# Prosocial Managers, Employee Motivation, and the Creation of Shareholder Value

Kajackaite, Agne; Sliwka, Dirk

Veröffentlichungsversion / Published Version
Arbeitspapier / working paper

**Zur Verfügung gestellt in Kooperation mit / provided in cooperation with:**
Wissenschaftszentrum Berlin für Sozialforschung (WZB)

**Empfohlene Zitierung / Suggested Citation:**
Kajackaite, A., & Sliwka, D. (2018). *Prosocial Managers, Employee Motivation, and the Creation of Shareholder Value.* (IZA Discussion Paper, 11789). Bonn: Institute of Labor Economics (IZA). https://hdl.handle.net/10419/185249

Kajackaite, Agne; Sliwka, Dirk

**Working Paper**

# Prosocial Managers, Employee Motivation, and the Creation of Shareholder Value

IZA Discussion Papers, No. 11789

**Provided in Cooperation with:**
IZA – Institute of Labor Economics

Suggested Citation: Kajackaite, Agne; Sliwka, Dirk (2018) : Prosocial Managers, Employee Motivation, and the Creation of Shareholder Value, IZA Discussion Papers, No. 11789, Institute of Labor Economics (IZA), Bonn

This Version is available at:
http://hdl.handle.net/10419/185249

I Z A Institute
of Labor Economics
Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 11789

# Prosocial Managers, Employee Motivation, and the Creation of Shareholder Value

Agne Kajackaite
Dirk Sliwka

AUGUST 2018

I Z A Institute
of Labor Economics

Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 11789

# Prosocial Managers, Employee Motivation, and the Creation of Shareholder Value

**Agne Kajackaite**
*WZB Berlin Social Science Center*

**Dirk Sliwka**
*University of Cologne, CESifo and IZA*

AUGUST 2018



**IZA – Institute of Labor Economics**

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

# ABSTRACT

## Prosocial Managers, Employee Motivation, and the Creation of Shareholder Value

Milton Friedman has famously claimed that the responsibility of a manager who is not the owner of a firm is "to conduct the business in accordance with their [the shareholders'] desires, which generally will be to make as much money as possible." In this paper we argue that when contracts are incomplete it is not necessarily in the interest even of money maximizing shareholders to pick a manager who pursues this goal. We show in a formal model and in a series of lab experiments that choosing a manager who has a preference to spend resources for social causes can increase employee motivation. In turn, ex-post losses in shareholder value may be offset by ex-ante gains in performance through higher employee motivation.

**JEL Classification:** C91, D03, D21, J33, M52

**Keywords:** shareholder value, corporate social responsibility, incentives, motivation, experiment

**Corresponding author:**
Dirk Sliwka
University of Cologne
Albertus-Magnus-Platz
50923 Cologne
Germany
E-mail: dirk.sliwka@uni-koeln.de

# 1 Introduction

Milton Friedman has famously argued that manager's responsibility is "*to conduct the business in accordance with their [the shareholders'] desires, which generally will be to make as much money as possible*..." Friedman's key argument was that if a manager who is not the owner of a company uses company resources for causes that do not generate value for the shareholders, he is *"spending someone else's money for a general social interest*" (Friedman, 1970). In his view, it is – if anything – the duty of the shareholders themselves to spend their own money for social causes.

In this paper we argue that shareholders who are interested merely in maximizing shareholder value (such that they share Friedman's goal ex-post) should not necessarily pick a manager who pursues this goal. From an ex-ante perspective, it may well be in their interest to employ a manager who cares for social causes, because doing so will motivate employees. In line with Friedman's argument, this indeed may be costly to shareholders ex-post. But even selfish money maximizing shareholders will ex-ante benefit from having more motivated employees.

In particular, we investigate theoretically and experimentally a situation where an owner of a firm can choose between different types of managers, i.e. those that are selfishly interested in a pure shareholder value maximization and others that are also interested to benefit social causes. We show in a formal model and three lab experiments, that *ex-post* shareholder value is always higher when a money maximizing manager executes residual control rights. Yet, this does not always hold true from an *ex-ante* perspective when contracts are incomplete and the firm employs workers who anticipate how the firm's resources are spent. In this case, our model shows that choosing a manager with a social interest (contributing to a "larger objective") can serve as a commitment device that raises employee motivation. That is, ex-post losses in shareholder value can be offset by motivational gains ex-ante.

Bénabou and Tirole (2009) distinguish *"win-win" corporate social responsibility* encompassing social activities that in fact serve shareholder interest[1] from *insider-initiated corporate philanthropy* that can be driven by genuine social concerns of management but generates losses

[1] This is what Baron (2001) calls "Strategic CSR", i.e. CSR activities that for instance serve to attract customers and strengthen a firm's market position.

in shareholder value. Borrowing this notion, we thus argue that hiring a manager who is genuinely interested in (costly) insider initiated corporate philanthropy in fact can help to generate win-win CSR for shareholders in the longer term.

In essence, our argument is that shareholder value maximization – even when it is a legitimate objective of controlling shareholders – may not be a sensible objective for managers who execute control rights. A manager who too narrowly follows this goal may simply not inspire her workforce sufficiently. This argument is also reflected in thoughts put forward by Jack Welch, the former CEO of General Electric (sometimes regarded as the "father of the shareholder value movement"), in an interview with the Financial Times (FT 13 Mar 2009) long after his retirement. According to Jack Welch, "*the emphasis executives and investors had put on shareholder value* [..] *was misplaced*" and "*managers and investors should not set share price increases as their overarching goal*. [..] *On the face of it, shareholder value is the dumbest idea in the world*. [..] *Shareholder value is a result, not a strategy . . . Your main constituencies are your employees, your customers and your products.*".

After formalizing this idea in a theoretical model, we first analyze descriptive field data to study the association between employer's social engagement and employee motivation. We use a linked employer-employee data set generated on behalf of the German Federal Ministry of Labor. This is a rich data set with survey responses by 6.557 employees in 947 establishments and contains information about management practices and an employee level survey on attitudes and personality. We indeed find that employees display significantly higher levels of engagement when they perceive their employer to be more charitable.

We then study the *causal* behavioral effect of choosing a prosocial manager on (i) employees motivation and (ii) ex-post value creation in a series of lab experiments. In the experiments, participants first receive an endowment and are asked to decide how much of it they want to donate to a renowned charity. After that, participants are randomly assigned to groups of three – "companies" – and have a role of an owner, employee or manager. Subjects in the role of managers are classified as either "low donors" or "high donors", depending on their previous donation decision. Each subject in the role of an employee receives an initial endowment and decides how much effort to spend in order to generate "resources of the company". Agents are also informed that in the subsequent stage of the experiment their assigned manager would decide

how to use these resources. The allocation decision that the manager has to make is what share of the resources to invest in a social cause (generating donations for "Doctors without Borders"). The remainder of resources is used to generate profits which are split between the owner and manager.

We find that subjects in the role of employees exert more effort when the respective manager is a "high donor". Hence, knowing that the person who will decide on the use of the resources is prosocial is motivating. The managers who are "high donors" then again invest more of the resources to generate charitable donations which – conditional on the resources generated by the employee – leads to lower profits ex-post. However, in our experiments these ex-post losses are fully offset by ex-ante gains in employee motivation such that the "shareholder value" generated is *not reduced* when a prosocial manager is in place. Moreover, overall efficiency is *significantly larger* with a prosocial manager as significantly more donations are generated without lowering profits.

In additional experiments, we show the results hold in a real-effort environment (Experiment 2) and in an extended game in which an owner can actively choose a manager (Experiment 3). In the latter experiment, we implement a matching mechanism in which owners state their preference for a manager's type and then managers are allocated to owners if there is a sufficient supply of the desired type. By applying the strategy method we make use of this assignment mechanism to study motivational reactions not only to the type of the manager but also to the revealed preferences of the owner. We find that more effort is exerted if the owner had a preference to employ a prosocial manager even if the actually assigned manager is not prosocial. In other words, the motivational effects on employees are not driven by a *consequentialist motive* alone ("The resources generated by me will be well spent") but also by a *deontological one* ("The party who held the decision rights was well intentioned when picking the person deciding on the allocation of resources").

