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Signaling Purpose

Dirk Sliwka Marina Talantceva Timo Vogelsang

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Dirk Sliwka† Marina Talantceva‡ Timo Vogelsang§

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Workers value their jobs' social impact but often know less about it than managers. We analyze a principal-agent model where both value social impact but only the principal observes it. Since higher bonuses are more attractive to the principal when social returns are larger, bonuses signal purpose: they increase in social value only under asymmetric information, and effort responds more steeply to them. A large-scale online experiment confirms that principals condition bonuses on social value only when agents are uninformed; support for the effort prediction is only directional. Contrary to theory, signaling vanishes when principals have a known material stake.

Keywords: Incentives, Principal-Agent, Signaling, Social Contribution, Purpose, Social Incentives

JEL classification: C92, D64, D82, D83, J33, M10, M40, M50, M52

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†University of Cologne. Faculty of Management, Economics and Social Sciences. Department of Corporate Development. sliwka@wiso.uni-koeln.de

‡University of Cologne. Faculty of Management, Economics and Social Sciences. Department of Corporate Development. mtalantceva@wiso.uni-koeln.de

§Frankfurt School of Finance & Management. Department of Accounting. t.vogelsang@fs.de

1 Introduction

It has often been argued that signaling effects can undermine the value of monetary incentives or even lead to backfiring effects.[1] In formal principal-agent models it has, for instance, been shown that incentives can reveal that a task is unpleasant (Bénabou and Tirole, 2003), undermine image motivation (Bénabou and Tirole, 2006), or damage perceptions about social norms (Sliwka, 2007). Moreover, several empirical studies provide causal evidence that such backfiring effects indeed can occur (see, e.g., Gneezy and Rustichini, 2000*a*, Gneezy and Rustichini, 2000*b*, Danilov and Sliwka, 2017, Alfitian, Sliwka and Vogelsang, 2024, Vogelsang, 2023). But why should monetary incentives only carry negative signals? In this study, we investigate whether principals can also use incentives to signal a purpose behind a job and whether such signaling effects may even result in increased effort provision by agents beyond material incentive effects.

The question matters because the informational content of incentives has, so far, been studied almost exclusively on its detrimental side. When a principal is better informed than the agent—about task difficulty, the social environment, or the prevalence of free-riders—her incentive choice becomes a strategically chosen signal, and agents update their beliefs accordingly.[2] Existing experimental work shows these updates are typically bad news for behavior. Van der Weele (2012) find that when a principal privately knows the share of defectors, high sanctions can signal that egoists are common and depress cooperation. Bremzen et al. (2015) find that when principals know task difficulty, agents read higher bonuses as a signal that the task is hard, reducing effort when bonuses lack a direct incentive effect. Cardinaels and Yin (2015) show that the very choice to use an incentive contract can signal distrust and weaken honesty norms, increasing misreporting. Similarly, Christ (2013) shows that employees' responses to formal control depend on the managerial intentions they infer from its implementation. The picture is similar for incentives tied explicitly to prosocial meaning: corporate social-responsibility programs can induce moral licensing and more shirking (List and Momeni, 2021), making incentive motives salient can crowd out intrinsic motivation among the most prosocial agents (Yoon and Woolley, 2024), and higher advertised pay in mission-oriented jobs can signal *weaker* purpose and deter prosocial applicants (Deserranno, 2019). Against this backdrop, evidence that incentives can signal something positive is scarce, and what exists concerns signals sent through observable prosocial actions by the employer—charitable giving and the like (Tonin and Vlassopoulos,

[1] While many studies show positive performance effect of incentives (e.g., Banker et al., 2000, Lazear, 2000, Delfgaauw et al., 2013, Lourenço, 2016, Friebel et al., 2017, Manthei, Sliwka and Vogelsang, 2023), psychologists and economists have questioned that this is universally true (e.g., Deci, 1971, Deci and Ryan, 1985, Frey and Oberholzer-Gee, 1997, Kreps, 1997, Gneezy and Rustichini, 2000*a*, Gneezy and Rustichini, 2000*b*).

[2] The foundational treatment of such informed-principal problems is Myerson (1983) and Maskin and Tirole (1990, 1992).

2015; Kajackaite and Sliwka, 2017; Butz and Harbring, 2022; Bruni et al., 2020)—or team settings, where Deversi and Spantig (2026) find an informed manager's choice of a team bonus raised trust rather than signaling distrust. Whether an ordinary *individual* performance bonus can serve as a credible positive signal of social value, and whether this lifts performance, is an open question. This is the gap we address.

We develop a principal–agent model in which effort is costly but generates social impact ("purpose"), and both parties value this impact. The principal observes the social impact of the task before choosing a piece-rate bonus. The agent observes only the bonus. Under this asymmetric information, the bonus has two functions: It raises the agent's marginal return to effort, but it now also can signal the principal's private information: because higher-powered bonuses are more attractive to the principal precisely when the social return to effort is larger, a high bonus *credibly* communicates high social impact. We start with a non-profit setting where there are no monetary returns for the principal and then study whether the mechanism survives in a setting where the principal also has a for-profit motive to incentivise the task.

The model yields several testable implications. A necessary precondition for any signaling channel is that effort responds to purpose at all: when the social value of the task is known to agents, effort should rise with both the bonus and the task's social value. Under asymmetric information, the bonus takes on a second role, since agents can no longer observe the social value directly and must instead infer it from the bonus itself — so effort should respond more steeply to bonus increases when purpose is unknown than when it is known. The informational asymmetry also affects the principal's incentive to pay: principals should raise bonuses with the social value of the task only when this value is otherwise hidden from the agent. When purpose is known, an agent who shares the valuation of social impact already works harder when the social value is larger, and in our model the gain from inducing even more effort is exactly offset by the cost of paying the bonus on all units of effort the agent supplies anyway, so that no bonus is paid. But when the agent cannot observe the social value, his effort no longer adjusts to it, and bonuses become upward-sloping in this value. In equilibrium, the agent anticipates this and reads a higher bonus as a signal of a higher social value. Finally, we also consider a "for-profit" setting where the principal also holds a private material stake in the task. The model here predicts that uncertainty about that stake blurs the signal: the agent can no longer tell whether a higher bonus reflects a larger social return or simply a larger private return to the principal, so the signaling mechanism — and with it the responsiveness of effort to the bonus — should be weakened.

We empirically test these hypotheses in a large-scale online experiment conducted on Prolific. The study employs an abstract effort game in which a subject in the role of principal first decides on the size of a piece rate payment to a matched agent, after which this agent chooses a level of effort. Higher efforts lead to donations made to the organization

GrowMyTree, which finances tree planting—but the precise rate determining the impact of effort on created donations (the "social value of the task") is randomly drawn for each agent from a prior distribution. Our main treatment varies whether agents know this social value of the task precisely. In the condition where this value is not disclosed, agents receive only information on the probability distributions of possible outcomes and only the principal observes the exact values of the social returns. This design enables us to test whether, under incomplete information, principals condition bonuses on the social value of the task—and whether agents read higher bonuses as a signal of higher social value and exert more effort in response. In addition to this non-profit environment, we introduce a for-profit environment in which effort generates both social returns and a monetary return to the principal. This allows us to study whether incentive-based purpose signals remain effective when principals also have a selfish motive to induce effort and when the employee may face uncertainty not only about purpose but also about the material return.

In the non-profit setting the results support the model's signaling logic on the principal side but qualify it on the agent side. First, agents respond to monetary incentives as well as to the strength of purpose: when the social value of the task is observable, effort rises with both the bonus and the social value. In line with the prediction of the model principals then also condition bonuses on social value *only* when it is private information — the bonus slope is positive and significant under unknown purpose and flat when the agent observes the social value of the task. Principals thus choose information-contingent bonuses, which is a necessary condition for the bonus to carry information about purpose. Whether agents actually read the bonus as a signal is reflected in their effort response. We find tentative evidence for this as the effort-bonus slope is about 40% steeper under unknown purpose, but this difference in slopes is imprecisely estimated and considerably smaller than the model predicts. So the robust evidence on the principals' side is not followed by robust evidence on the agents' effort reaction.

In for-profit environments, by contrast, we find no evidence of the signaling pattern. The formal model indeed predicts the signaling mechanism to be weakened when principals also have a selfish motive for raising bonuses – but only when there is uncertainty about the profitability of the task's output. But our experimental results show that it suffices to add a for-profit motive for the principal (even a fully transparent one) for the effects to vanish: the difference in bonus slopes between unknown and known purpose is significantly smaller in the for-profit than in the non-profit setting. When agents can observe both the social value of the task and its impact on the principal's profit, we can no longer detect an effect of the social value on effort, while efforts respond significantly more strongly to the bonus than in the non-profit setting. And when the social value is unobserved by the agents we find neither evidence that principals condition bonuses on social value nor that agents respond to a stronger extent to bonus increases.

These findings contribute to the literature on how incentives shape beliefs as well as behavior in three ways. First, by isolating a *positive* signaling role for bonuses in an environment where effort generates purely social returns, we complement the body of theory and evidence in which incentives transmit unfavorable information—about unpleasant tasks, image payoffs, norms, or task difficulty (Bénabou and Tirole, 2003, 2006; Sliwka, 2007; Van der Weele, 2012; Bremzen et al., 2015; Cardinaels and Yin, 2015) showing that monetary incentives can hold favorable information by transmitting otherwise unobservable social value. This helps explain why monetary incentives may emerge even in non-profit settings where both parties care about purpose: there, bonuses can carry information about meaningful work rather than merely serve as instruments of control. Second, our experiment examines the informational role of bonuses by varying whether agents observe the social return to effort, complementing work on negative signaling and selection (Deserranno, 2019; Galbiati, Schlag and van der Weele, 2013). It also connects to research on mission-oriented organizations, social incentives, and mission alignment (Besley and Ghatak, 2005; Fehrler and Kosfeld, 2014; Tonin and Vlassopoulos, 2015; Carpenter and Gong, 2016; Cassar, 2019). In particular, Cassar (2019) finds that highly motivated principals may offer higher piece rates to increase donations. We differ by focusing on asymmetric information about the social return to effort: holding the social cause fixed, we ask whether the principal's bonus choice conveys that return to the agent.

