the selfish principal is* $M^P = 6$ *and for the agent either* $M^A = 0$ *or* $M^A = 4$.

[1]A previous version of this paper was circulated under the title "Contracts, Fairness, and Incentives."

[2]Fehr and Schmidt (1999) use four different types in the calibration of their model: 30 percent of the population are assumed to have $\alpha_i = \beta_i = 0$, 30 percent are assumed to have $\alpha_i = 0.5$ and $\beta_i = 0.3$, 30 percent are assumed to have $\alpha_i = 1$ and $\beta_i = 0.6$, and 10 percent are assumed to have $\alpha_i = 4$ and $\beta_i = 0.6$. It turn out to be very tedious to solve the model for four different types. This is why we simplified the model and use only two different types here. We used the same simplified distribution in Fehr and Schmidt (2004) and Fehr, Kremhelmer, and Schmidt (2005).

PROOF: We can solve for the optimal trust contract by using backward induction. At stage 2, a selfish agent always chooses $e = 1$. A fair agent chooses e such that

$$M^p = 10e - w = w - c(e) = M^A. \tag{1}$$

This equation implicitly defines the fair agent's effort response function $e(w)$. By the implicit function theorem, we have

$$\frac{de}{dw} = \frac{2}{10 + c'(e)}. \tag{2}$$

Consider now stage 1 and let q be the fraction of fair agents. Then the expected monetary payoff of the principal from offering w is

$$M^P(w) = q[10e(w) - w] + (1 - q)[10 - w]. \tag{3}$$

Differentiating with respect to w yields

$$\frac{\partial M^P}{\partial w} = 10 \cdot q \cdot \frac{de}{dw} - 1 = \frac{20q}{10 + c'(e)} - 1 \leq 0 \tag{4}$$

for $q < 0.55$.

Thus, there are three candidates for the optimal wage offer:

- $w = 0$: This wage will be accepted by a selfish agent who then chooses $e = 1$, which yields a monetary payoff of 10 to the principal and 0 to the agent. However, the fair agent will reject this wage offer, so that both parties get a payoff of 0. If $q = 0.4$, the expected monetary payoff of the principal from offering $w = 0$ is thus $M^P = 6$.
- $w = 4$: This wage may also be accepted by the fair type of the agent (if $\alpha = 2$). If the fair type accepts this contract and chooses $e = 1$, his utility is $U^A = 4 - \alpha^A(6 - 4) = 4 - 4 = 0$, which is just equal to what he would receive if he rejected the offer. The selfish type also accepts this offer and chooses $e = 1$. Hence, the monetary payoff of the principal is $M^P = 6$, while the agent gets $M^A = 4$.
- $w = 5$: This wage will be accepted by both types of agents, who both choose $e = 1$, yielding monetary payoffs $M^P = M^A = 5$.

Hence, the fair principal chooses $w = 5$, while the selfish principal may choose either $w = 0$ or $w = 4$ in equilibrium. *Q.E.D.*

INCENTIVE CONTRACTS

Suppose that the principal can only offer an incentive contract.

PROPOSITION S2—Incentive Contract: (a) *A selfish principal offers* $w = 4$, $e^* = 4$, *and* $f = 13$, *which is accepted by a selfish agent* (*who chooses* $e = 4$) *and* *rejected by a fair agent. This contract yields an expected monetary payoff* $M^P = 15.6$ *to the principal and* $M^A = 0$ *to both types of agent.*

(b) *A fair principal offers* $w = 17$, $e^* = 4$, *and* $f = 13$, *which is accepted by both types of agents* (*all agents choose* $e = 4$), *and the monetary payoff to the principal and to the agent are both equal to* 13.