In a recent contribution Hart and Zingales (2017) critically discuss Friedman's arguments from a different angle. They explore a setting in which shareholders may care for social causes but take these concerns into account only when being pivotal in decisions relevant to these social causes. They show that in such a setting the market value of a firm (i.e. the monetary shareholder value) does not fully reflect the welfare of shareholders. Hence, while Hart and Zingales show that

socially concerned shareholders may not be well represented by shareholder value maximizing managers, we argue that even money maximizing shareholders may not be well represented by shareholder value maximizing managers.

Our paper also contributes to a growing literature on social incentives and employee motivation. In lab experiments, Tonin and Vlassopoulus (2015) show that social incentives (i.e., a piece rate or a fixed donation transferred to a charity) lead to a rise in productivity but are not as effective as monetary incentives in motivating workers. Imas (2014) and Charness et al. (2016) also compare monetary and social incentives in a form of a piece rate to a charity and find that social incentives work better when the stakes are low but are not more effective than monetary incentives when the stakes are high. Koppel and Regner (2014) analyze the effect of CSR on the agents' effort in an experimental gift-exchange game and find that agents' efforts increase according to the share of profit that principals donate to the charity. Similarly, Cassar (forthcoming) shows that in a gift-exchange game agents are motivated by a principal's piece-rate donation to exert more effort. Kajackaite and Sliwka (2017) show that agents exert higher efforts when principals ex-ante had donated to charitable cause and identify that reciprocal altruism is the key behavioral driver. Furthermore, our paper relates to the literature on motivated agents and working for a mission (see, for instance Besley and Ghatak (2005) and Delfgaauw and Dur (2008)).

The previous literature mainly concentrated on whether agents' motivation can be enhanced by a prosocial activity of the principal in two tier principal agent settings. We study a three tier structure and show that even a selfish owner may prefer to let a prosocial manager decide on the allocation of surplus in a firm as this serves a commitment device to motivate employees.

The paper is organized as follows: In sections 2, we describe theoretical predictions. Section 3 reports results from the field data. In sections 4-6, we describe experimental design and results from laboratory experiments. In section 7, we conclude.

# 2 A Model

## 2.1 The Set-Up

Consider a model where an owner/shareholder $S$ of a company has to decide what kind of manager $M$ to employ. Managers are characterized by their type $\theta_M \in [0,1]$ which determines the extent to which they care for social concerns that are beyond the material interest of the firm. The

firm employs an agent who observes the type of the selected manager and then decides on how much effort $e \in [0, \overline{e}]$ to invest at private costs $e^{\eta}$ (with $\eta > 1$), which determines the amount of "resources" available to the firm $r = k \cdot e$. The manager then decides on an amount $g$ of these resources that is donated for a social cause (or is, for instance, spent on unobserved customer benefits). The welfare gain generated from a charitable investment of $g$ is equal to $B(g) = \sqrt{g}$. The remainder is invested in a technology generating a shareholder return of $\Pi(r, g) = \sqrt{r - g}$. The manager owns a share $\beta_M$ of stocks such that her payoff is given by

$$\beta_M \Pi(r, g) + \theta_M \cdot B(g).$$

Shareholders $S$ are purely interested in maximizing shareholder value

$$(1 - \beta_M) \cdot \Pi(r, g).$$

Agents are also characterized by their type $\theta_A$ which determines the extent to which they care for social concerns that are beyond the material interest of the firm. An employee's utility function is

$$\theta_A \cdot B(g) - c(e).$$

## 2.2 Donations and Incentives

After the agent has exerted her efforts a manager of type $\theta_M$ maximizes

$$\max_g \beta_M \sqrt{ke - g} + \theta_M \cdot \sqrt{g}.$$

Solving this optimization problem yields the following result:

**Proposition 1.** *The amount donated to a charity by a manager*

$$g(\theta_M, e) = \frac{\theta_M^2}{\beta_M^2 + \theta_M^2} ke$$

*is strictly increasing in her type $\theta_M$ and the effort $e$ exerted by the agent.*

**Proof:** See Appendix.

The manager thus trades-off personal gain and charitable giving. A more prosocial manager donates a larger share of the generated resources $ke$ to the charity. But this share is decreasing in the size of the bonus $\beta_M$.

The agent now anticipates the manager's behavior and an agent with social concerns $\theta_A$ maximizes

$$\begin{aligned} \max_{e_i} \quad & \theta_A \cdot \sqrt{g(\theta_M, e)} - e^{\eta} \\ s.t. \quad & e \in [0, \overline{e}], \end{aligned}$$

which leads to the following:

**Proposition 2.** *The efforts of an agent of type $\theta_A$ when working for a manager of type $\theta_M$ are*

$$e = min\left\{\left(\frac{\theta_A \theta_M}{\sqrt{\beta_M^2 + \theta_M^2}} k \frac{1}{2\eta}\right)^{\frac{2}{2\eta-1}}, \overline{e}\right\}$$

*Prosocial agents work harder when the firm employs a prosocial manager. If the upper bound of effort $\overline{e}$ is sufficiently large there is a complementarity between the manager's and agent's type, i.e. prosocial agents work the harder, the more prosocial the manager's type.*

**Proof:** See Appendix.

Hence, employing a prosocial manager can be an incentive device: it serves as a commitment that the efforts of the agent are used also for a cause valued by the agent. Moreover, as long as there is an internal solution (i.e. the agent works less than his full capacity) there is a complementarity between the agent's and the manager's degree of prosocial inclinations: the benefit of having a prosocial manager is higher when the agent is more prosocial.

Finally, we can explore the effect on expected shareholder returns

$$(1 - \beta_M)\Pi(r, g) = (1 - \beta_M)\Pi\left(e(\theta_A, \theta_M)k, g\big(\theta_M, e(\theta_A, \theta_M)\big)\right).$$

Note that there is a clear trade-off: a prosocial manager induces higher incentives ex-ante as $e(\theta_A, \theta_M)$ is increasing in $\theta_M$ but also lower shareholder returns ex-post (i.e. for a fixed level of effort) as the partial derivative $\frac{\partial g(\theta_M, e)}{\partial \theta_M} > 0$. It turns out, that shareholder value is a non-monotonic function of the managers degree of prosocial preferences:

**Proposition 3.** *Expected shareholder returns are inversely U-shaped in the prosociality of the manager $\theta_M$.*

**Proof:** See Appendix.

Hence, the model implies the following hypotheses:

**Hypothesis 1.** *Agents work harder when managers are more prosocial, and this effect is stronger for more prosocial agents.*

**Hypothesis 2.** *Prosocial managers spend a larger share of profits on charitable causes.*

**Hypothesis 3.** *Shareholder value is inversely U-shaped in the degree of the manager's prosocial inclinations.*

In the following, we first provide descriptive field evidence for the first hypothesis and then test all three hypotheses in a series of lab experiments.

## 3 Descriptive Field Evidence

To test the first hypothesis, we use descriptive field evidence from a linked employer-employee data set generated on behalf of the German Federal Ministry of Labor, the Linked Personnel Panel (LPP).[2] The data set comprises a representative firm level survey on the use of management practices and an employee level survey on attitudes and personality. In our analyses, we use two most recent 2014 and 2016 waves which include an employee-level assessment of the firm's prosocial activities. It leads us to a rich data set with survey responses by 6.557 employees in 947 establishments. While the sample of surveyed employees changes between the two waves, we have survey responses from a subset of 1.363 employees for both waves such that we can also estimate panel regressions for this subset.

The dependent variable in our analyses is *Employee Engagement*. It is a common psychological construct used to measure an employee's level of personal investment in the tasks performed on a job (see, for instance, Christian et al., 2011). The panel we use contains a nine-item version of the Utrecht Work Engagement Scale – one of the most widely used psychological scales to measure work engagement (Schaufeli et al., 2002; Schaufeli and Bakker, 2004). Some sample items are: *"I am enthusiastic about my job", "My job inspires me", "I feel happy when I am working intensely", and "I am immersed in my work"*.

[2] See, for instance, Kampkötter et al. (2016) for a detailed overview of the data set.