Third, our results speak to research on how the design of incentive and control systems interacts with employees' prosocial motivation. This work has examined how altruism and social norms relate to incentive-contract design (Abernethy et al., 2023), how a firm's CSR mission interacts with monetary CSR incentives in shaping employees' CSR engagement (Spallek, Bastini and Lachmann, 2023), and how formal communication and performance assessment can be used to promote corporate values (Deller, Gallani and Sandino, 2026). We add an informational perspective to this work: when managers know more than employees about the social value of a task, the incentive contract itself may carry information about this value. Our for-profit results point to an important boundary condition for this channel. Once the organization has a material stake in the task, employees appear to interpret incentives primarily in monetary terms, which suggests that in for-profit firms purpose may have to be communicated through other, more explicit channels, such as the formal communication of values studied by Deller, Gallani and Sandino (2026).

The paper proceeds as follows. Section 2 presents the model and derives its predictions for the non-profit and the for-profit setting. Section 3 states our hypotheses. Section 4 describes the experimental design and its implementation. Section 5 reports the results, first for the non-profit and then for the for-profit setting, and Section 6 concludes. The proofs are in Appendix A, additional tables in Appendix B, and the experimental screens in Appendix C.

2 Theory

Consider the following principal-agent model: An agent A works for a principal P and exerts effort e at quadratic effort costs $c(e) = \frac{c}{2}e^2$. Each unit of effort generates a social return v (the strength of the task's "purpose") which is drawn from a normal distribution with $v \sim N(m_v, \sigma_v^2)$ such that $m_v > 0$ is the prior expected value of v and σ_v^2 measures the uncertainty about this purpose. The realization of v is known by the principal but not by the agent. Before the agent chooses the effort level the principal chooses a bonus rate β which is then revealed to the agent.

The principal's utility function is

$$(\kappa v - \beta) e$$

and the agent's utility is given by

$$(\kappa v + \beta) e - \frac{c}{2}e^2,$$

where $\kappa > 0$ measures the importance of the social value relative to monetary payments. Note that both parties value the social return of the task to the same extent.

2.1 Known Purpose

First consider a baseline setting where there is no asymmetric information on the strength of purpose v. The agent then maximizes

$$\max_e (\kappa v + \beta) e - \frac{c}{2}e^2$$

and from the first order condition we have that

$$e = \frac{\beta + v\kappa}{c}.$$

In turn, the principal maximizes

$$\max_\beta (\kappa v - \beta) \frac{\beta + v\kappa}{c}$$

which yields:

Proposition 1. *When there is symmetric information and thus the purpose v is known by both parties, the agent chooses effort*

$$e^K(\beta) = \frac{\beta + \kappa v}{c}. \tag{1}$$

and the bonus is independent of v and equal to zero, i.e.

$$\beta^K(v) = 0 \ \forall v. \tag{2}$$

The intuition for the first part is simple: There are two sources of motivation for the agent and he works harder when the material bonus β and the social return v are higher. To understand why the principal pays no bonus here, note that raising the bonus has two effects for the principal: it induces additional effort, each unit of which is worth $\kappa v - \beta$ to her, but she also has to pay the higher bonus on all units of effort the agent supplies anyway. As the agent cares for the "mission" to the same extent as she does, his effort already increases in v, and at $\beta = 0$ both effects exactly offset each other. Hence, there is no need to pay a bonus.[3]

2.2 Unknown Purpose

Now consider a setting with asymmetric information where the principal learns the realization of v but the agent only knows its prior distribution. Given the bonus β chosen by the principal the agent maximizes

$$E\left[(\kappa v + \beta)\, e - \frac{c}{2}e^2 \middle| \beta\right]$$

and from the first order condition we obtain that

$$e = \frac{\beta + E[v|\beta]\,\kappa}{c}.$$

Note that β here may have two potential effects: On the one hand, there is the standard incentive effect as higher values of β raise the agent's marginal returns to effort. But β may also reveal information about v and thus can affect the agent's beliefs $E[v|\beta]$. We can show the following:

Proposition 2. *When the magnitude of purpose v is unknown to the agent, there is a perfect Bayesian equilibrium in which the agent exerts effort*

$$e^U(\beta) = \frac{3\beta}{c} \tag{3}$$

and the principal chooses a bonus of

$$\beta^U(v) = \frac{v\kappa}{2} \tag{4}$$

[3]This result hinges on both parties valuing the social return equally. If the principal and the agent attach weights κ_P and κ_A to the social return, the optimal bonus under symmetric information is $\beta^K = (\kappa_P - \kappa_A)\, v/2$, which is increasing in v when the principal cares more about the social return than the agent. The comparison between the known and the unknown purpose case discussed below is not affected by this.

Proof: See Appendix.[4]

This yields two important insights: First of all, note from comparing the agent's effort choices for given bonus payments in equations (1) and (3), the impact of the bonus on effort is larger when the purpose is unknown. The reason is indeed that the bonus now has two roles: it provides incentives to perform and it signals the importance of the task. In turn, the agent responds to a stronger extent to bonus increases.

The second key implication is that even in a non-profit setting the principal now has an incentive to pay a bonus which reveals the importance of the task. By paying more per unit of output despite having no monetary motive to do so, she the importance of the task is signaled. Or vice versa, when no bonus is paid by the principal the agent would infer that the task does not create a social value and here would even choose an effort level of zero. Note also that equilibrium efforts are larger than under known purpose, as $e^U = \frac{3\kappa v}{2c} > \frac{\kappa v}{c} = e^K$: the higher bonuses paid in equilibrium raise the agent's marginal return to effort.

It is useful to spell out which of these predictions depend on agents actually reading the bonus as a signal. Start with the principal. Bonuses increase in the social value v only when purpose is unknown. When purpose is known, the agent already works harder on his own when the social value is high. A principal who faces a high social value would like more effort, but raising the bonus is also more expensive for her, because she has to pay it on all the effort the agent supplies anyway. As discussed after Proposition 1, the two effects exactly offset each other, and the bonus does not depend on v. When purpose is unknown, however, the agent cannot adjust his effort to the true social value. A principal who knows that the social value is high then uses the bonus to make up for this, and pays a higher bonus the higher v is. This motive does not require that the agent draws any inference from the bonus: even if the agent ignored the bonus as a source of information, the principal would raise the bonus with v, and in fact at exactly the same rate.[5]

As a consequence, only when purpose is unknown does the bonus carry information about the social value of the task: a high bonus indicates that the task is valuable. Whether agents make use of this information is a separate question. In the equilibrium as characterized by Proposition 2, agents correctly infer the social value from the bonus and thus effort responds more strongly to the bonus, as a higher bonus raises both the agent's pay and his belief about the value of the task. In our experiment, a bonus that increases in the social value only when purpose is unknown thus shows that bonuses are informative about purpose. A

[4] As v is normally distributed, the equilibrium bonus is negative for (rare) negative realizations of v. In the experiment, the social contribution factor and the bonus are bounded, such that the linear equilibrium should be seen as an approximation.

[5] The proof of Proposition 2 in Appendix A shows that the slope of the principal's optimal bonus in v is $\kappa/2$ whatever the agent's (linear) belief. With an agent who ignores the informational content of the bonus, the optimal bonus is $\beta = \kappa\left(v - m_v\right)/2$.

steeper effort response to the bonus when purpose is unknown shows whether agents actually understand them as a signal.

2.3 For-Profit Setting

So far we have considered a setting where the task itself had a mere social purpose and did not generate any profits for the principal. In a next step we now study how the signaling mechanism described above is affected when the principal also has a further profitability motive to get the agent to work hard. To do that we assume that the principal additionally receives a private return r per unit of effort which is drawn from a normal distribution such that $r \sim N(m_r, \sigma_r^2)$ with $m_r > 0$, independently of v. The principal's utility function then becomes

$$(\kappa v + r - \beta)\, e$$

while the agent's utility function remains unchanged. While the principal knows the realization of r the agent only knows its distribution.

Note that the for-profit setting now induces another motive for the principal to raise the bonus: when the task itself becomes more profitable she will want to increase the bonus to motivate higher efforts – just as in any standard hidden action model. However, it is particularly this mechanism which may undermine the signaling purpose channel: if the agent does not know the true profitability, it becomes more difficult for them to infer whether a higher bonus reflects a stronger commitment to purpose or simply a greater profit motive on the part of the principal. We indeed find:

Proposition 3. *When the principal has a for-profit motive the signaling value of bonus payments is reduced when the agent is uncertain about the strength of this motive. That is, equilibrium bonus payments β are decreasing in the variance of the task's profitability σ_r^2 and efforts are less responsive to bonus increases when this uncertainty σ_r^2 is larger, i.e.*

$$\frac{\partial \beta}{\partial \sigma_r^2} < 0 \text{ and } \frac{\partial^2 e(\beta)}{\partial \beta \partial \sigma_r^2} < 0.$$

Hence, uncertainty about the principal's private returns indeed reduces the signaling value of the bonus as the agent can be less certain whether a high bonus is due to high social or high personal returns. It is important to note that in the model it is not the fact that the principal makes a profit from the agent's effort per se that undermines the purpose signaling mechanism. It is the uncertainty about the magnitude of this motive that makes it harder to signal purpose as it becomes harder for the agent to discern the two motives to raise the bonus. In particular, when r is known to the agent ($\sigma_r^2 = 0$), the signaling mechanism works exactly as in the non-profit setting.

3 Hypotheses

In our experiment we thus test four main hypotheses: A first precondition for the signaling mechanisms to work is that agents indeed work harder when social returns are stronger:

Hypothesis 1. *When agents can observe the social value of the task, their efforts are increasing in both the bonus paid by the principals and the social returns of the task.*

When the agents, however, cannot directly observe the social value of the task, the signaling mechanism becomes active and the bonus then serves two functions as it provides not only material incentives but will also reveal information about these social returns. In turn, the agent should respond to a stronger extent to bonus increases:

Hypothesis 2. *Bonuses have a stronger effect on efforts when agents cannot observe the social returns.*

On the principal's side, the model predicts that the bonus does not depend on the social value when this value is known to the agent (and in fact is equal to zero), but is strictly increasing in the social value when this value is unknown to the agent. As discussed above, a flat bonus under known purpose relies on both parties valuing the social return equally, whereas the difference in slopes between the two information conditions is robust to this. We therefore state the hypothesis in terms of this difference:

Hypothesis 3. *Bonus payments increase more strongly in the social value of the task when agents cannot observe these social returns than when they can.*

Finally, the signaling mechanism should be weaker in for-profit settings, when the agent also faces uncertainty about the profitability of the task for the principal, as then it is harder to discern whether bonus increases are due to a higher profitability of the task for the principal or a higher social value:

Hypothesis 4. *In the for-profit setting, uncertainty about the principal's private returns weakens the purpose signaling mechanism and thus efforts become less responsive to the bonus.*

Note that the model predicts that Hypothesis 2 and Hypothesis 3 should also hold in the for-profit setting when the principal's return is known to the agent, as then the signaling mechanism works exactly as in the non-profit setting.