PROOF: Consider the contract $w = 4$, $e^* = 4$, and $f = 13$, which is optimal if all agents are selfish. If this contract is accepted and if the agent chooses $e = 4$, then monetary payoffs are given by $M^P = 26$ and $M^A = 0$. However, a fair agent will reject this contract. If $q = 0.4$, then the expected monetary payoff to the principal from this contract is $M^P = (1 - q)26 = 15.6$. To get a fair agent to accept the contract and choose $e = 4$, the principal would have to offer at least $w = 17$, which gives monetary payoffs $M^P = M^A = 13$ to both parties. Note that this is less for the principal than the "selfish offer" considered previously.

The principal could raise w above 17 to induce the fair agents to choose a higher effort level. However, by the same argument that was used for the trust contract, this does not pay off in expectation if $q < 0.6$. *Q.E.D.*

TRUST-INCENTIVE TREATMENT

Suppose now that the principal can choose between trust contract (TC) and incentive contract (IC). Note that the choice of contract may convey information about the principal's type to the agent. However, for TC and IC this does not have any effect, because the principal does not move again after offering the contract. Therefore, the following proposition is an immediate consequence of Propositions S1 and S2.

PROPOSITION S3—Trust Incentive (TI) Treatment: *In equilibrium all principals choose the incentive contract. From an outside perspective* (*not knowing which types of principal and agent interact*), *the expected monetary payoff of the principal is* $M^P = 14.56$ (*where the expectation is taken over the different types of principals*), *while the expected monetary payoff of the agent is* $M^A = 5.2$.

PROOF: If $q = 0.4$, we have

$$M^P = 0.6 \cdot 15.6 + 0.4 \cdot 13 = 14.56, \quad (5)$$

$$M^A = 0.6 \cdot 0 + 0.4 \cdot 13 = 5.2. \quad (6)$$

Q.E.D.

BONUS CONTRACTS

Suppose now that the principal can only offer a bonus contract. With this contract, the principal has to move twice: at stage 1 when she offers the contract and at stage 3 when she decides on the bonus payment. Thus, the contract offer can be a signal about the principal's type and the agents will update their beliefs about it. However, the following lemma shows that there cannot be a separating equilibrium in which different types of principals make different wage offers. In the following, "equilibrium" refers to a perfect Bayesian equilibrium.

LEMMA 1: *There does not exist a separating equilibrium in which the selfish principal offers $\underline{w}$ and the fair principal offers $\overline{w}$, where $\underline{w} \neq \overline{w}$.*

PROOF: Suppose there is such a separating equilibrium. If the principal offers $\underline{w}$, the agent updates his beliefs to $\hat{q} = 0$. Thus, the agent is sure that the bonus is not going to be paid and we are back to the case of a trust contract. From Proposition S1 we know that the selfish principal will either offer $w = 0$ or $w = 4$. In either case, his expected monetary payoff is $M^P = 6$.

On the other hand, the selfish principal can always mimic the fair principal by choosing $w = \overline{w}$. In this case, the agent believes $\hat{q} = 1$. We have to distinguish two cases:

- If $\overline{w} \leq 40$, both types of agent choose $e = 10$. Thus, if the selfish principal offers $w = \overline{w}$ and does not pay the bonus, her monetary payoff is $M^{Ps} = 100 - \overline{w} > 60$, a contradiction to the assumption that $w = \underline{w}$ is an equilibrium wage offer.
- If $\overline{w} > 40$, the selfish type of agent will choose $e = 1$ and the fair type of agent will choose $e = 10$. If the fraction of fair agents is 0.4, this gives an expected monetary payoff to the selfish principal who does not pay the bonus of $M^{Ps} = 0.4 \cdot 100 + 0.6 \cdot 10 - \overline{w} = 46 - \overline{w} < 6$. Hence, the selfish principal would have no incentive to deviate from $w = \underline{w} = 0$. However, in this case the fair principal wants to deviate. She pays the bonus to the agent who chooses $e = 10$, so her expected monetary payoff is $M^{Pr} = 0.4 \cdot 40 + 0.6 \cdot (10 - \overline{w}) < -2$. In addition, the fair principal suffers from the inequality if the selfish agent chooses $e = 1$. On the other hand, she could have guaranteed herself a payoff of 5 by offering $w = 5$, which would have been accepted by both agents, both agents would have chosen $e = 1$, and both parties would have had a payoff of 5. Hence, $\overline{w} > 40$ cannot be part of a separating equilibrium either. *Q.E.D.*