The independent variables we use are *Perceived Prosocial Activity* and *Altruism*. *Perceived Prosocial Activity* measures to what extent the employees find their employers to be engaged in social and charitable activities. The item the LPP uses is the following: "*Management also supports charitable and socially valuable projects outside of the firm*". The variable *Altruism* measures the altruism of employees. The item on altruism reads "*How would you rate your personal willingness to share with others without getting something in return?*"[3] This item is similar to the experimentally validated survey item in Falk et al. (2016).

We report the regression results in Table 1. Note that both, altruism and perceived prosocial activity are standardized variables with mean zero and standard deviation 1. In Columns (1), (2), (4) and (5), we report OLS regression results, and in Columns (3) and (6) fixed effects regression results. In line with Hypothesis 1, employees display significantly higher levels of engagement when they perceive their employer to be more charitable. The regressions also show that employee engagement is higher for more altruistic employees. Finally, as columns (2) and (5) show, the interaction term between altruism and perceived prosocial activity is strictly positive and highly significant. That is, in line with Hypothesis 1, the regressions suggest that the more altruistic the employees, the stronger their work engagement is affected by the employers' prosocial activities.

[3] All personality measures such as the item assessing altruism are asked only once. In each wave new responds are added to the survey to replace employees that were not available for an interview. Each time a new respondent is sampled, responses to the personality are collected.

**Table 1:** Engagement, altruism and perceived social activities

| | (1) OLS | (2) OLS | (3) FE | (4) OLS | (5) OLS | (6) FE |
|---|---|---|---|---|---|---|
| Altruism (std.) | 0.141*** | 0.143*** | | 0.138*** | 0.140*** | |
| | (0.0142) | (0.0141) | | (0.0146) | (0.0145) | |
| Perceived prosocial activity (std.) | 0.150*** | 0.150*** | 0.00756 | 0.155*** | 0.154*** | -0.00631 |
| | (0.0135) | (0.0133) | (0.0207) | (0.0135) | (0.0135) | (0.0224) |
| Altruism x Perceived prosocial activity (std.) | | 0.0469*** | 0.0378** | | 0.0451*** | 0.0382* |
| | | (0.0132) | (0.0189) | | (0.0131) | (0.0222) |
| Employee controls | No | No | No | Yes | Yes | Yes |
| Establishment controls | No | No | No | Yes | Yes | No |
| Employee fixed effects | No | No | Yes | No | No | Yes |
| Observations | 7912 | 7912 | 7920 | 7063 | 7063 | 7186 |
| $R^2$ | 0.046 | 0.049 | 0.008 | 0.100 | 0.102 | 0.015 |

*Notes:* The dependent variable is employee engagement (standardized). Robust standard errors clustered on establishment in parentheses. Wave 2016 dummy included. Employee controls are dummies for white collar worker, manager, part time work, performance pay, recent promotion, highest educational degree, highest vocational degree, wage, age, and gender. Establishment controls are dummies for industry, region, establishment size and ownership. * p<0.10, ** p<0.05, *** p<0.01

In addition to the main analyses, columns (3) and (6) report results from fixed effects regressions in which we estimate to what extent changes in employees' perceptions about the employer's charitable activities predict changes in their work engagement. We have data from 1.363 employees who were asked the *Perceived Prosocial Activity* question in both waves. While we do not observe that changes in perceptions about the employer's charitable activities predict changes in engagement for average employees (i.e. at the mean of the altruism measure), we find a significantly positive interaction term *Altruism* × *Perceived Prosocial Activity* in a similar order of magnitude as in the OLS regressions. Hence, for more altruistic employees an increase in perceived social activities of the employer are associated with an increase in work engagement.

Put together, the descriptive evidence is in line with Hypothesis 1. However, while the fixed effects regression can rule out that the result is driven by time constant unobserved variables that at the same time affect Employee Engagement and Perceived Prosocial Activity, they of course do not provide clean evidence on causal behavioral mechanisms and may suffer from attenuation bias. Furthermore, the observational data we have is not suited for testing Hypotheses 2 and 3 as

the data set so far does not include financial performance metrics. To explore the behavioral mechanisms and its implications on performance in more detail, in the next steps, we test all three hypotheses in a series of lab experiments.

# 4 Experiment 1: Chosen Effort and Exogenous Manager Assignment

In Experiment 1, we study the extent to which information about a manager's prosocial behavior affects employees' motivation. In order to do so, we study a simple stylized lab experiment which we later extend to investigate the robustness of the results in a real-effort setting in Experiment 2 and to study further behavioral channels in Experiment 3.

## 4.1 Experimental Design

The game we used consisted of several stages and was played only once. At the beginning of the experiment, all participants received 25 ECU (1 ECU = 0.10 EUR) and were asked to decide how much of it they want to donate to the charity "Médecins sans Frontières". They could choose a donation $d \in \{0,1,..,25\}$.[4] At this stage, the participants did not know anything about the rest of the experiment, except that there will be a second stage.

After participants made the donating decision, they received instructions for the rest of the experiment. Participants were randomly assigned to groups of three – "companies" – and had a role of either an "owner", "employee" or "manager". The owners had no decision to make. The managers were classified as either LD (low-donation) or HD (high-donation) - types, depending on their previous donating decisions, and were informed about their own type as well as the assignment procedure.[5] If a manager had donated as much or more than the median player in previous pilot sessions (the median was equal to 5) she was assigned to the group HD and if she donated less, to the group LD.[6]

In the next stage, each subject in the role of an employee received an initial endowment of 100 ECU and was asked to decide how much "effort" $e \in \{1,..,100\}$ to spend in order to generate what we called "resources of the company". Employees were also informed that in the subsequent stage of the experiment their assigned manager would decide on the use of these

[4] The organization "Médecins sans Frontières" is a renowned charity which received the Nobel Peace Prize in 1999.
[5] We did not frame the managers as low/high-donation types but called them managers of type X and type Y in the instructions explaining in detail the classification procedure.
[6] The participants in the experiment do not know that the median is 5. We ran 3 pilot sessions to set the median.

resources. After that, managers decided about the share of resources $x$ they wanted to invest into the generation of profits/shareholder value. The remaining share of resources $1 - x$ was invested into a technology which generated money for the charity (again "Médecins sans Frontières"). The specific payoff functions were

$$\pi_M = 0.5 * \sqrt{x * 1000 * e},$$
$$\pi_O = 0.5 * \sqrt{x * 1000 * e},$$
$$\pi_C = \sqrt{(1 - x) * 1000 * e},$$
$$\pi_E = 100 - e,$$

for manager, owner, charity and employee, respectively. We used the strategy method (Selten, 1967) for agents' choices in this experiment, i.e. we asked subjects in the role of employees to state their effort levels for both possible manager's types. Managers made their decision about the share $x$ after observing the actual resources that resulted from the agent's effort chosen for the manager's type.

The structure of the experiment is described in Table 2:

Table 2: The Structure of the Game

| Stage | Player | Action |
|---|---|---|
| 1 | Owner, manager, employee | Donation to the charity |
| 2 | Manager | Classification as either LD or HD type<br>Information about own type |
| 3 | Employee | Effort decision with the strategy method: effort for LD and HD managers |
| 4 | Manager | Information about the actual resources<br>Decision about the profit/charity share |
| 5 | Owner, manager, employee | Information for all players about the payoffs, donation and the manager's type |

We conducted the experiment in July 2014-October 2015 at the Cologne Laboratory for Economic Research using the experimental software zTree (2007). We recruited participants via ORSEE (2004) and ran overall 29 sessions with a total of 864 participants (240 participants in

Experiment 1, 267 participants in Experiment 2, and 357 participants in Experiment 3). No subject participated in more than one session.