4 The Experiment

4.1 Experimental Design

The experiment proceeds as follows. First, after being invited to participate in our study, participants start with a survey, where we elicit the information about their willingness to

donate, their beliefs about the willingness to donate of others, their attitude towards risk, their general willingness to give to good causes without expecting anything in return, and their willingness to return favors (for the screens with questions please see Appendix C).

Next, participants are then randomly assigned to one of two roles – Employer (principal) or Employee (agent) – and to the respective treatment. Within each treatment Employers and Employees receive identical instructions (for the experimental screens see Appendix C). All participants receive the same endowment of 300 experimental currency units (ECU) and are informed that the Employee will choose an effort level between 0 and 20. Effort is costly for the agent, and both parties are informed about the cost function.[6] Importantly, each unit of effort contributes to a donation to the organization that plants trees.[7] The rate at which effort generates donations for the tree planting – the "Social Contribution Factor", corresponding to v in the model – is randomly drawn for each pair from a normal distribution with mean 10 and a standard deviation 3.5 (rounded to integer values and capped at 0 and 20). In the for-profit treatments, the Employer's material return per unit of effort – the "Principal Return Factor", corresponding to r in the model – is drawn independently from the same distribution. The Employer always learns the realized values on the task screen, while what the Employee learns about them varies by treatment (see below). The Employer may incentivise effort by offering a bonus rate between 0 and 15 ECU per unit of effort, which is deducted from their own endowment. Hence, the Employee's payoff is $300 + \beta e - e^2/2$ ECU, the Employer's payoff is $300 - \beta e$ ECU (plus the Principal Return Factor times effort in the for-profit treatments), and the donation equals the Social Contribution Factor times effort.

The five treatments differ in the information Employees have about the Social Contribution Factor and, in for-profit treatments, the Principal Return Factor:

Non-Profit

- **Known Purpose Treatment:** Both parties observe the exact value of the Social Contribution Factor.
- **Unknown Purpose Treatment:** Only the Employer sees the exact value of the Social Contribution Factor, while Employees know only its distribution.

For-Profit

- **For-Profit Baseline:** Effort generates both social returns and Employer profits; both parties observe the exact values of the Social Contribution Factor and the Principal Return Factor.

[6] Costs were computed by the formula $C(e) = e^2/2$, where e is the agent's effort, which corresponds to $c = 1$ in the model.

[7] More information on the organization can be found here: https://growmytree.com

- **For-Profit Unknown Social Returns:** Effort generates both types of returns; the Principal Return Factor is known to both, but only Employers see the exact Social Contribution Factor, while Employees know only its distribution.
- **For-Profit Unknown Social and Material Returns:** Effort generates both types of returns; only Employers see the exact values of the Social Contribution Factor and the Principal Return Factor, while Employees know only their distributions.

After reading the instructions, participants answer six comprehension questions. Those who fail twice are excluded from the study. Each Employee is matched with exactly one Employer (after the Employer completes the task) and learns the bonus rate chosen by this Employer. Participants then proceed with their tasks, after which they complete a survey to provide demographic information (age, gender, education, race). After that, they complete two open-ended questions evaluating both their understanding of the instructions and the reasoning underlying their task choices. Finally, participants are informed of their payments.

4.2 Experimental Implementation

The experiment was conducted between August and October 2025. We invited more than 2,500 participants from the US to take part in an online experiment on Prolific. The final sample used in this paper consists of 2,134 participants (1,067 principals and 1,067 agents).[8] Of these, 48.5% were female, with an average age of 42 years (for the balance table see Table B1, and for descriptive statistics on bonuses and effort by treatment see Table B2, both in Appendix B). Participants received a baseline payment of approximately $3. Principals earned on average an additional $1.60, while agents earned $1.85 on top of the baseline payment. The total social contribution raised in this study amounted to approximately $620, which has been donated to an organization that plants trees. This amount corresponds to the planting of approximately 280 new trees.

5 Results

5.1 Non-Profit Setting

Hypothesis 1 states a precondition for the signaling mechanism to work: that is, agents respond not only to the magnitude of the bonus payment but also to that of the social contribution factor, which determines the social value of their efforts – in other words, that they also exhibit a purpose-driven motivation. We can test this with the data from the treatment where the agents can observe the social contribution factor directly. Column (1)

[8]The rest of the participants were excluded from the study due to the failure of comprehension check or incompletion of the task.

Table 1: Effort Responsiveness to Bonus and Social Value in the Known Purpose Treatment

	Effort	
	(1)	(2)
Bonus	0.242***	0.248***
	(0.085)	(0.084)
Social Contribution Factor	0.189*	0.200**
	(0.102)	(0.100)
Female		-0.098
		(0.682)
Age		0.015
		(0.024)
Good Cause		0.485
		(0.414)
Constant	6.758***	
	(1.239)	
Education	-	x
Observations	212	211
R^2	0.056	0.077

Note: The table reports OLS regression estimates of agents' effort choices as a function of the bonus and the social contribution factor in the Known Purpose treatment. Column (2) additionally controls for the agent's gender (a female dummy), age, and charity preferences (willingness to give money for a good cause), and absorbs educational-level fixed effects. Robust standard errors in parentheses. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

in Table 1 reports the respective result of a regression of the agent's effort choices on the bonus this agent received and the realized social contribution factor, column (2) additionally controls for gender, age, education and charity preferences of the agent.[9] As the results show, indeed both motives matter for effort choices. Note that, since principals and agents are randomly matched, the bonus an agent receives is independent of the agent's own characteristics.

In a next step we focus on studying the signaling mechanism, first comparing the effect of bonus increases on the agents' efforts between the *Known Purpose* and *Unknown Purpose* treatments and then looking at the principals' bonus choices in these two treatments.

As postulated in Hypothesis 2, the model predicts that the bonus has a stronger effect on efforts in the *Unknown Purpose* treatment as here agents should also read the bonus as a signal of purpose. As Table 2 shows, this is directionally true as the coefficient of the bonus

[9]The exact wording of the survey question was: "How willing are you to give to good causes without expecting anything in return?", answered on an 11-point scale from 0 ("I am completely unwilling to do so") to 10 ("I am very willing to do so"). The variable is standardized.

Table 2: Effort Responsiveness in Non-Profit Treatments

	Effort		
	Known Purpose	Unknown Purpose	Pooled
	(1)	(2)	(3)
Bonus	0.242***	0.341***	0.242***
	(0.085)	(0.080)	(0.085)
Unknown Purpose			0.214
			(1.436)
Bonus × Unknown Purpose			0.099
			(0.117)
Social Contribution Factor	0.189*		
	(0.102)		
Social Contribution Factor × Known Purpose			0.189*
			(0.102)
Constant	6.758***	6.972***	6.758***
	(1.239)	(0.729)	(1.237)
Observations	212	212	424
R^2	0.056	0.089	0.081

Note: The table reports OLS regression estimates of the determinants of agents' effort choices. The dependent variable is the agent's chosen effort level, while the independent variables are the bonus assigned by the principal, a dummy for the purpose being unknown, and their interaction. In the Known Purpose treatment, the regressions control for the social contribution factor, which agents observe only in this treatment. Robust standard errors in parentheses. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

Table 3: Determinants of Bonus Choices in Non-Profit Treatments

	Bonus		
	Known Purpose	Unknown Purpose	Pooled
	(1)	(2)	(3)
Social Contribution Factor	-0.089	0.245***	-0.089
	(0.080)	(0.094)	(0.080)
Unknown Purpose			-2.953**
			(1.292)
Unknown Purpose × Social Contribution Factor			0.335***
			(0.124)
Constant	8.067***	5.114***	8.067***
	(0.872)	(0.954)	(0.872)
Observations	212	212	424
R^2	0.006	0.032	0.023

Note: The table reports OLS regression estimates of the determinants of principals' bonus choices. The dependent variable is the principal's chosen bonus level, while the independent variables are social contribution factor and a dummy for the purpose being unknown. Robust standard errors in parentheses. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

is about 40% larger when purpose is unknown.[10] But as standard errors are large we cannot reject the hypothesis that both are equal ($p = 0.395$), so we have only tentative evidence for a stronger responsiveness of effort to bonus increases under asymmetric information. Moreover, the difference is considerably smaller than predicted by the model: according to equations (1) and (3), the effect of the bonus on effort should be three times as large under unknown purpose, independently of κ.

Next, we look at the principals' side. Hypothesis 3 states that bonuses should respond more strongly to variations in the social contribution factor in the *Unknown Purpose* treatment. In the model, a regression of the bonus β on the social value of the task v should exhibit a positive slope only in this case and should otherwise be flat. Here we find evidence well in line with the predicted pattern: Table 3 shows results of regressions of the bonus β as dependent variable on the social contribution factor v. As column (1) of Table 3 shows, indeed, higher social values do not lead to higher bonuses in the *Known Purpose* treatment, but there is a sizable and significant effect of the social contribution factor in the *Unknown Purpose* treatment as column (2) shows. As column (3) shows, the slope is indeed significantly larger in the *Unknown Purpose* than in the *Known Purpose* treatment.

[10] Appendix B reports specifications including further control variables of this and all further tables in the paper.