Even though there is no separating equilibrium, there are many possible pooling equilibria that are characterized by the following lemma:

LEMMA 2—Bonus Contracts: *All pooling equilibrium outcomes can be characterized as follows*: *Both principals offer* w, $0 \leq w \leq 15$, *at stage* 1. *The selfish agents choose* $e = 7$, *the fair agents reject if* $w < 4$, *and accept and choose* $e = 1$ *if* $4 \leq w < 9$, *and accept and choose* $e = 2$ *if* $9 \leq w < 15$ *and* $e = 3$ *if* $w = 15$. *The selfish principal does not pay a bonus at stage* 3. *The fair principal chooses* $b(e) = \max\{5e - w + \frac{c(e)}{2}, 0\}$.

PROOF: At stage 3, the selfish principal always chooses $b = 0$. The fair principal chooses b so as to achieve

$$M^p = 10e - w - b = w + b - c(e) = M^A. \tag{7}$$

Thus,

$$b = \max\left\{5e - w + \frac{c(e)}{2}, 0\right\}. \tag{8}$$

At stage 2 all agents believe that they face the fair principal with probability 0.4 (because we are in a pooling equilibrium). Thus the agent's expected monetary payoff as a function of e is

$$M^A(e) = 0.4[w + b(e) - c(e)] + 0.6[w - c(e)]. \tag{9}$$

Differentiating with respect to e yields

$$\frac{\partial M^A}{\partial e} = \begin{cases} 0.4(5 + 0.5c'(e)) - c'(e) = 2 - 0.8c'(e), & \text{if } b(e) > 0, \\ -c'(e), & \text{if } b(e) = 0. \end{cases} \tag{10}$$

Thus, $M^A(e)$ has a local maximum at $e = 1$ and, given the convex cost function, another local maximum at $e = 7$. It is easy to check that the global maximum is at $e = 7$ for $w \leq 15$ and $e = 1$ for $w > 15$. Hence, the selfish agent chooses

$$e(w) = \begin{cases} 7, & \text{if } w \leq 15, \\ 1, & \text{if } w > 15. \end{cases} \tag{11}$$

A fair agent suffers from the inequality if the principal does not pay the bonus. It is easy to show that (for $\alpha = 2$) a fair agent rejects if $w < 4$, accepts and chooses $e = 1$ if $4 \leq w < 9$, accepts and chooses $e = 2$ if $9 \leq w < 15$, and accepts and chooses $e = 3$ for $w = 15$.

Consider now stage 1: The fair principal will never offer $w > 15$. We have seen already that with $w > 15$ the selfish agent will choose $e = 1$. Only the fair agents would choose $e > 1$. For the same argument as the one given in Proposition S1, increasing wages to appeal to the fair agents does not pay off in expected terms and the fair principal would suffer from the inequality to her disadvantage if the selfish agent chooses $e = 1$. Therefore, $w > 15$ cannot be part of a pooling equilibrium.

However, for all $0 \leq w \leq 15$, the outcomes characterized in Lemma 2 can be sustained as pooling equilibrium outcomes. There are many possible off-the-equilibrium-path beliefs to do that. For example, if a principal offers a contract with a different wage, the agent believes that he faces a selfish principal with probability 1. Thus he chooses $e = 1$ and both types of principal do not pay a bonus. *Q.E.D.*

We can make a point prediction for the equilibrium outcome if we are willing to accept the following condition:

CONDITION 1: Fix an equilibrium and let $\hat{q}(w)$ denote the probability assigned by the agent to the event that he is matched to a fair principal. In any equilibrium, $\hat{q}(w)$ is weakly increasing in w.