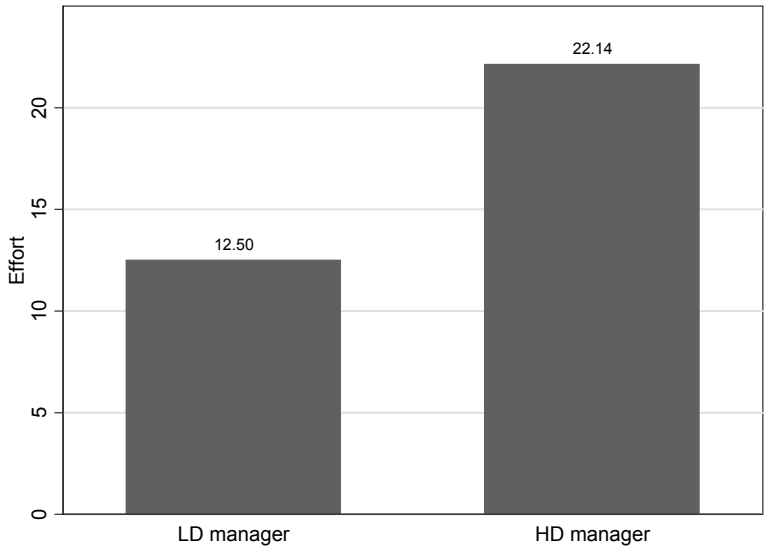
At the beginning of the experiment, participants received written instructions for the pre-stage of the experiment (the donating decision) and were allowed to ask questions privately. After making the donating decision, participants received instructions for the main part of the experiment where they were informed about their roles and the structure of the game. To ensure each participant understood the instructions, subjects had to answer comprehension questions that the experimenters examined before the experiment started. After completing the actual experiment, participants were asked to fill in a post-experiment questionnaire that included questions on gender, age, field of study, and motives behind the decisions. At the end, participants privately received their payoffs in cash and left the laboratory. Each session lasted approximately one and a half hours.

We transferred the donation to "Médecins sans Frontières" after all sessions were finished. To ensure the donation was credible, we told students in the instructions that they could give us their email address if they wanted to receive a proof of the donation, and we sent them the proof at a later date.

## 4.2 Results

We start the description of the results with the analysis of the agents' behavior. The left bar of Figure 1 displays the average effort chosen by an agent if the manager made a low donation (LD-type), and the right bar shows the average effort, if the manager made a high donation (HD-type). As expected, we find that agents exert significantly more effort, for a prosocial manager – the average effort increases from 12.50 in LD-case to 22.14 in HD-case. The difference in effort levels is highly statistically significant ($p<0.001$, Wilcoxon two-sided Matched Pairs Signed Ranks test; WMPSR in following).

**Figure 1**: Average chosen effort in Experiment 1




*Notes:* Number of observations amounts to 80 in each cell.

Our model predicts that the increase in the motivation when working for a prosocial manager will be stronger for more prosocial agents (see Hypothesis 1). In order to investigate this prediction, we regress the agent's effort choice on dummy variables for the agent's and the manager's type (column (1) in Table 3) as well as on an interaction term of both dummies (column (2) in Table 3). We find that (i) prosocial agents exert higher efforts, (ii) agents exert higher efforts when the manager is prosocial and (iii) there is a complementarity between the types such that the motivational effect of having a prosocial manager is larger when the agent is prosocial as well.

**Table 3:** Effort as a function of the agent's and manager's type

| | (1) | (2) |
|---|---|---|
| HD agent | 9.325*** | 6.067** |
| | (3.169) | (2.764) |
| HD manager | 9.638*** | 4.750** |
| | (1.259) | (2.337) |
| HD manager x HD agent | | 6.517** |
| | | (2.740) |
| Constant | 5.506** | 7.950*** |
| | (2.462) | (2.069) |
| Observations | 160 | 160 |
| $R^2$ | 0.156 | 0.163 |

*Notes:* Robust standard errors clustered on subject in parentheses, * p<0.10, ** p<0.05, *** p<0.01

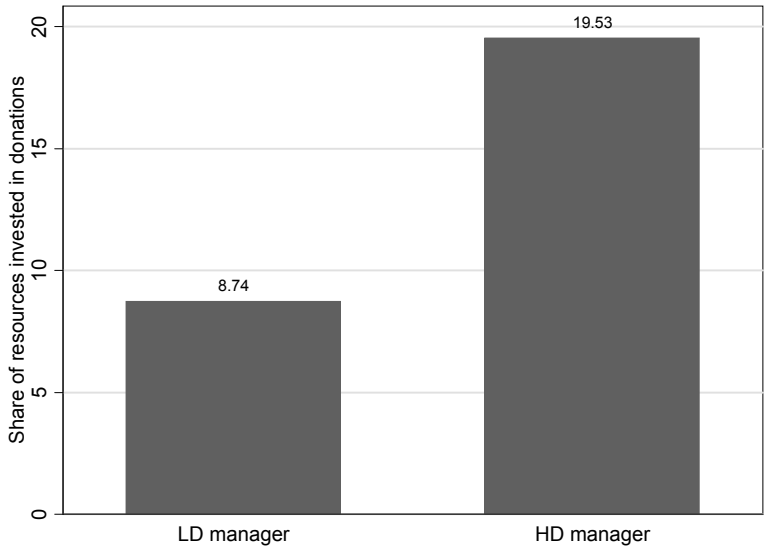
The results are in line with the descriptive field evidence presented in Section 3. Both observational and experimental data analyses lead us to our first result:

**Result 1.** Agents exert significantly more effort if the manager is prosocial. This effect is stronger if the agent herself is prosocial.

In the next step, we investigate the managers' ex-post resource allocation decisions. Figure 2 presents managers' decisions about the donation/profit shares. In line with Hypothesis 2, we observe that LD-managers donate a lower share of resources than HD-managers. While LD-managers invest only 8.74% of the resources into charitable donations, HD-managers invest more than twice as much at 19.53% (p=0.001, Mann-Whitney U test; MWU in following).[7]

[7] We also tested whether HD (LD) managers with high resources donate more generously than managers of the same type with lower resources. We find that both types of managers choose the profit share rather independently of the agents' effort, with Spearman's rho=-0.117, p=0.595 for LD-managers and rho=-0.100, p=0.459 for HD-managers.

**Figure 2:** Average resource share invested in donations in Experiment 1



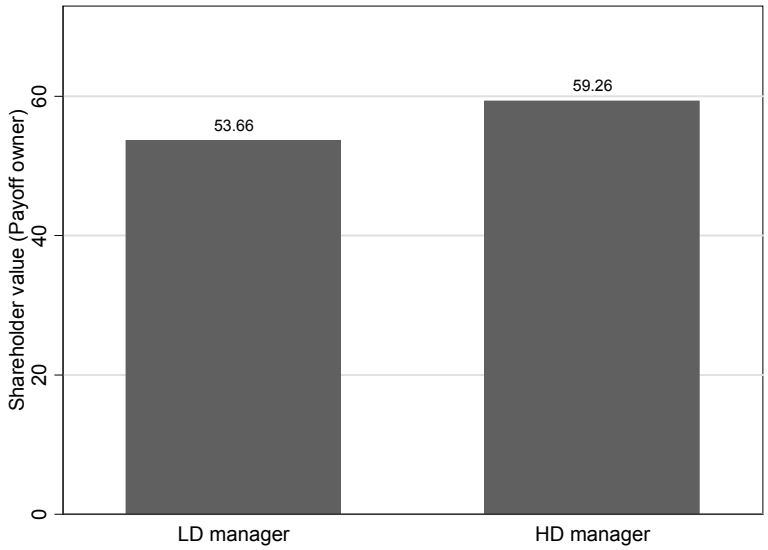

*Notes:* Figure 2 plots the average share of the generated resources (in %) that managers invested in charitable donations ex-post. The number of observations amounts to 23 in LD and 57 in HD.

Hence, in line with Hypothesis 2, we find that ex-ante donations are predictive of ex-post resource expenditures for the social cause. That is:

**Result 2.** More prosocial managers donate a larger fraction of resources to the charity.

After having shown that (i) agents work more for a prosocial manager and (ii) a prosocial manager donates a higher fraction of resources to the charity, we are interested in the effect of the two channels on the generated "*shareholder value"*, i.e. the owner's profit in our experiment. Figure 3 displays the payoffs of the owners for the two manager types. When the owner is assigned to an LD-manager, her average payoff is 53.66. The owner earns slightly more when she works with an HD-manager with an average payoff increasing by 10.44% up to 59.26. The difference is not statistically significant (MWU p=0.179), but we can conclude that the owners' profits are *not smaller* when an HD manager is in place. In fact, the monetary loss due to higher donations ex-post is offset by the ex-ante gain in agents' motivation.