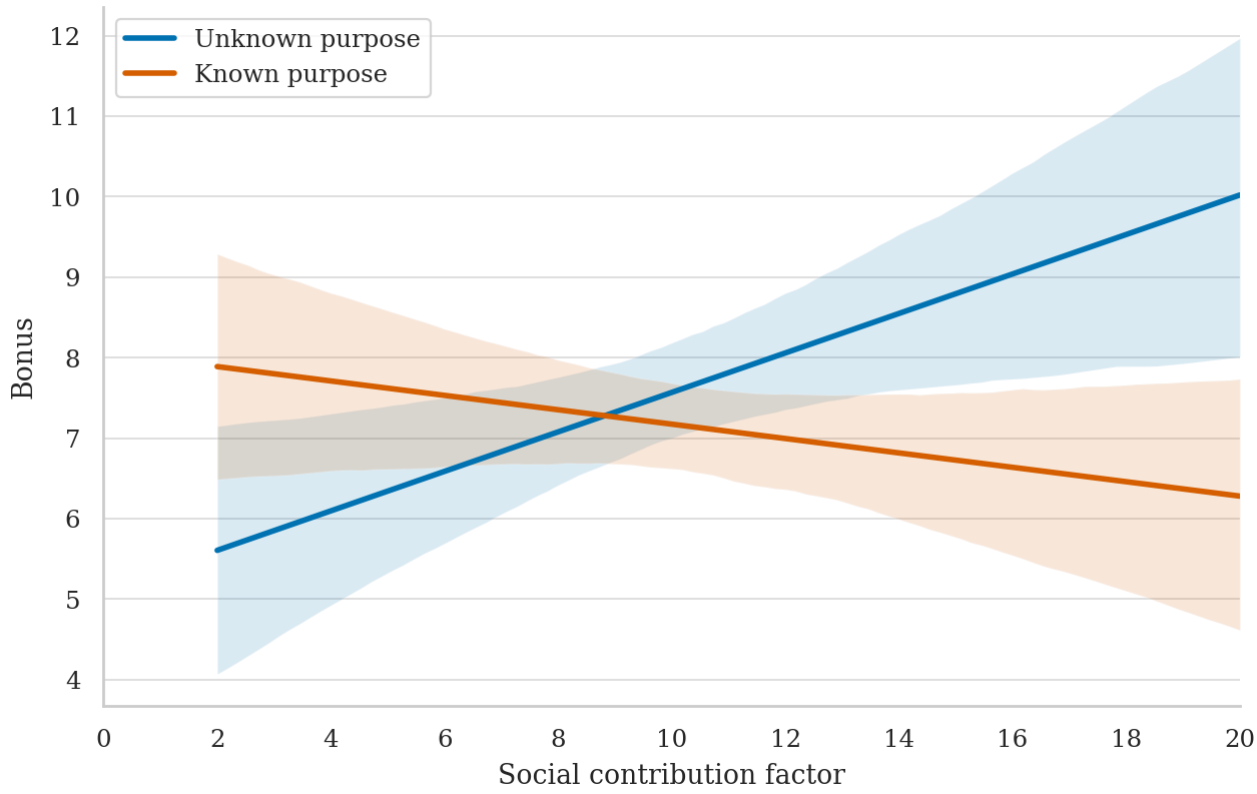

Figure 1: Bonus vs. Social Contribution Factor

Notes: The figure plots the predicted relationship between the Social Contribution Factor and the bonus chosen by principals in the Known Purpose and Unknown Purpose conditions. Predicted values are based on the OLS regressions reported in Table 3, including the interaction between Social Contribution Factor and the treatment indicator. Shaded areas show 95% confidence intervals.

Figure 1 illustrates this pattern graphically. The blue line represents the *Unknown Purpose* condition, where indeed bonuses are upward sloping in the social contribution factor. The orange line corresponds to the *Known Purpose* treatment which even indicates a slightly negative slope.[11]

Contrary to the model's prediction in Proposition 1 that bonuses should be zero when purpose is known, this figure also shows that we do not find bonuses (close to) zero in the *Known Purpose* treatment. Principals are thus willing to invest to motivate the agents to exert effort even when they do not materially benefit from it (or care about the agents' payoffs). Average bonuses of 7.58 are only slightly and insignificantly larger when purpose is unknown than those under known purpose at 7.17 ($p = 0.320$) and average efforts are even

[11]While this is admittedly rather speculative, this could indicate that principals may have considered high social values as a substitute for bonus payments.

slightly smaller at 9.56 as opposed to 10.4 ($p = 0.079$).[12]

Overall, the non-profit results provide support for the model's predictions on the principal's side: principals condition bonus payments on the social value of the task when this value is private information, but not when it is observable to agents. As a result, bonuses carry information about the otherwise hidden purpose. Whether agents read the bonus as a signal is reflected in their effort response, and here the evidence is more limited. Although effort responds positively to bonuses in both conditions and the estimated slope is directionally larger under unknown purpose, the difference is not statistically precise. The results therefore show that bonuses are informative about purpose, but do not provide systematic evidence that agents translate this information into additional effort.

One possible explanation for the weaker agent-side response is that agents may underinfer the informational content of bonuses. Cursed-equilibrium theory assumes that players "underappreciate the connection between other players' actions and their types" (Eyster and Rabin, 2005, p. 1629). Applied here, agents may recognize the direct monetary incentive provided by a higher bonus but insufficiently update their beliefs about the task's social value from the principal's bonus choice. Such underreaction would attenuate the additional signaling channel predicted by the model. Two further observations are in line with this interpretation. First, as noted above, the effort-bonus slope is only about 40% larger under unknown purpose instead of the predicted threefold increase. Second, in the model an agent who receives no bonus under unknown purpose infers that the task has no social value and exerts no effort, whereas the estimated effort at a zero bonus is about 7 units in the *Unknown Purpose* treatment (see Table 2), suggesting that agents' beliefs stay close to the prior.

5.2 For-Profit Setting

The for-profit environment adds a material return to the principal in addition to the social return. The model predicts that (i) when the principal's return is known, bonuses should be informative about purpose exactly as in the non-profit setting, but that (ii) signaling is less effective when there is uncertainty about the principal's material returns (Hypothesis 4).

But our results show that once a for-profit motive is present, we no longer find any evidence that bonuses signal purpose. To see this, first consider Table 4 which replicates our earlier analysis of bonus determinants for the for-profit settings in which agents are fully informed about the profitability of the task. In contrast to the non-profit settings the bonus is not more responsive to the social contribution factor when the agent cannot observe the latter

[12] It is important to note that the signaling effect per se does not predict higher efforts –as rational agents infer that social values do not differ between the treatments and thus *average* beliefs about purpose cannot systematically differ. The model still predicts higher efforts when purpose is unknown due to a price effect induced by the higher bonuses the model predicts in equilibrium. However, as we do not observe higher bonuses in the *Unknown Purpose* treatment in the experiment there is also no gain in marginal returns to effort.

Table 4: Bonus Choices in For-Profit Treatments with Known Material Returns

	Bonus		
	Known Purpose	Unknown Purpose	Pooled
	(1)	(2)	(3)
Social Contribution Factor	0.140*	0.025	0.139*
	(0.076)	(0.068)	(0.076)
Principal Return Factor	0.220***	0.140*	0.178***
	(0.069)	(0.073)	(0.051)
Unknown Purpose			0.426
			(1.067)
Unknown Purpose × Social Contribution Factor			-0.112
			(0.102)
Constant	4.264***	5.528***	4.705***
	(1.013)	(1.102)	(0.928)
Observations	217	213	430
R^2	0.059	0.018	0.048

Note: The table reports OLS regression estimates of principals' bonus choices in for-profit treatments with known material returns. The independent variables are social contribution factor, principal return factor, and a dummy for the purpose being unknown. In the pooled specification, the principal return factor enters without interaction. Robust standard errors in parentheses. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

but even tends to be less responsive. This clearly contradicts the model predictions.[13]

It appears that already the presence of a profit motive breaks the signaling mechanism in the experiment. To understand this result, consider agents' effort reactions in these settings. Column (1) of Table 5 reports effort as a function of the bonus, the principal's return from each unit of effort, and the Social Contribution Factor in the treatment with known purpose and known profitability. Effort responds substantially more strongly to bonuses in this for-profit setting than in the non-profit benchmark (compare column (1) of Table 1, where the bonus coefficient is less than half as large), and this difference of 0.31 is statistically significant ($p = 0.015$). At the same time, the estimated effect of the Social Contribution Factor is small and statistically indistinguishable from zero. Thus, in the for-profit setting, agents appear to respond primarily to the monetary bonus rather than to the task's social return even if both are fully transparent.

Comparing agents' reactions to bonus variation between the Known Purpose and Unknown Purpose treatments in columns (2)-(4) of Table 5 shows no evidence that agents respond more strongly to bonuses when purpose is unknown. In turn, using the bonus to signal purpose is ineffective, and principals' lack of purpose signaling through the bonus is consistent

[13]Note that this is partly driven by principals in the *Known Purpose* treatment, whose bonuses now slightly increase in the social contribution factor, contrary to the model's prediction.

Table 5: Effort Responses with Known Material Returns

	Effort			
	Known Purpose		Unknown Purpose	Pooled
	(1)	(2)	(3)	(4)
Bonus	0.547***	0.557***	0.487***	0.530***
	(0.091)	(0.089)	(0.091)	(0.090)
Principal Return Factor	-0.145	-0.148	0.114	-0.007
	(0.103)	(0.103)	(0.095)	(0.071)
Social Contribution Factor	0.076			
	(0.108)			
Unknown Purpose				-0.248
				(1.105)
Bonus × Unknown Purpose				-0.028
				(0.127)
Constant	6.615***	7.335***	4.802***	6.113***
	(1.493)	(1.287)	(1.087)	(1.077)
Observations	217	217	213	430
R^2	0.134	0.132	0.155	0.141

Note: The table reports OLS regression estimates of agents' effort choices in for-profit treatments with known material returns. The independent variables are the bonus assigned by the principal, principal return factor, social contribution factor, and a dummy for the purpose being unknown. In the pooled specification, the principal return factor enters without interaction. Robust standard errors are in parentheses. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

Table 6: Bonus Choices and Effort Responses when Purpose is Unknown in For-Profit Treatments

	Bonus	Effort
	(1)	(2)
Social Contribution Factor	0.024	
	(0.068)	
Principal Return Factor	0.138**	
	(0.054)	
Unknown Return	0.275	0.647
	(1.076)	(1.079)
Social Contribution Factor × Unknown Return	0.038	
	(0.100)	
Bonus		0.501***
		(0.090)
Bonus × Unknown Return		-0.073
		(0.129)
Constant	5.543***	5.804***
	(0.937)	(0.723)
Observations	426	426
R^2	0.028	0.124

Note: The table reports OLS regression estimates of the principal's bonus assignment and agents' effort choices in the for-profit treatments with unknown purpose, comparing the treatment with unknown material returns to the treatment with known material returns. The independent variables are social contribution factor and principal return factor (column (1)), the bonus assigned by the principal (column (2)), and a dummy for the principal return factor being unknown. Robust standard errors in parentheses. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

with this finding. The difference between the two settings on the principals' side is also statistically significant. In the non-profit setting, the bonus increases more strongly in the social contribution factor when purpose is unknown than when it is known: the slope is larger by 0.335. In the for-profit setting with known material returns, this difference is even slightly negative (−0.112). The gap between the two settings is significant ($p = 0.006$).[14]

One possible interpretation is that, once the principal has a material stake in the task, agents view the bonus primarily as a conventional incentive payment or as a potentially fair share of the principal's return. On this interpretation, attention is directed to the monetary terms of the relationship, leaving less scope for the bonus to communicate social purpose. A related explanation is reciprocity: in the for-profit setting, effort directly benefits the principal financially, so agents can reward a generous bonus by working harder. This is not possible in the non-profit setting, where effort only benefits the charity. Such reciprocal responses would explain the steeper effort-bonus slope in the for-profit setting.