REMARK: Condition 1 is plausible in the context under consideration, but it is not a standard refinement argument. Standard refinement arguments (e.g., the intuitive criterion or D1) cannot be used to narrow down the set of pooling equilibrium outcomes.

PROPOSITION S4—Bonus Contract: *There is a unique pooling equilibrium outcome that satisfies Condition* 1 *in which both principals offer* $w = 15$.

(a) *The selfish agent chooses* $e = 7$ *and is rewarded by the fair principal with a bonus of* 25.

(b) *The fair agent chooses* $e = 3$ *and is rewarded by the fair principal with a bonus of* 1.

The selfish principal never pays a bonus.

PROOF: We have shown already that this is an equilibrium outcome. To prove uniqueness, suppose that there is another equilibrium outcome with $w < 15$. If $w < 15$, the fair principal would like to increase w. This does not affect her payoff if she faces the selfish agent, but it increases her payoff if she faces the fair agent who will put in more effort. Therefore, Condition 1 implies that $w < 15$ cannot be chosen by the fair principal in an equilibrium that satisfies Condition 1. *Q.E.D.*

PROPOSITION S5—Bonus Incentive (BI) Treatment: *There is a pooling equilibrium consistent with Condition* 1 *in which all principals choose a bonus contract and offer* $w = 15$. *In this equilibrium the selfish principals get an expected payoff of* 39 *and the fair principals get an expected payoff of* 23.6, *both of which are higher than the expected payoff from the optimal incentive contract.*

The proof is obvious.

REMARK: There are other equilibria in which all principals choose the incentive contract. These equilibria are supported by the belief that if a principal chooses the bonus contract, he is selfish. Although these beliefs are not particularly plausible, it is difficult to rule them out.

SUPERIORITY OF THE BONUS OVER THE TRUST CONTRACT

In the following text, we show that the superiority of the bonus contract over the trust contract is a general result that is independent of the specific parameters and functional forms that we employed in the experiments. Let $v(e)$ and $c(e)$ be any strictly increasing valuation and cost functions with $v''(e) < 0$, $c''(e) \geq 0$, and $e^{\text{FB}} = \arg\max\{v(e) - c(e)\} > \underline{e}$. Suppose that with probability $1 - q$ a player is purely self-interested and maximizes his expected monetary payoff. With probability q he is inequity averse, i.e., $\alpha, \beta > 0.5$. The following proposition shows that in this case a contract that relies on the promise of a voluntary bonus payment (bonus contract) always induces a (weakly) higher effort level than a contract that pays a generous wage up front (trust contract).

PROPOSITION S6—Bonus vs. Trust Contracts: *For all* $q \in (0, 1)$ *and all* $\alpha, \beta > 0.5$, *the expected effort chosen by an agent under an optimally chosen bonus contract is* (*weakly*) *higher than the expected effort induced by a principal with an optimally chosen trust contract*. *It is strictly higher if the average effort induced by the optimal bonus contract is strictly larger than the minimum effort level*.

PROOF: Let us start with a *bonus contract*. The agent anticipates that, with probability q, the principal will pay a bonus that equalizes payoffs, $b = (v(e) + c(e))/2 - w$, and, with probability $1 - q$, the principal will not pay a bonus. Thus, his expected monetary payoff is

$$M^A(e) = w - c(e) + q \cdot \left[\frac{v(e) + c(e)}{2} - w\right]. \tag{12}$$

A self-interested agent chooses the effort level e^{bs} that maximizes $M^A(e)$. Note that either $e^{bs} = \underline{e}$ or e^{bs} is characterized by the first order condition (FOC)

$$c'(e^{bs}) = \frac{q}{2 - q} v'(e^{bs}). \tag{13}$$

On the other hand, a fair-minded agent is afraid that the principal may not pay the bonus. His utility function is given by[3]

$$U^{Af}(e) = w - c(e) + q \cdot \left[\frac{v(e) + c(e)}{2} - w\right] - (1 - q)\alpha[v(e) - w - w + c(e)]. \tag{14}$$

[3]Note that we restrict attention to the case where the agent is worse off than the principal if the principal does not pay the bonus. If the wage is so high that the agent is better off than the principal even if no bonus is being paid, then the bonus contract is actually a trust contract that relies on a high up-front payment. In this case, Proposition S6 trivially holds.