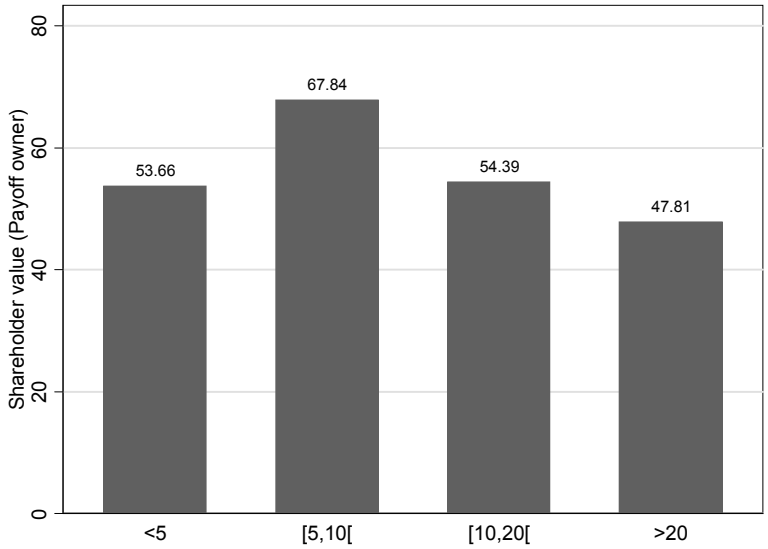
**Figure 3:** Owner's payoff in Experiment 1




*Notes:* Number of observations amounts to 23 in LD and 57 in HD.

Recall, however, that our model predicts a non-monotonic effect of the manager's prosociality on the value created for the owner (Hypothesis 3). As in our experimental design the information on the manager's type available to the agent is binary, this non-monotonic pattern should be reinforced. We have seen that the binary signal that the manager belongs to the more prosocial group has a positive effect on employee motivation. On the other hand, as higher initial donations predict lower ex-post investments in profits, prosocial inclinations beyond the cut-off should have detrimental effects on profit.

**Figure 4:** Owner's payoff conditional on manager's ex-ante donation




*Notes:* The number of observations amounts to 23, 26, 20 and 11 in groups 1, 2, 3 and 4, respectively

This pattern is confirmed in Figure 4 as well as the regression reported in Table 4 (column (2)). We regress the owner's payoff on the dummy indicating whether the manager is classified as an HD-manager (which is the case when she had donated at least 5 ex-ante) and on the actual manager's ex-ante donation. The regression in column 2 shows that the positive signal about the manager's type increases owners' payoffs when controlling for the manager's actual ex-ante donation. But conditional on the signal, the manager's actual ex-ante donation is negatively associated with owners' payoffs. In other words, a selfish owner benefits from having a manager who is visibly classified as being charitable, but controlling for this signal value larger ex-ante donations are associated with lower profits as highly prosocial managers invest more in charitable donations ex-post and thus reduce "shareholder value".

**Table 4:** Owners' payoffs and managers' types

| | (1) | (2) |
|---|---|---|
| HD agent | 21.19*** | 19.84*** |
| | (7.450) | (7.272) |
| HD manager | 5.277 | 16.15** |
| | (7.101) | (8.090) |
| Initial Donation | | -1.015** |
| | | (0.385) |
| Constant | 37.99*** | 39.56*** |
| | (7.825) | (7.717) |
| Observations | 80 | 80 |
| $R^2$ | 0.121 | 0.169 |

*Notes:* Robust standard errors clustered on subject in parentheses, * p<0.10, ** p<0.05, *** p<0.01

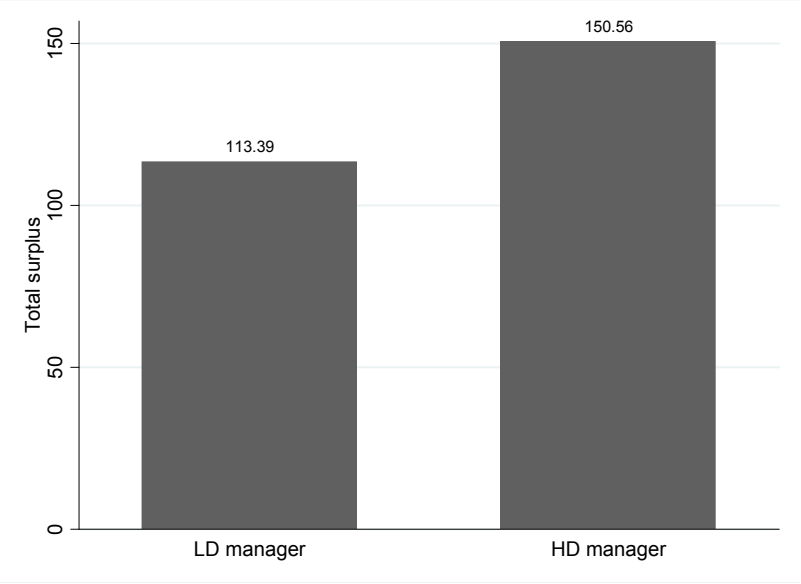
In line with Hypothesis 3, we conclude:

**Result 3.** The owners' payoffs are non-monotonic in the manager's charitable inclinations.

Finally, we consider the overall surplus generated, i.e. the sum of the owner's and manager's payoffs and the donation minus the effort cost. We find that the efficiency is substantially higher with an HD-manager (113.39) than LD-manager (150.56); p=0.018, MWU (see Figure 5). The choice of a prosocial manager leads to efficiency gains because (i) the overall value generated for the owner is not lower as ex-post losses in profits are offset by motivational gains and (ii) charitable donations are substantially larger when an HD-manager is in place. That is:

**Result 4.** A prosocial manager leads to a higher overall surplus.

**Figure 5:** Total surplus by manager's type in Experiment 1




*Notes:* Number of observations amounts to 23 in LD and 57 in HD.

# 5 Experiment 2: Real Effort and Exogenous Manager Assignment

In Experiment 1 we elicited agents' efforts in a stated effort setting. One of the advantages of using the stated effort setting is that we know the exact costs of effort the agents have, since we define them in a payoff function. However, a potential drawback of the method is that stating an effort is very different from exerting effort in real-world environments (see also Charness et al. (2018) for more discussion). In Experiment 2, we test for the robustness of the stated effort results by letting agents work on a real effort task instead of picking an effort level.

## 5.1 Experimental Design

In Experiment 2, in the efforts provision stage, agents work on a decoding task similar to the task by Charness et al. (2014). The task is to decode letters into two-digit numbers: There is a table with letters in the first column and numbers in the second column displayed on the computer screen in zTree.[8] Only one particular letter in the table has to be decoded with the corresponding number. After a subject decodes the letter, a new table with different numbers' and letters' combinations appears. The accuracy of entries is checked and a participant cannot move to the

[8] See instructions in Appendix for an example of a code table that we used in the experiment.

next decoding task if the letter is not decoded correctly. Agents have 10 minutes to work on the task and can decode up to 250 letters. Agents' payoffs do not depend on the number of letters decoded but each decoded letter increases resources of the company. Since agents' action space is different in this treatment from the main game we adjust the payoff functions with

$$\pi_M = 0.5 * \sqrt{x * 400 * e},$$
$$\pi_O = 0.5 * \sqrt{x * 400 * e},$$
$$\pi_C = \sqrt{(1-x) * 400 * e},$$
$$\pi_E = 100,$$

where $e$ is the amount of letters decoded by the agent.