Finally, because there is no evidence for purpose signaling in the for-profit setting even when the principal's return is known, introducing uncertainty about that return does not materially change the pattern (compare Table 6). In the treatment where agents know neither the Social Contribution Factor nor the principal's return, bonuses continue to depend primarily on task profitability, and we find no evidence that agents' bonus sensitivity changes when the principal's return is unknown.

6 Conclusion

Our study investigates how monetary incentives can serve also as signals of social purpose. Our experimental evidence provides support for the model's predictions on the principal side in the non-profit environment: While bonus payments do not depend on the strength of "purpose" (i.e., the social value of the task) when the latter is known, they strongly do so when it is unknown to the agent. Hence, bonuses then carry information about the social value of a task. While higher bonuses lead to higher efforts in both settings, the bonus effect tends to be larger when purpose is unknown (but we acknowledge that this difference is statistically insignificant and smaller than predicted by the model). Agents thus appear to use the information contained in bonuses at most partially.

The for-profit environment reveals an important boundary condition for incentive-based purpose signaling. When effort also generates a monetary return for the principal, bonuses respond strongly to profitability and do not become more sensitive to social value under unknown purpose. In contrast to the prediction based on our signaling model, it is not the

[14] By contrast, the (insignificant) difference in effort-bonus slopes between unknown and known purpose does not differ significantly between the two settings ($p = 0.498$). These tests are based on regressions pooling the non-profit treatments and the for-profit treatments with known material returns, which are reported in Table B8 in Appendix B.

uncertainty about the profitability motive that breaks the signaling logic—it is the presence of a for-profit motive per se even if there is full transparency about this motive. It appears that once the principal has a material stake in the task, attention is directed to the monetary terms of the relationship, leaving less scope for the bonus to communicate social purpose.

Overall, our results imply that incentives can sometimes transmit positive information about social impact, but that this channel is context-dependent. For nonprofits and public-sector organizations, performance pay may reflect underlying purpose when managers are better informed about social impact—although our results suggest that employees may not fully pick up this information. For mission-oriented for-profit firms, by contrast, relying on incentive intensity as an implicit mission signal may fail. Clearer and verifiable communication about purpose may be required to make mission salient and interpretable alongside profitability.

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Appendix A

Proof of Proposition 2:

To characterize equilibria assume for the moment that in equilibrium the agent's conditional expectation is linear such that $E[v|\beta] = h_0 + h_1\beta$. We will show that such an equilibrium with linear beliefs indeed exists. Then the agent's best response is given by

$$e(\beta) = \frac{\beta + (h_0 + h_1\beta)\kappa}{c}.$$

In turn, the principal then maximizes

$$\max_{\beta} (v\kappa - \beta) \frac{\beta + (h_0 + h_1\beta)\kappa}{c}$$

and from the first order condition we obtain that

$$-\frac{\beta + (h_0 + h_1\beta)\kappa}{c} + (v\kappa - \beta)\frac{1 + h_1\kappa}{c} = 0 \Leftrightarrow$$

$$\beta = \frac{v\kappa}{2} - \frac{h_0\kappa}{2(1 + \kappa h_1)}$$

In a perfect Bayesian equilibrium the agent will form rational expectations $E[v|\beta]$ given this best response. We can apply the standard result on the conditional expectation of normally distributed random variables to obtain

$$\begin{aligned}
E[v|\beta] &= m_v + \frac{Cov[v,\beta]}{V[\beta]}(\beta - E[\beta]) \\
&= m_v + \frac{Cov[v, \frac{v\kappa}{2}]}{V[\frac{v\kappa}{2}]}(\beta - E[\beta]) \\
&= m_v + \frac{\frac{\kappa}{2}\sigma_v^2}{\frac{1}{4}\kappa^2\sigma_v^2}(\beta - E[\beta]) \\
&= m_v + \frac{2}{\kappa}\left(\beta - \frac{m_v\kappa}{2} + \frac{h_0\kappa}{2(1 + \kappa h_1)}\right)
\end{aligned}$$

Hence, beliefs are indeed linear in β and in equilibrium we must have that (recall $E[v|\beta] = h_0 + h_1\beta$)

$$h_1 = \frac{2}{\kappa}$$

and

$$h_0 = \frac{h_0}{1 + \kappa h_1}$$

which yields $h_0 = 0$. In this equilibrium we thus must have that the principal chooses a bonus

$$\beta = \frac{v\kappa}{2}$$

and the agent exerts effort

$$e = \frac{\beta + h_1 \beta \kappa}{c} = \frac{3\beta}{c}.$$

■

Proof of Proposition 3:

To characterize equilibria assume again that in equilibrium the agent's conditional expectation takes the following form $E[v|\beta] = h_0 + h_1\beta$. Then the agent's best response is given by

$$e(\beta) = \frac{\beta + (h_0 + h_1\beta)\kappa}{c}.$$

In turn, the principal then maximizes

$$\max_{\beta} (v\kappa + r - \beta) \frac{\beta + (h_0 + h_1\beta)\kappa}{c}$$

and from the first order condition we obtain that

$$\beta = \frac{v\kappa + r}{2} - \frac{h_0\kappa}{2(1 + \kappa h_1)}$$

In a perfect Bayesian equilibrium the agent will form rational expectations $E[v|\beta]$ given this best response. We can apply the standard result on the conditional expectation of normally distributed random variables to obtain

$$\begin{aligned}
E[v|\beta] &= m_v + \frac{Cov[v,\beta]}{V[\beta]}(\beta - E[\beta]) \\
&= m_v + \frac{Cov\left[v, \frac{v\kappa+r}{2}\right]}{V\left[\frac{v\kappa+r}{2}\right]}(\beta - E[\beta]) \\
&= m_v + \frac{\frac{\kappa}{2}\sigma_v^2}{\frac{1}{4}(\kappa^2\sigma_v^2 + \sigma_r^2)}(\beta - E[\beta]) \\
&= m_v + \frac{2\kappa\sigma_v^2}{\kappa^2\sigma_v^2 + \sigma_r^2}\left(\beta - \frac{m_v\kappa + m_r}{2} + \frac{h_0\kappa}{2(1 + \kappa h_1)}\right)
\end{aligned}$$

Hence, beliefs are indeed linear in β and in equilibrium we must have that

$$h_1 = \frac{2\kappa\sigma_v^2}{\kappa^2\sigma_v^2 + \sigma_r^2}$$

and

$$h_0 = m_v + \frac{2\kappa\sigma_v^2}{\kappa^2\sigma_v^2 + \sigma_r^2}\left(-\frac{m_v\kappa + m_r}{2} + \frac{h_0\kappa}{2(1 + \kappa h_1)}\right).$$

Substituting h_1 yields

$$\begin{aligned} h_0 &= m_v + \frac{2\kappa\sigma_v^2}{\kappa^2\sigma_v^2+\sigma_r^2}\left(-\frac{m_v\kappa+m_r}{2}+\frac{h_0\kappa\left(\kappa^2\sigma_v^2+\sigma_r^2\right)}{2(3\kappa^2\sigma_v^2+\sigma_r^2)}\right) \\ &= m_v - \frac{\kappa\sigma_v^2\left(m_v\kappa+m_r\right)}{\kappa^2\sigma_v^2+\sigma_r^2} + h_0\frac{\kappa^2\sigma_v^2}{3\kappa^2\sigma_v^2+\sigma_r^2} \Leftrightarrow \\ h_0\left(1-\frac{\kappa^2\sigma_v^2}{3\kappa^2\sigma_v^2+\sigma_r^2}\right) &= m_v - \frac{\kappa\sigma_v^2\left(m_v\kappa+m_r\right)}{\kappa^2\sigma_v^2+\sigma_r^2} \Leftrightarrow \\ h_0 &= \frac{\sigma_r^2 m_v - \kappa\sigma_v^2 m_r}{\kappa^2\sigma_v^2+\sigma_r^2}\frac{3\kappa^2\sigma_v^2+\sigma_r^2}{2\kappa^2\sigma_v^2+\sigma_r^2} \end{aligned}$$

In this equilibrium we thus must have that

$$\beta = \frac{v\kappa+r}{2} - \frac{h_0\kappa}{2\left(1+\kappa h_1\right)}$$

which by substituting h_0 and h_1 and rearranging terms becomes

$$\beta = \frac{v\kappa+r}{2} - \frac{\left(\frac{\sigma_r^2 m_v-\kappa\sigma_v^2 m_r}{\kappa^2\sigma_v^2+\sigma_r^2}\frac{3\kappa^2\sigma_v^2+\sigma_r^2}{2\kappa^2\sigma_v^2+\sigma_r^2}\right)\kappa}{2\left(1+\kappa\frac{2\kappa\sigma_v^2}{\kappa^2\sigma_v^2+\sigma_r^2}\right)} \Leftrightarrow$$

$$\beta = \frac{v\kappa+r}{2} - \frac{\sigma_r^2 m_v-\kappa\sigma_v^2 m_r}{2\kappa^2\sigma_v^2+\sigma_r^2}\frac{\kappa}{2}.$$

Now note that

$$\begin{aligned} \frac{\partial\beta}{\partial\sigma_r^2} &= -\frac{m_v\left(2\kappa^2\sigma_v^2+\sigma_r^2\right)-\left(\sigma_r^2 m_v-\kappa\sigma_v^2 m_r\right)}{\left(2\kappa^2\sigma_v^2+\sigma_r^2\right)^2}\frac{\kappa}{2} \\ &= -\frac{2\kappa^2\sigma_v^2 m_v+\kappa\sigma_v^2 m_r}{\left(2\kappa^2\sigma_v^2+\sigma_r^2\right)^2}\frac{\kappa}{2} < 0 \end{aligned}$$

and

$$\begin{aligned} \frac{\partial e\left(\beta\right)}{\partial\beta} &= \frac{1+h_1\kappa}{c} \\ &= \frac{1}{c}\left(1+\frac{2\kappa^2\sigma_v^2}{\kappa^2\sigma_v^2+\sigma_r^2}\right) \end{aligned}$$

which is strictly decreasing in σ_r^2 such that

$$\frac{\partial^2 e\left(\beta\right)}{\partial\beta\partial\sigma_r^2} < 0$$

■

Appendix B

Table B1 reports summary statistics for principals' and agents' background characteristics across all five treatments and tests whether these are balanced. Table B2 reports descriptive statistics for the two main outcome variables of the experiment – principals' bonus choices and agents' effort levels – separately by treatment.