Thus, the fair-minded agent who chooses either $e^{bf} = \underline{e}$ or e^{bf} is characterized by the FOC

$$-c'(e^{bf}) + \frac{q}{2}[v'(e^{bf}) + c'(e^{bf})] - \alpha(1-q)[v'(e^{bf}) - c'(e^{bf})] = 0. \tag{15}$$

Rearranging yields

$$c'(e^{bf}) = \frac{q - 2\alpha + 2\alpha q}{2 - q - 2\alpha + 2\alpha q} \cdot v'(e^{bf}). \tag{16}$$

The expected effort with a bonus contract is

$$e^b = q \cdot e^{bf} + (1-q) \cdot e^{bs}. \tag{17}$$

Consider now a *trust contract*. In this case, the agent reciprocates with probability q by choosing effort level $e(w)$ that equalizes payoffs, while he chooses $e = \underline{e}$ with probability $1 - q$. If the principal wants to induce a fair-minded agent to choose effort e, she has to offer a wage that compensates the agent for $c(e)$ and gives him half of $v(e) - c(e)$ up front, so

$$w(e) = \frac{v(e) + c(e)}{2}. \tag{18}$$

Suppose first that the principal is selfish. If she correctly anticipates that with probability $1 - q$ the agent is selfish and chooses $\underline{e}$ independent of w, her expected payoff is

$$\begin{aligned} M^P(e) &= qv(e) + (1-q) \cdot v(\underline{e}) - \frac{v(e) + c(e)}{2} \\ &= \frac{2q-1}{2} \cdot v(e) - \frac{1}{2}c(e) + (1-q) \cdot v(\underline{e}). \end{aligned} \tag{19}$$

Let $\hat{e}$ denote the effort level that maximizes $M^P(e)$, which is either $\hat{e} = \underline{e}$ or characterized by

$$c'(\hat{e}) = (2q-1)v'(\hat{e}). \tag{20}$$

A self-interested principal will offer $w(\hat{e})$ to induce the fair-minded agent to choose $\hat{e}$, but she anticipates correctly that with probability $1 - q$ the agent is self-interested and chooses $\underline{e}$. Thus the expected effort that is induced by the selfish principal in a trust contract is given by

$$e^{ts} = q \cdot \hat{e} + (1-q) \cdot \underline{e}. \tag{21}$$

On the other hand, the fair-minded principal is afraid that the agent is not going to work. Her utility function is given by

$$U^{Pf}(w) = q\big[v(e(w)) - w\big] + (1-q)\big[v(\underline{e}) - w - \alpha[w - c(\underline{e}) - v(\underline{e}) + w]\big]. \tag{22}$$

The fair principal will either offer a wage of 0 that induces both types of agents to choose $e^{tf} = \underline{e}$, or she will offer a wage $w(e)$ that induces the fair agent to choose effort e according to (18). In the latter case, the fair principal's utility function can be written as

$$\begin{aligned} U^{Pf}(e) &= q\left[v(e) - \frac{v(e)+c(e)}{2}\right] \\ &\quad + (1-q)\left[v(\underline{e}) - \frac{v(e)+c(e)}{2} - \alpha\left[\frac{v(e)+c(e)}{2} - c(\underline{e}) - v(\underline{e}) + \frac{v(e)+c(e)}{2}\right]\right] \\ &= q\frac{v(e)-c(e)}{2} \\ &\quad + (1-q)\left[(1+\alpha)v(\underline{e}) + \alpha c(\underline{e}) - (1+2\alpha)\frac{v(e)+c(e)}{2}\right]. \end{aligned} \tag{23}$$