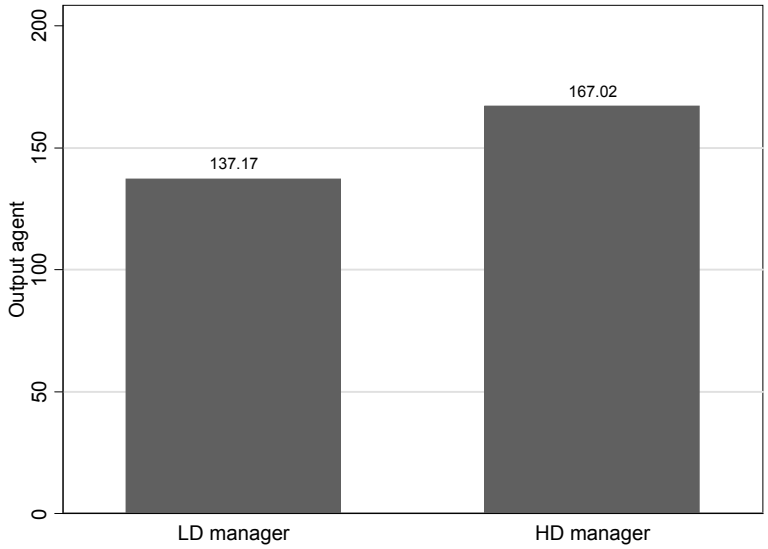
As in in Experiment 1, in Experiment 2, participants first made a donating decision. In the next step, we controlled for the ability of the participants by letting each participant work on the real effort task for 90 seconds, where they received 1 ECU for every correctly decoded letter. After the trial period, participants received instructions for the main part of the experiment in which they were informed about their roles and the structure of the game, and the experiment continued the same way as in Experiment 1.

## 5.2 Results

Figure 6 displays the average effort for LD- and HD-managers, measured by the number of decoded letters. On average, agents decode 137.17 letters with an LD-manager. Agents decode significantly more letters, if the manager is of HD-type – here the average output increases up to 167.02 letters (p=0.013, MWU). The result also holds if we control for the ability of participants measured by their performance in the trial period. To derive a measure of output that takes ability into account that we can use for non-parametric testing, we divide the output level in the main part of the experiment by the number of decoded letters in the trial period for every participant.[9] When comparing this measure, we find that the difference between the output with LD- and HD-managers stays significant with p=0.041, MWU.

[9] In the trial period, participants decoded on average 23.92 and 23.75 letters in LD- and HD-condition, respectively.

**Figure 6:** Agents' performance in Experiment 2




*Notes:* Figure 6 shows the average amount of decoded letters per agent. The number of observations amounts to 24 in LD and 65 in HD.

The first regression in Table 5 (column (1)) confirms the non-parametric result that agents work more for prosocial managers. Column (2) reports a regression where we interact the principal's type with the agent's type. The negative, yet not significant, coefficient of the interaction term indicates that – in contrast to Experiment 1 – here the principal's and agent's prosocial inclinations seem to be substitutes rather than complements. The most likely explanation for this pattern is a ceiling effect: Even agents who made low donations themselves work very fast when the manager made a high donation. In turn, higher own prosocial inclinations cannot raise output further.

**Table 5:** Agent's performance as a function of the agent's and manager's type

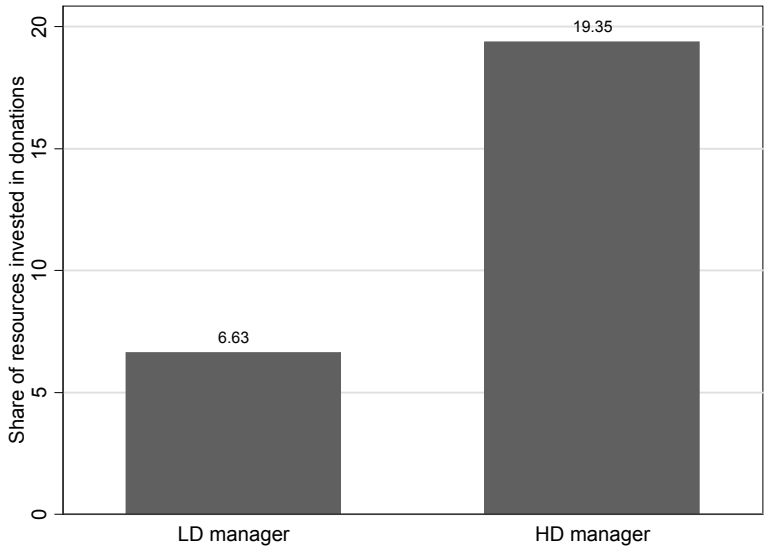
| | (1) | (2) |
|---|---|---|
| HD agent | 13.59 | 47.04 |
| | (12.06) | (31.47) |
| HD manager | 30.29** | 63.07** |
| | (11.76) | (31.63) |
| HD manager x HD agent | | -45.99 |
| | | (33.20) |
| Performance trial round | 3.943*** | 4.066*** |
| | (0.894) | (0.895) |
| Constant | 33.23 | 6.609 |
| | (27.16) | (38.15) |
| Observations | 89 | 89 |
| $R^2$ | 0.249 | 0.289 |

*Notes:* Robust standard errors in parentheses, * p<0.10, ** p<0.05, *** p<0.01

Moving to managers' behavior, we replicate the results from Experiment 1 that LD-managers invest less resources into charitable donations ex-post. As Figure 7 shows, LD-managers spend only 6.63% of the resources on charitable causes, whereas HD-managers spend 19.35%. The difference is highly statistically significant (p<0.001, MWU).[10]

[10] In addition, we test whether managers with higher resources donate more generously to the charity. We find that LD-managers choose the profit share independently of the agents' effort (rho=-0.170, p=0.438). In contrast to this and to the results in Experiment 1, HD-managers in Experiment 2 set the profit share conditionally on the effort (rho=-0.407, p<0.001), i.e. the higher are the resources, the higher is the share they donate to the charity.

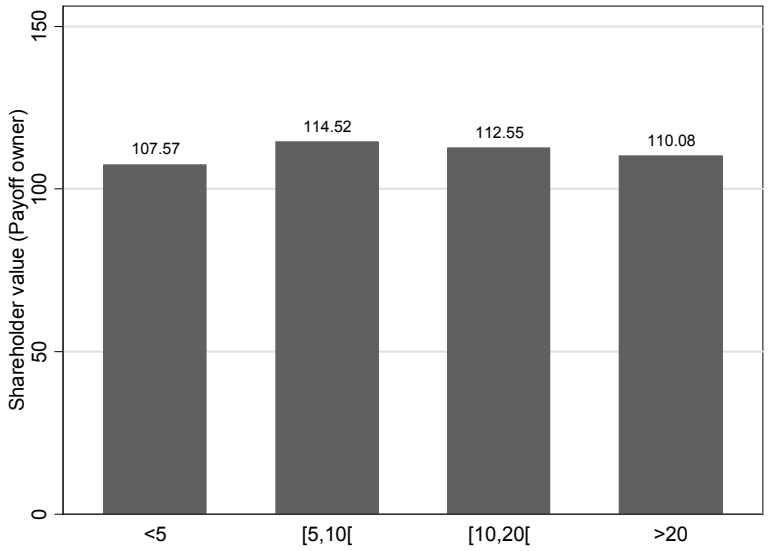
**Figure 7:** Average resource share invested in donations in Experiment 2




*Notes:* Figure 7 plots the average share of the generated resources (in %) that managers invested in generating charitable donations ex-post. The number of observations amounts to 24 in LD and 65 in HD.

In line with the results in the first experiment, we find that in Experiment 2 an owner does not earn less when a prosocial manager is in place even though such a manager spends more resources for charitable causes ex-post. On average, owners earn 107.57 with an LD-manager and again slightly more (112.91) with an HD-manager ($p=0.893$, MWU). As Figure 8 shows, there is again an inversely U-shaped pattern in the association between the manager's prosocial inclinations and owners' payoffs but the differences are economically smaller and statistically insignificant.