As additional robustness checks, Table B3, Table B4, Table B5, Table B6, and Table B7 replicate Table 3, Table 2, Table 4, Table 5, and Table 6 while additionally controlling for gender (a female dummy), age, and charity preferences (the survey measure of willingness to give money for a good cause), and absorbing educational-level fixed effects.

Finally, Table B8 reports the pooled regressions underlying the comparison between the non-profit and the for-profit setting in Section 5.2. Column (1) tests whether the difference in bonus slopes between unknown and known purpose differs between the two settings (the coefficient of the triple interaction). Column (2) tests whether the effort response to the bonus under known purpose differs between the settings, and column (3) whether the difference in effort-bonus slopes between unknown and known purpose differs between the settings.

Table B1: Balance Table: Principal vs Agent across All Treatments

	Non-Profit		For-Profit			
	Unknown Purpose	Known Purpose	Unknown Purpose Unknown Return	Unknown Purpose Known Return	Known Purpose Known Return	p-value
Principal						
Age	43.03	43.19	43.57	41.68	41.87	0.471
	(14.23)	(12.67)	(13.44)	(12.60)	(12.49)	
Good Cause	0.05	0.07	0.02	-0.13	-0.07	0.196
	(1.02)	(0.94)	(1.02)	(1.07)	(1.12)	
Risk Aversion	0.01	0.04	-0.01	-0.05	-0.02	0.935
	(1.00)	(1.00)	(0.96)	(1.06)	(1.06)	
Female	0.51	0.50	0.55	0.46	0.51	0.481
Male	0.48	0.49	0.45	0.52	0.47	0.638
Oth. Gender	0.00	0.01	0.00	0.01	0.02	0.180
< High School	0.00	0.00	0.00	0.00	0.01	0.263
High School	0.10	0.09	0.07	0.10	0.10	0.789
Some College	0.16	0.20	0.19	0.19	0.16	0.739
College or Higher	0.74	0.71	0.74	0.71	0.74	0.862
Native American or American Indian	0.01	0.01	0.00	0.00	0.00	0.602
Asian/Pacific Islander	0.08	0.06	0.08	0.08	0.08	0.848
Black or African American	0.16	0.17	0.17	0.16	0.15	0.987
Hispanic or Latino	0.06	0.04	0.05	0.06	0.06	0.859
White	0.68	0.69	0.67	0.67	0.66	0.983
Other	0.00	0.03	0.02	0.03	0.03	0.308
Agent						
Age	41.68	43.48	41.12	41.47	40.41	0.121
	(12.68)	(12.32)	(11.75)	(12.61)	(12.25)	
Good Cause	0.04	0.10	-0.03	-0.06	0.01	0.504
	(0.95)	(0.98)	(0.96)	(0.98)	(0.94)	
Risk Aversion	-0.09	0.06	0.08	0.02	-0.03	0.348
	(0.98)	(1.00)	(0.96)	(0.99)	(1.01)	
Female	0.52	0.46	0.46	0.47	0.55	0.200
Male	0.46	0.52	0.53	0.51	0.43	0.167
Oth. Gender	0.02	0.02	0.01	0.02	0.02	0.971
< High School	0.01	0.00	0.00	0.02	0.01	0.295
High School	0.10	0.11	0.10	0.10	0.10	0.995
Some College	0.25	0.20	0.20	0.17	0.20	0.399
College or Higher	0.64	0.69	0.70	0.70	0.70	0.561
Native American or American Indian	0.00	0.01	0.00	0.01	0.01	0.826
Asian/Pacific Islander	0.09	0.09	0.06	0.06	0.08	0.410
Black or African American	0.14	0.19	0.15	0.14	0.19	0.329
Hispanic or Latino	0.06	0.06	0.07	0.04	0.06	0.859
White	0.68	0.61	0.70	0.74	0.63	0.032
Other	0.02	0.03	0.02	0.02	0.03	0.794

Note: Cells report means with standard deviations in parentheses; for gender, education, and ethnicity, cells report the share of respondents in each category. The p-value is from a joint Wald test of equality across the five treatment groups, based on a regression of each balance variable on treatment indicators, run separately for principals and agents.

Table B2: Descriptive Statistics for Bonus and Effort by Treatment

	N	Mean	SD	Median	Min	Max
Unknown Purpose						
Bonus	212	7.58	4.51	7.00	0.00	15.00
Effort	212	9.56	5.16	10.00	0.00	20.00
Known Purpose						
Bonus	212	7.17	3.95	7.00	0.00	15.00
Effort	212	10.40	4.71	10.00	0.00	20.00
Unknown Purpose Unknown Return						
Bonus	213	7.90	3.81	7.00	0.00	15.00
Effort	213	9.84	5.19	10.00	0.00	20.00
Unknown Purpose Known Return						
Bonus	213	7.12	3.78	6.00	0.00	15.00
Effort	213	9.37	4.93	10.00	0.00	20.00
Known Purpose Known Return						
Bonus	217	7.93	3.64	8.00	0.00	15.00
Effort	217	10.24	5.47	10.00	0.00	20.00

Note: The table reports the number of observations, mean, standard deviation, median, minimum, and maximum for the principal's bonus and the agent's effort, separately by treatment.

Table B3: Determinants of Bonus Choices in Non-Profit Treatments, with Controls

	Bonus		
	Known Purpose	Unknown Purpose	Pooled
	(1)	(2)	(3)
Social Contribution Factor	-0.074	0.218**	-0.077
	(0.082)	(0.094)	(0.081)
Unknown Purpose			-2.509*
			(1.286)
Unknown Purpose × Social Contribution Factor			0.292**
			(0.123)
Female	-1.051*	0.011	-0.518
	(0.549)	(0.607)	(0.405)
Age	-0.001	-0.002	-0.003
	(0.021)	(0.021)	(0.015)
Good Cause	0.651**	0.614**	0.631***
	(0.282)	(0.309)	(0.207)
Education	x	x	x
Observations	211	212	423
R^2	0.051	0.06	0.054

Note: The table reports OLS regression estimates of the determinants of principals' bonus choices, controlling for the principal's gender (a female dummy), age, and charity preferences (willingness to give money for a good cause), and absorbing educational-level fixed effects. The dependent variable is the principal's chosen bonus level, while the independent variables are social contribution factor and a dummy for the purpose being unknown. Observations in singleton fixed-effect groups are dropped. Robust standard errors in parentheses. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

Table B4: Effort Responsiveness in Non-Profit Treatments, with Controls

	Effort		
	Known Purpose	Unknown Purpose	Pooled
	(1)	(2)	(3)
Bonus	0.248***	0.356***	0.243***
	(0.084)	(0.078)	(0.086)
Unknown Purpose			0.279
			(1.453)
Bonus × Unknown Purpose			0.097
			(0.115)
Social Contribution Factor	0.200**		
	(0.100)		
Female	-0.098	-0.011	-0.011
	(0.682)	(0.701)	(0.486)
Age	0.015	0.004	0.007
	(0.024)	(0.029)	(0.019)
Good Cause	0.485	-0.531	0.001
	(0.414)	(0.344)	(0.278)
Social Contribution Factor × Known Purpose			0.196*
			(0.102)
Education	x	x	x
Observations	211	212	424
R^2	0.077	0.111	0.085

Note: The table reports OLS regression estimates of the determinants of agents' effort choices, controlling for the agent's gender (a female dummy), age, and charity preferences (willingness to give money for a good cause), and absorbing educational-level fixed effects. The dependent variable is the agent's chosen effort level, while the independent variables are bonus assigned by the principal and a dummy for the purpose being unknown. Observations in singleton fixed-effect groups are dropped. In the Known Purpose treatment, the regressions control for the social contribution factor. Robust standard errors in parentheses. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

Table B5: Bonus Choices in For-Profit Treatments with Known Material Returns, with Controls

	Bonus		
	Known Purpose	Unknown Purpose	Pooled
	(1)	(2)	(3)
Social Contribution Factor	0.106	0.023	0.113
	(0.081)	(0.070)	(0.080)
Principal Return Factor	0.219***	0.148**	0.179***
	(0.069)	(0.072)	(0.051)
Unknown Purpose			0.141
			(1.101)
Unknown Purpose × Social Contribution Factor			-0.089
			(0.106)
Female	-0.452	-0.366	-0.378
	(0.513)	(0.514)	(0.354)
Age	-0.000	0.009	0.005
	(0.023)	(0.022)	(0.016)
Good Cause	0.352	-0.218	0.084
	(0.247)	(0.286)	(0.185)
Education	x	x	x
Observations	217	213	430
R^2	0.081	0.031	0.057

Note: The table reports OLS regression estimates of principals' bonus choices in for-profit treatments with known material returns, controlling for the principal's gender (a female dummy), age, and charity preferences (willingness to give money for a good cause), and absorbing educational-level fixed effects. The independent variables are social contribution factor, principal return factor, and a dummy for the purpose being unknown. Robust standard errors in parentheses. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

Table B6: Effort Responses with Known Material Returns, with Controls

	Effort			
	Known Purpose		Unknown Purpose	Pooled
	(1)	(2)	(3)	(4)
Bonus	0.527***	0.534***	0.479***	0.525***
	(0.096)	(0.095)	(0.093)	(0.092)
Principal Return Factor	-0.104	-0.106	0.111	0.006
	(0.103)	(0.103)	(0.095)	(0.071)
Social Contribution Factor	0.064			
	(0.109)			
Unknown Purpose				-0.152
				(1.110)
Bonus × Unknown Purpose				-0.041
				(0.127)
Female	-0.539	-0.550	-0.796	-0.707
	(0.729)	(0.725)	(0.665)	(0.491)
Age	0.011	0.012	0.006	0.008
	(0.028)	(0.028)	(0.023)	(0.018)
Good Cause	0.788*	0.782*	0.573*	0.682***
	(0.408)	(0.411)	(0.311)	(0.256)
Education	x	x	x	x
Observations	217	217	213	430
R^2	0.174	0.172	0.173	0.166

Note: The table reports OLS regression estimates of agents' effort choices in for-profit treatments with known material returns, controlling for the agent's gender (a female dummy), age, and charity preferences (willingness to give money for a good cause), and absorbing educational-level fixed effects. The independent variables are bonus assigned by the principal, principal return factor, social contribution factor, and a dummy for the purpose being unknown. Robust standard errors in parentheses. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