The FOC for the optimal $\tilde{e}$ that maximizes (23) is given by

$$\frac{q}{2}[v'(\tilde{e}) - c'(\tilde{e})] - \frac{(1-q)(1+2\alpha)}{2}[v'(\tilde{e}) + c'(\tilde{e})] = 0. \tag{24}$$

Rearranging yields

$$c'(\tilde{e}) = \frac{2q - 1 - 2\alpha + 2\alpha q}{1 + 2\alpha - 2\alpha q} v'(\tilde{e}). \tag{25}$$

However, the selfish agent chooses $\underline{e}$. Therefore, the expected effort that is induced by the fair principal with a trust contract is given by

$$e^{tf} = q \cdot \tilde{e} + (1-q) \cdot \underline{e} \le \tilde{e}. \tag{26}$$

Thus, the expected effort that is induced by a trust contract is

$$e^{t} = q \cdot e^{tf} + (1-q) \cdot e^{ts}. \tag{27}$$

Let us now compare e^b and e^t. We first show that $e^{bf} \geq e^{tf}$. From (26) we see that $e^{bf} \geq e^{tf}$ if $e^{bf} \geq \tilde{e}$. Comparing the FOCs (16) and (25), note that

$$\frac{q-2\alpha+2\alpha q}{2-q-2\alpha+2\alpha q} \geq \frac{2q-1-2\alpha+2\alpha q}{1+2\alpha-2\alpha q}. \tag{28}$$

This is the case because the numerator of the left-hand side is larger than the numerator on the right-hand side ($q \geq 2q-1$), while the denominator on the left-hand side is smaller than the denominator on the right-hand side:

$$\begin{aligned} & 2-q-2\alpha+2\alpha q < 1+2\alpha-2\alpha q \\ & \Leftrightarrow \quad 2-q-2\alpha(1-q) < 1+2\alpha(1-q) \\ & \Leftrightarrow \quad 1-q < 4\alpha(1-q) \\ & \Leftrightarrow \quad 1 < 4\alpha. \end{aligned} \tag{29}$$

The last inequality (29) is implied by $\alpha > 0.5$. Thus, if there is an interior solution for e^{bf}, we have $e^{bf} \geq \tilde{e}$. If there is a corner solution, $e^{bf} = \underline{e}$ implies $\tilde{e} = \underline{e}$. Hence, because $e^{tf} \leq \tilde{e}$, we get $e^{bf} \geq e^{tf}$.

Now we show that $e^{bs} \geq e^{ts}$. Two cases have to be distinguished. If $0 \leq q \leq 0.5$, the expected marginal return of raising e in a trust contract is always negative as can be seen from (20), so $e^{ts} = \underline{e}$ while $e^{bs} \geq \underline{e}$. In this case, the result trivially holds. If $0.5 < q \leq 1$, by comparing the FOCs (13) and (20), we have

$$\frac{q}{2-q} \geq 2q-1. \tag{30}$$

To see this, note that

$$\begin{aligned} & \frac{q}{2-q} \geq 2q-1 \\ & \Leftrightarrow \quad q \geq (2-q)\cdot(2q-1) \quad \Leftrightarrow \quad 0 \geq 4q-2-2q^2 \\ & \Leftrightarrow \quad 0 \leq q^2-2q+1 \quad \Leftrightarrow \quad 0 \leq (q-1)^2. \end{aligned} \tag{31}$$

Thus, if there is an interior solution for e^{bs}, we find that $e^{bs} \geq \hat{e} \geq e^{ts}$. Furthermore, if there is a corner solution, $e^{bs} = \underline{e}$ implies $\hat{e} = \underline{e} = e^{ts}$. Hence, $e^{bs} \geq e^{ts}$.