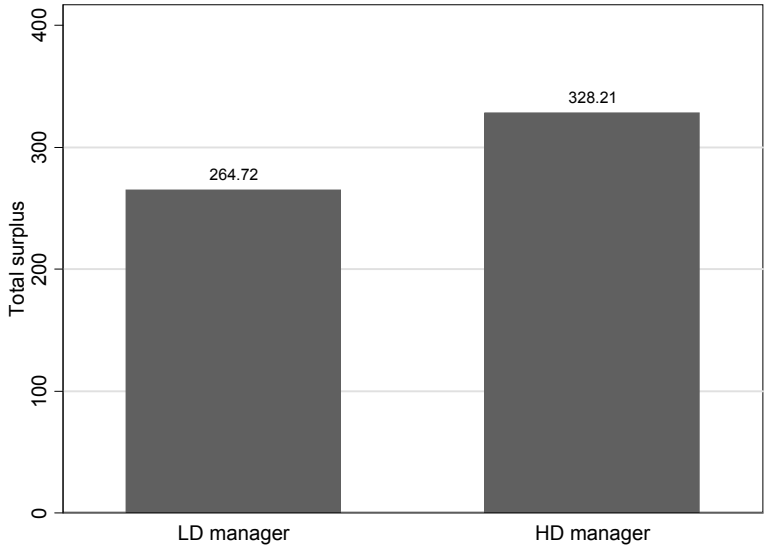
**Figure 8:** Owner's payoff conditional on manager's ex-ante donation




*Notes:* Figure 8 displays the average owner's payoffs conditional on the manager's ex-ante donation. The number of observations amounts to 24, 28, 24 and 13 in groups 1, 2, 3 and 4, respectively

Finally, as in Experiment 1, we find that the overall surplus is significantly higher when an HD-manager is employed. Figure 9 shows that the generated surplus increases from 264.72 to 328.21 when an HD-manager is employed ($p<0.001$, MWU).

**Figure 9:** Total surplus by manager's type in Experiment 2



*Notes:* Figure 9 plots the overall generated surplus. The number of observations amounts to 24 in LD and 65 in HD.

# 6 Experiment 3: Chosen Effort and Endogenous Manager Assignment

In Experiment 1 and Experiment 2, managers were exogenously assigned to owners (and employees). If, in addition, the owner can actively choose the type of manager she hires, the owner's choice will reveal information about her own prosociality which in turn can affect the agent's behavior in a positive or negative way. In this section, we test for the effects of the owner's choice on agent's motivation and firm's profits.

## 6.1 Set-Up

The game in this treatment differs from Experiment 1 only in the owner's action space. Here, the owner can choose what type of a manager she wants to employ. The assignment mechanism is such that if there is the same amount of owners wanting an LD (HD) manager as there are LD (HD) managers on the market (i.e. in the experimental session), owners are matched to the preferred type of a manager. If, however, there are fewer LD (HD) types than wanted, a random draw decides which owners get their preferred types. Using the strategy method, agents have to make four decisions in this treatment – for all possible combinations of the owner's preference and manager's type. The rest of the game and experimental procedure is equivalent to the procedure in Experiment 1.

## 6.2 Predictions

In the model we show that agents are motivated to work more for an HD-manager, because HD-managers will donate more to the charity. However, beyond this *consequentialist channel* there may be another *deontological channel* that can lead to higher efforts when the *owner* is prosocial. Our reasoning here is based on Levine (1998)'s model of reciprocal altruism: by selecting a prosocial manager an owner may signal her own prosocial inclinations. [11]

If the intentions of the owner matter, agents care not only about the manager's type because this determines the allocation of resources ex-post – but also about the owner's objectives which may

[11] Kajackaite and Sliwka (2017) study a formal model illustrating how reciprocal altruism can drive motivational effects of employers' prosocial behavior and provide experimental evidence in line with this.

be signaled through her choice. By choosing a prosocial manager, an owner may signal that she herself is a prosocial type. As a consequence, agents who are reciprocal altruists may reward prosocial owners with higher efforts.

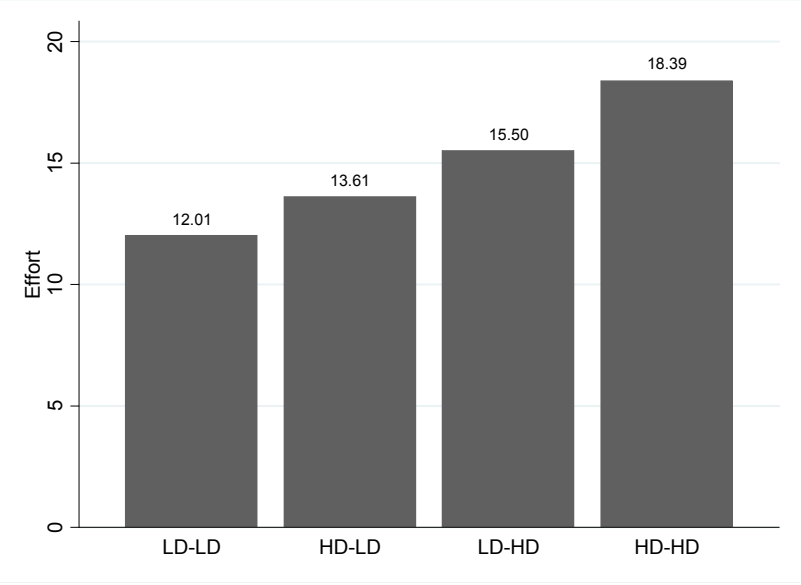
Consider, for instance, the case where the owner stated a preference for an HD-manager and such an HD manager was indeed assigned to her by our matching protocol (denoted by HD-HD). Our hypothesis is that in this HD-HD condition, a reciprocal agent will exert more effort than in the LD-HD condition, in which the owner preferred an LD-manager but was assigned to an HD-manager. The reason is that the HD-HD case signals to the agent not only that the manager will most likely spend more resources for social causes (as in the previous experiments) but also that the owner intentionally had chosen such a manager. Reciprocal altruism should then lead an agent to exert higher efforts.

## 6.3 Results

We start the analyses with the owners' behavior. We find that 62.18% (74 out of 119) of the owners prefer a prosocial manager. Importantly, the choice of a manager correlates with the owner's type – 70.45% of HD-owners (i.e. owners who had made a high donation themselves ex-ante) prefer to select an HD-manager, whereas only 38.71% of LD-owners prefer an HD-manager ($p=0.002$, Fisher's exact test). That is, the owner's choice is indeed a credible signal about her own type.

In the next step, we test how agents react to the owners' choices. Figure 10 illustrates that agents indeed react to the preferences of the owner. Agents exert significantly less effort for an LD-manager chosen by an owner with an LD-preference (LD-LD) – 12.01 points – than for an LD-manager assigned to an owner with an HD-preference (HD-LD) – 13.61 points; $p<0.001$, WMPSR. Similarly, agents exert more effort for an HD-manager preferred by the owner (HD-HD) than for an HD-manager assigned to an owner who preferred an LD-manager (LD-HD) with 18.39 points versus 15.50 points ($p<0.001$, WMSPR). The results suggest that agents care about the owner's type revealed through her choice of a manager and react to this information by adapting their efforts. Furthermore, note that independently of the owner's preference, the effort for an LD-manager is always lower than for an HD-manager (the first two bars vs. the last two bars in Figure 10, $p<0.001$, WMPSR) which replicates the results from Experiments 1 and 2.

**Figure 10**: Average chosen effort in Experiment 3




*Notes:* Number of observations amounts to 119 in each cell.

In Table 6 we regress agents' effort choices on the manager's and the agent's type as well as on the owner's preference. The results in column (1) confirm that both, the consequentialist motive ("Resources of my work will be well spent") as well as the deontological one ("The owner is well-intentioned") play a role. Efforts are increasing in the manager's actual prosocial inclinations (dummy variable HD manager) as well as in the owner's prosocial intentions (dummy variable HD owner preference). But as the size of the coefficients indicates, the consequentialist motive has a stronger effect on the chosen efforts. In column (2) we include an interaction term between the manager's actual type and owner's desired type and find that the consequentialist and deontological effects are essentially additive.

In column (3) we report a regression in which the manager's actual type and the owner's preferences are interacted with the agent's type (dummy HD agent indicating whether the agent herself had made a high donation prior to the main experiment). We find that in contrast to Experiment 1, selfish agents are not motivated more by HD-managers than LD-managers. Selfish agents do not react to the owner's preferences for a prosocial manager neither. The interaction terms in column (3) show that the main effects found in columns (1) and (2) are driven by the prosocial agents.