Table B7: Bonus Choices and Effort Responses when Purpose is Unknown in For-Profit Treatments, with Controls

	Bonus	Effort
	(1)	(2)
Social Contribution Factor	0.028	
	(0.068)	
Principal Return Factor	0.138**	
	(0.054)	
Unknown Return	0.335	0.568
	(1.080)	(1.076)
Social Contribution Factor × Unknown Return	0.028	
	(0.101)	
Bonus		0.493***
		(0.089)
Bonus × Unknown Return		-0.068
		(0.129)
Female	-0.167	-0.721
	(0.369)	(0.460)
Age	0.029**	-0.012
	(0.014)	(0.019)
Good Cause	-0.025	0.572**
	(0.194)	(0.252)
Education	x	x
Observations	426	426
R^2	0.04	0.139

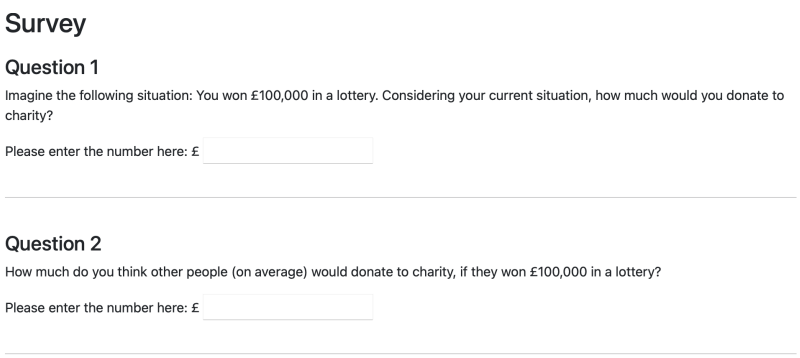
Note: The table reports OLS regression estimates of the principal's bonus assignment and agents' effort choices in for-profit treatments with unknown material returns, controlling for gender (a female dummy), age, and charity preferences (willingness to give money for a good cause), and absorbing educational-level fixed effects (principal characteristics in column (1), agent characteristics in column (2)). The sample consists of the for-profit treatments with unknown purpose. The independent variables are social contribution factor, principal return factor, bonus assigned by the principals (for agents only), and a dummy for the principal return factor being unknown. Robust standard errors in parentheses. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

Table B8: Comparing Non-Profit and For-Profit Settings with Known Material Returns

	Bonus	Effort	
	All Treatments	Known Purpose	All Treatments
	(1)	(2)	(3)
Unknown Purpose × Social Contribution Factor × For-Profit	-0.446***		
	(0.160)		
Bonus × Unknown Purpose × For-Profit			-0.118
			(0.174)
Bonus × For-Profit		0.306**	0.278**
		(0.125)	(0.126)
Unknown Purpose × Social Contribution Factor	0.335***		
	(0.124)		
Bonus × Unknown Purpose			0.099
			(0.117)
Social Contribution Factor	-0.089	0.189*	
	(0.080)	(0.102)	
Bonus		0.242***	0.242***
		(0.085)	(0.085)
Unknown Purpose	-2.953**		0.214
	(1.293)		(1.437)
For-Profit	-3.362***	-0.143	-1.399
	(1.273)	(1.940)	(1.839)
Principal Return Factor	0.178***	-0.145	-0.006
	(0.051)	(0.103)	(0.071)
Unknown Purpose × For-Profit	3.379**		0.280
	(1.676)		(2.022)
Social Contribution Factor × For-Profit	0.229**	-0.114	
	(0.111)	(0.148)	
Social Contribution Factor × Known Purpose			0.189*
			(0.102)
Social Contribution Factor × Known Purpose × For-Profit			-0.109
			(0.148)
Constant	8.067***	6.758***	6.758***
	(0.872)	(1.240)	(1.238)
Observations	854	429	854
R^2	0.034	0.102	0.114

Note: The table reports the OLS regressions underlying the comparison of the non-profit and the for-profit setting in Section 5.2, pooling the non-profit treatments and the for-profit treatments with known material returns. Column (1) reports principals' bonus choices, columns (2) and (3) agents' effort choices. Column (2) uses the two Known Purpose treatments only. The principal return factor is set to zero in the non-profit treatments. In column (3), the social contribution factor enters only in the Known Purpose treatments, where it is observed by agents. Robust standard errors in parentheses. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

Appendix C



Survey

Question 1

Imagine the following situation: You won £100,000 in a lottery. Considering your current situation, how much would you donate to charity?

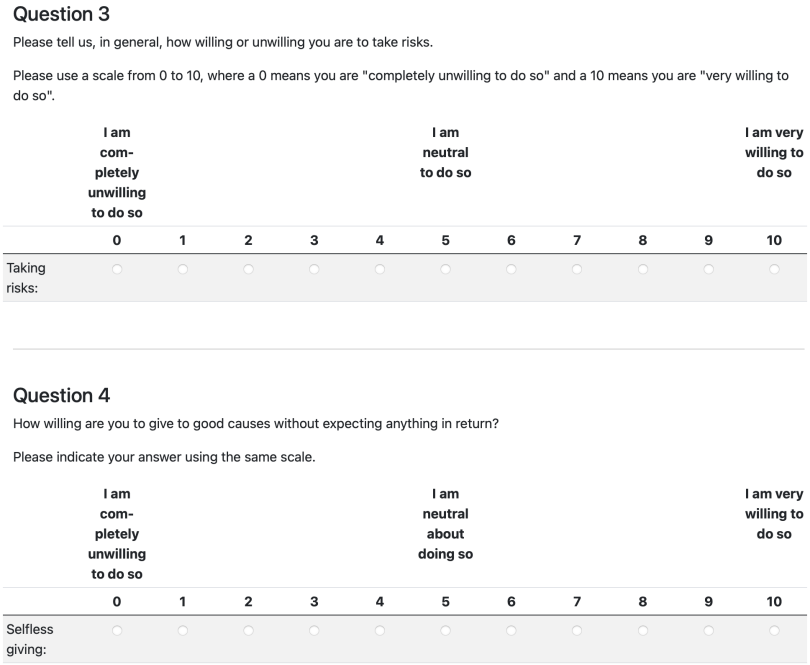
Please enter the number here: £

Question 2

How much do you think other people (on average) would donate to charity, if they won £100,000 in a lottery?

Please enter the number here: £

Figure C1: Screen Survey Questions about Willingness to Donate



Question 3

Please tell us, in general, how willing or unwilling you are to take risks.

Please use a scale from 0 to 10, where a 0 means you are "completely unwilling to do so" and a 10 means you are "very willing to do so".

	I am completely unwilling to do so					I am neutral to do so					I am very willing to do so
	0	1	2	3	4	5	6	7	8	9	10
Taking risks:	○	○	○	○	○	○	○	○	○	○	○

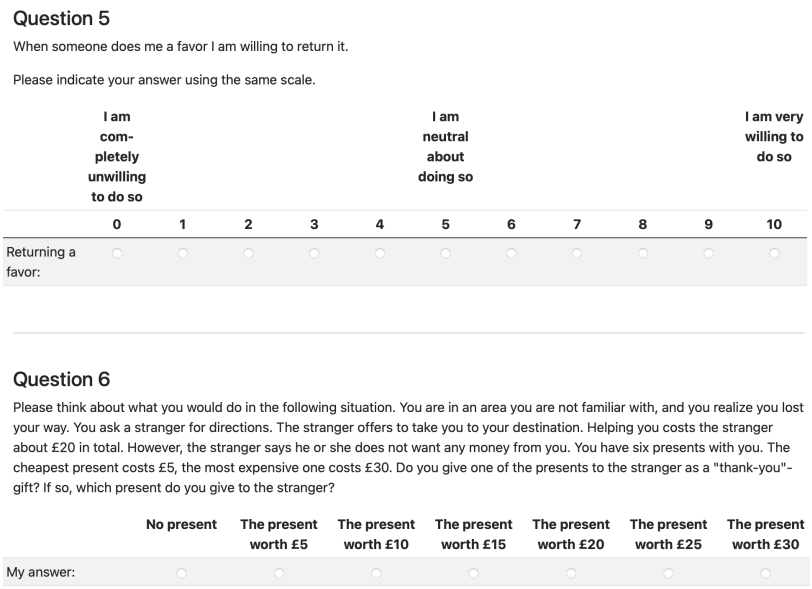
Question 4

How willing are you to give to good causes without expecting anything in return?

Please indicate your answer using the same scale.

	I am completely unwilling to do so					I am neutral about doing so					I am very willing to do so
	0	1	2	3	4	5	6	7	8	9	10
Selfless giving:	○	○	○	○	○	○	○	○	○	○	○

Figure C2: Screen Survey Questions about Risk and Giving to a Good Cause



Question 5

When someone does me a favor I am willing to return it.

Please indicate your answer using the same scale.

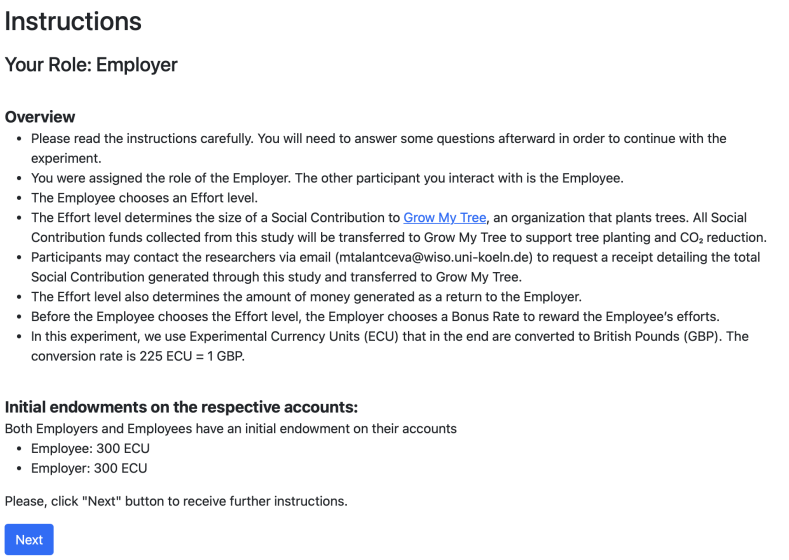
	I am completely unwilling to do so					I am neutral about doing so					I am very willing to do so
	0	1	2	3	4	5	6	7	8	9	10
Returning a favor:	○	○	○	○	○	○	○	○	○	○	○

Question 6

Please think about what you would do in the following situation. You are in an area you are not familiar with, and you realize you lost your way. You ask a stranger for directions. The stranger offers to take you to your destination. Helping you costs the stranger about £20 in total. However, the stranger says he or she does not want any money from you. You have six presents with you. The cheapest present costs £5, the most expensive one costs £30. Do you give one of the presents to the stranger as a "thank-you"-gift? If so, which present do you give to the stranger?