We conclude that $e^b \geq e^t$. Furthermore, we have shown that whenever there is an interior solution we have $e^b > e^t$. *Q.E.D.*

TRUST CONTRACTS IN FEHR, KIRCHSTEIGER, AND RIEDL

Fehr, Kirchsteiger, and Riedl (1993; hereafter FKR) conducted a principal–agent experiment in which principals could also offer trust contracts. In their experiments, trust contracts have been fairly successful in inducing higher effort levels and it was profitable for the principals to offer generous wages. How does this fit with our results?

The main difference between FKR and our paper is the principal's payoff function. FKR used $M^P = (v - w) \cdot e$ to make sure that the principal cannot make losses by offering generous wages, while we used $M^P = v \cdot e - w$. It turns out that this difference is crucial, not only for the experimental results, but also for the theoretical analysis. To see this, let us apply the Fehr–Schmidt (1999) model with the same parameter assumptions used here to FKR. In the FKR experiments, the monetary payoff functions used were

$$M^A = w - 26 - c(e), \tag{32}$$

$$M^P = (126 - w) \cdot e. \tag{33}$$

The agent could choose his effort level $e \in \{0.1, 0.2, \dots, 1.0\}$ at effort cost

e	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
$c(e)$	0	1	2	4	6	8	10	12	15	18

Principals could make wage offers w that had to be multiples of 5.

Assume that there are 60 percent selfish agents who maximize their monetary income and 40 percent inequity-averse agents who choose an effort level that aims at equalizing payoffs:

$$w - 26 - c(e) = (126 - w) \cdot e. \tag{34}$$

Table S.I shows the monetary payoffs of the agent and the principal for each possible wage–effort combination. For each possible wage level, the underlined payoffs show which effort level will be chosen by the inequity-averse agent. The selfish agents always choose $e = 0.1$.

If the principal anticipates the agent's behavior correctly, his expected monetary payoff as a function of his wage offer is given by Table S.II. It also reports the average effort levels observed by FKR in their experiments (see FKR, Table II). The table shows that the Fehr–Schmidt model is roughly consistent with the observed effort choices. Furthermore, the model predicts that the principal's monetary payoff is maximized at $w = 85$. However, an inequity-averse principal will offer a lower wage ($w = 30$) because he suffers in addition from the inequity that is generated if the agent does not work. With 60 percent selfish and 40 percent inequity-averse principals, the model predicts an average wage of 63. In the experiment, the average wage was 72 (see FKR, p. 446). Again, the prediction of the model is fairly accurate.

TABLE S.I

PREDICTED WAGE–EFFORT RELATIONSHIPS FOR FAIR TYPES (FROM FKR (1993))