	No present	The present worth £5	The present worth £10	The present worth £15	The present worth £20	The present worth £25	The present worth £30
My answer:	○	○	○	○	○	○	○

Figure C3: Screen Survey Questions about Returning Favors and Gifts



Instructions

Your Role: Employer

Overview

- Please read the instructions carefully. You will need to answer some questions afterward in order to continue with the experiment.
- You were assigned the role of the Employer. The other participant you interact with is the Employee.
- The Employee chooses an Effort level.
- The Effort level determines the size of a Social Contribution to Grow My Tree, an organization that plants trees. All Social Contribution funds collected from this study will be transferred to Grow My Tree to support tree planting and CO_2 reduction.
- Participants may contact the researchers via email (mtalantceva@wiso.uni-koeln.de) to request a receipt detailing the total Social Contribution generated through this study and transferred to Grow My Tree.
- The Effort level also determines the amount of money generated as a return to the Employer.
- Before the Employee chooses the Effort level, the Employer chooses a Bonus Rate to reward the Employee's efforts.
- In this experiment, we use Experimental Currency Units (ECU) that in the end are converted to British Pounds (GBP). The conversion rate is 225 ECU = 1 GBP.

Initial endowments on the respective accounts:

Both Employers and Employees have an initial endowment on their accounts

- Employee: 300 ECU
- Employer: 300 ECU

Please, click "Next" button to receive further instructions.

Next

Figure C4: Screen Instructions Introduction

Instructions: Task

Your Role: Employer

The Employee will choose a (costly) Effort level.

This Effort level will determine:

- the Employer Return and,
- the size of the Social Contribution generated for the organization Grow My Tree.

Before the Employee chooses the Effort level, the Employer decides how to reward these Efforts by choosing a Bonus Rate.

To be precise, the Effort level determines:

- the Employer Return, which will be paid to the Employer's account:
  Employer Return = Employee's Effort × Employer Return Factor
- the Social Contribution generated for the organization Grow My Tree:
  Social Contribution = Employee's Effort × Social Contribution Factor
- the Bonus the Employee receives from the Employer, which will be subtracted from the Employer's account and paid to the Employee's account:
  Bonus = Employee's Effort × Bonus Rate

Note: The Social Contribution will not be paid by the Employer. The higher the Employee's chosen Effort Level and the higher the Social Contribution Factor, the higher will be the Social Contribution paid by us (the University of Cologne) to Grow My Tree.

Please, click "Next" button to receive further instructions.

Next

Figure C5: Screen Instructions Task Overview

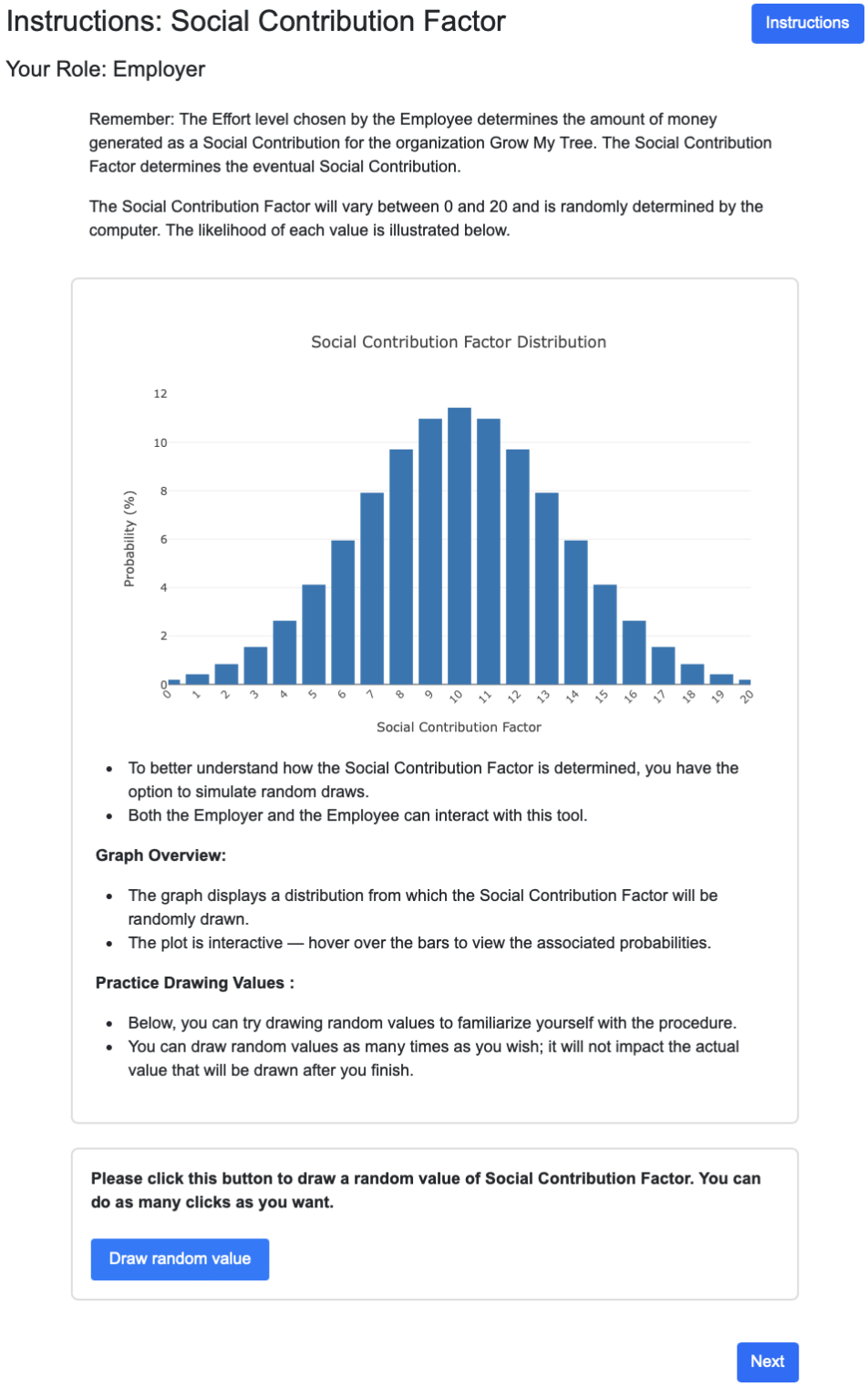


Figure C6: Screen Instructions Social Contribution Factor

Instructions: Your Task

Your Role: Employer

The Employer:

- The Employer will learn the Social Contribution Factor which, as described earlier, is chosen randomly by the computer. The Social Contribution Factor determines the extent to which the Employee can generate Social Contributions based on their Effort choice.
- The Employer will also learn the Employer Return Factor that, as described before, is also chosen randomly by the computer. The Employer Return Factor will determine the extent to which the Employee generates returns to the Employer with the Effort choice.
- **The Employer will then choose a Bonus Rate within a range from 0 ECU to 15 ECU.** This Bonus Rate determines the size of a bonus payment from the Employer to the Employee and can serve as a tool to reward the Employee's Effort choice.
- It is important to keep in mind that
  - the Social Contribution Factor is determined by the computer,
  - the Employer Return Factor is determined by the computer,
  - the Bonus Rate is chosen by the Employer,
  - the Employer Return is NOT subtracted from the Employee's account,
  - the Social Contribution is NOT subtracted from either the Employee's or the Employer's account.

The Employee:

- The Employee learns the Bonus Rate chosen by the Employer and the exact value of the Social Contribution Factor as well as Employer Return Factor, both randomly selected by the computer.
- **The Employee chooses an Effort level between 0 and 20 in increments of 1.**
- Higher Effort levels result in higher costs for the Employee, which are subtracted from this Employee's account.
- The costs incurred for each level of Effort are displayed in the following cost table:

Cost of Effort

Effort	Costs
0	0.0
1	0.5
2	2.0
3	4.5
4	8.0
5	12.5
6	18.0
7	24.5
8	32.0
9	40.5
10	50.0
11	60.5
12	72.0
13	84.5
14	98.0
15	112.5
16	128.0
17	144.5
18	162.0
19	180.5
20	200.0

Please, click "Next" button to receive further instructions.

Next

Figure C7: Screen Instructions Task Description

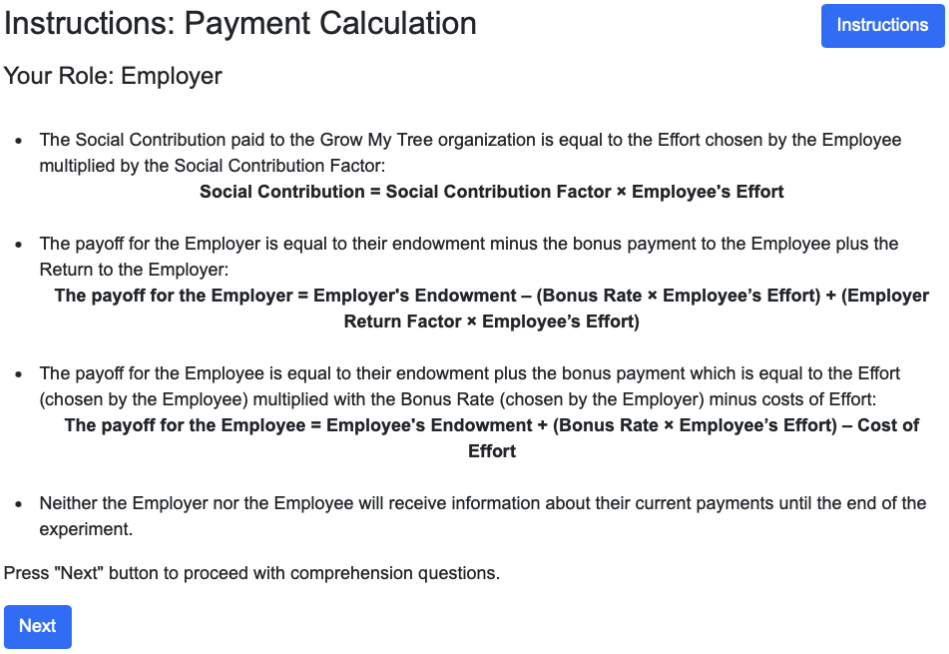


Figure C8: Screen Instructions Payments