		$e = 0.10$	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
w		$c = 0.00$	1.00	2.00	4.00	6.00	8.00	10.00	12.00	15.00	18.00
30	M^A	4.00	3.00	2.00	0.00	−2.00	−4.00	−6.00	−8.00	−11.00	−14.00
	M^P	9.60	19.20	28.80	38.40	48.00	57.60	67.20	76.80	86.40	96.00
35	M^A	9.00	8.00	7.00	5.00	3.00	1.00	−1.00	−3.00	−6.00	−9.00
	M^P	9.10	18.20	27.30	36.40	45.50	54.60	63.70	72.80	81.90	91.00
40	M^A	14.00	13.00	12.00	10.00	8.00	6.00	4.00	2.00	−1.00	−4.00
	M^P	8.60	17.20	25.80	34.40	43.00	51.60	60.20	68.80	77.40	86.00
45	M^A	19.00	18.00	17.00	15.00	13.00	11.00	9.00	7.00	4.00	1.00
	M^P	8.10	16.20	24.30	32.40	40.50	48.60	56.70	64.80	72.90	81.00
50	M^A	24.00	23.00	22.00	20.00	18.00	16.00	14.00	12.00	9.00	6.00
	M^P	7.60	15.20	22.80	30.40	38.00	45.60	53.20	60.80	68.40	76.00
55	M^A	29.00	28.00	27.00	25.00	23.00	21.00	19.00	17.00	14.00	11.00
	M^P	7.10	14.20	21.30	28.40	35.50	42.60	49.70	56.80	63.90	71.00
60	M^A	34.00	33.00	32.00	30.00	28.00	26.00	24.00	22.00	19.00	16.00
	M^P	6.60	13.20	19.80	26.40	33.00	39.60	46.20	52.80	59.40	66.00
65	M^A	39.00	38.00	37.00	35.00	33.00	31.00	29.00	27.00	24.00	21.00
	M^P	6.10	12.20	18.30	24.40	30.50	36.60	42.70	48.80	54.90	61.00
70	M^A	44.00	43.00	42.00	40.00	38.00	36.00	34.00	32.00	29.00	26.00
	M^P	5.60	11.20	16.80	22.40	28.00	33.60	39.20	44.80	50.40	56.00
75	M^A	49.00	48.00	47.00	45.00	43.00	41.00	39.00	37.00	34.00	31.00
	M^P	5.10	10.20	15.30	20.40	25.50	30.60	35.70	40.80	45.90	51.00
80	M^A	54.00	53.00	52.00	50.00	48.00	46.00	44.00	42.00	39.00	36.00
	M^P	4.60	9.20	13.80	18.40	23.00	27.60	32.20	36.80	41.40	46.00
85	M^A	59.00	58.00	57.00	55.00	53.00	51.00	49.00	47.00	44.00	41.00
	M^P	4.10	8.20	12.30	16.40	20.50	24.60	28.70	32.80	36.90	41.00
90	M^A	64.00	63.00	62.00	60.00	58.00	56.00	54.00	52.00	49.00	46.00
	M^P	3.60	7.20	10.80	14.40	18.00	21.60	25.20	28.80	32.40	36.00
95	M^A	69.00	68.00	67.00	65.00	63.00	61.00	59.00	57.00	54.00	51.00
	M^P	3.10	6.20	9.30	12.40	15.50	18.60	21.70	24.80	27.90	31.00
100	M^A	74.00	73.00	72.00	70.00	68.00	66.00	64.00	62.00	59.00	56.00
	M^P	2.60	5.20	7.80	10.40	13.00	15.60	18.20	20.80	23.40	26.00

TABLE S.II

w	30	35	49	45	50	55	60	65	70	75	80	85	90	95	100
e (selfish agent)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
e (fair agent)	0.1	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8	1.0	1.0	1.0	1.0
Expected e	0.1	0.1	0.1	0.14	0.18	0.22	0.22	0.26	0.3	0.34	0.38	0.46	0.46	0.46	0.46
Expected M^P	9.6	9.1	8.6	11.3	13.7	15.6	14.5	15.9	16.8	17.3	17.5	18.9	16.6	14.3	12.0
Average effort observed in FKR		0.17			0.18			0.34			0.45			0.52	

ADDITIONAL EXPERIMENTAL DATA

The following table summarizes the effort-bonus relationship in sessions S3–S6. The complete data of all experiments is available at Fehr, Klein, and Schmidt (2007).

EFFORT–BONUS RELATIONSHIP IN SESSIONS S3–S6[a]

$b\backslash e$	1	2	3	4	5	6	7	8	9	10	$\sum$
0	90	12	16	12	11	5	9	3	4	2	164
1–5	1	3	4	9	8	8	6	3	1	2	45
6–10	0	1	3	7	11	15	9	5	4	0	55
11–15	0	0	0	4	7	6	6	8	0	0	31
16–20	0	0	0	1	4	4	6	7	5	3	30
21–25	0	0	0	0	1	1	6	5	3	3	19
26–30	0	0	0	0	0	0	5	6	2	3	16
31–35	0	0	0	0	0	0	1	2	3	1	7
36–40	0	0	0	0	0	0	0	0	2	7	9
$\sum$	91	16	23	33	42	39	48	39	24	21	376

[a] For each possible effort level, the table shows how often a bonus was paid that either is 0 or falls in the given intervals.

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