**Table 6:** Effort as a function of the agent's, manager's type and owner's preference

| | (1) | (2) | (3) |
|---|---|---|---|
| HD manager | 4.134*** | 3.496*** | 0.329 |
| | (0.772) | (0.873) | (1.191) |
| HD owner preference | 2.244*** | 1.605*** | 0.814 |
| | (0.578) | (0.601) | (0.547) |
| HD agent | 8.803*** | 8.803*** | 5.095** |
| | (1.973) | (1.975) | (2.197) |
| HD manager x HD owner preference | | 1.277 | |
| | | (0.827) | |
| HD agent x HD manager | | | 5.392*** |
| | | | (1.507) |
| HD agent x HD owner preference | | | 2.025** |
| | | | (0.952) |
| Constant | 5.475*** | 5.795*** | 8.093*** |
| | (1.680) | (1.694) | (1.827) |
| Observations | 476 | 476 | 476 |
| $R^2$ | 0.130 | 0.130 | 0.140 |

*Notes:* Robust standard errors clustered on subject in parentheses, * p<0.10, ** p<0.05, *** p<0.01

As in previous sections, next we investigate the managers' resources allocation decisions. We replicate the result from Experiment 1 and Experiment 2 that LD-managers donate a lower share of the resources than HD-managers – while LD-managers donate only 6.34% of the resources, HD-managers give away 25.44% (p=0.001, MWU).[12]

In line with the results in Experiments 1 and 2, we find that in Experiment 3 an owner does not earn less with an HD-manager than with an LD-manager. On average, owners earn 45.46 in the LD-LD case. Their earnings are (statistically insignificantly) higher in the HD-HD case – 52.70; p=0.245, MWU.[13] Importantly, in line with Experiments 1 and 2, the generated donation and

[12] We also test whether LD (HD) managers with high resources donate more generously than managers of the same type with lower resources. We find that both types of managers choose profit shares independently of the agents' effort, with Spearman's rho=-0.217, p=0.156 for LD-managers and rho=-0.179, p=0.124 for HD-managers.

[13] In the LD-HD and HD-LD cases, the owners earn an average of 43.34 and 54.22. We do not further analyze the non-matching interests' cases, since the observations amount to only 12 and 13 in each cell.

overall efficiency are higher with an HD manager: In the LD-LD vs. HD-HD comparison, the overall surplus increases from 96.14 up to 142.30 ($p=0.004$, MWU) and the donation changes from 16.25 to 56.44 ($p<0.001$, MWU).

Put together, the results from Experiment 3 replicate the key results from Experiment 1 and Experiment 2: (i) agents work more when resource allocation decisions are made by prosocial managers, (ii) prosocial managers donate a higher share of profits, (iii) having a prosocial manager in place does not lead to a reduction in profits but (iv) leads to efficiency gains. Moreover, Experiment 3 also shows that the motivational gains from picking a prosocial manager are not only caused by consequentialist motives but also because such a choice reveals the prosocial intentions of those who made the decision.

# 7 Conclusion

Milton Friedman's famous dictum that a manager's responsibility is "*to make as much money as possible"* for the owners of a firm still constitutes an important benchmark in the debate on the social responsibility of business. We show in a formal model and a series of lab experiments that the normative content of this recommendation necessitates a careful distinction between *ex-ante motives* and *ex-post results*. We show that it may be preferable from an ex-ante perspective to have a manager in place who ex-post does not follow Friedman's postulation. Our key argument is that granting the responsibility to allocate generated resources ex-post to someone who has an intrinsic interest for something beyond the mere maximization of shareholder value can serve as a commitment device to motivate employees.

The simplest examples of a firm contributing to social causes are donations to charity. But the argument put forward can also be interpreted in a wider sense. For instance, think of a manager in a consumer products company who faces the choice whether to implement a feature in a product that raises the utility of customers without raising profits. Or consider a manager in a tech company who decides upon open sourcing software components or a manager of a pharmaceutical company deciding about the pricing of a drug for a third world country that has a choice between charging a monopoly price or a price that would lead to lower profits but help to save lives of more patients. Many employees of such firms will have a preference for the more prosocial choice that may reduce profits and thus for instance also lead to lower dividend payments. Having a management in place that intrinsically cares also for broader welfare rather

than mere profit maximization will generate trust in employees that the fruits of their work efforts will not be narrowly used only to make as much money as possible for shareholders. If this leads to a higher employee motivation, shareholders may even benefit in the longer term even though profits are lower in the short term.

# References


Baron, D. (2001). Private politics, corporate social responsibility and integrated strategy. *Journal of Economics and Management Strategy*, 10, 7–45.

Bénabou, R., & Tirole, J. (2010). Individual and corporate social responsibility. *Economica*, 77(305), 1-19.

Besley, T., Ghatak, M. (2005). Competition and Incentives with Motivated Agents. *American Economic Review*, 95 (3), 616-636.

Cassar, L. (forthcoming). Job Mission as a Substitute for Monetary Incentives: Benefits and Limits. *Management Science.*

Charness, G., Gneezy, U., Henderson, A. (2018). Experimental methods: Measuring effort in economics experiments. *Journal of Economic Behavior & Organization*, 149, 74-87.

Charness, G., Cobo-Reyes, R., Sanchez, A. (2016). The effect of charitable giving on workers' performance: Experimental evidence. *Journal of Economic Behavior & Organization*, 131, 61-74.

Christian, M. S., Garza, A. S. & Slaughter, J. E. (2011). Work Engagement: A Quantitative Review and Test of its Relations with Task and Contextual Performance. *Personnel Psychology*, 64(1), 89-136.

Delfgaauw, J., Dur, R. (2008). Incentives and Workers' Motivation in the Public Sector. *The Economic Journal*, 118, 171-191.

Falk, A., Becker, A., Dohmen, T., Huffman, D., Sunde, U. (2016). The Preference Survey Module: A Validated Instrument for Measuring Risk, Time, and Social Preferences. *IZA DP No. 9674.*

Fischbacher, U. (2007). z-Tree: Zurich toolbox for ready-made economic experiments. *Experimental Economics*, 10(2), 171-178.

Friedman, M. (1970). The Social Responsibility of Firms Is to Increase Its Profits. *New York Times*, September 13, 32-33.

Greiner, B. (2004). An online recruitment system for economic experiments. In: Forschung und wissenschaftliches Rechnen 2003. GWDG Bericht 63, Kremer, K., Macho, V. (eds), 79-93, Göttingen.

Hart, O., and L. Zingales. Companies Should Maximize Shareholder Welfare Not Market Value. *Journal of Law, Finance, and Accounting* 2 (2017): 247-274.

Imas, A. (2014). Working for the "warm glow": On the benefits and limits of prosocial incentives. *Journal of Public Economics*, 114, 14-18.

Kajackaite, A., Sliwka, D. (2017). Social responsibility and incentives in the lab: Why do agents exert more effort when principals donate? *Journal of Economic Behavior & Organization*, 142, 482-493

Kampkötter, P., Mohrenweiser, J., Sliwka, D., Steffes, S., Wolter, S. (2016). Measuring the use of human resources practices and employee attitudes: The Linked Personnel Panel. *Evidence-based HRM: a Global Forum for Empirical Scholarship*, 4(2), 94-115.

Levine, D.I. (1998). Modeling altruism and spitefulness in experiments. *Review of Econonomic Dynamics*, 1, 593–622.

Schaufeli, W. B., Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: a multi-sample study. *Journal of Organizational Behavior*, 25, 293–315.

Schaufeli, W. B., Salanova, M., González-Romá, V., Bakker, A. B. (2002). The Measurement of Engagement and Burnout: A Two Sample Confirmatory Factor Analytic Approach. *Journal of Happiness Studies*, 3(1), 71–92.

Tonin, M., Vlassopoulus, M. (2015). Corporate Philanthropy and Productivity: Evidence from an Online Real Effort Experiment. *Management Science*, 61(8), 1795-1811.

# Appendix

## Proofs

**Proof Proposition 1:** The function is strictly concave. From solving the first order condition,

$$-\frac{1}{2}\beta_M(ke-g)^{-\frac{1}{2}}+\frac{1}{2}\theta_M g^{-\frac{1}{2}}=0$$

the optimal resource allocation decision directly follows. ■

**Proof of Proposition 2:** The agent's objective function is strictly concave. The first order condition is

$$\theta_A\cdot\sqrt{\frac{\theta_M^2}{\beta_M^2+\theta_M^2}k}\frac{1}{2}e^{-\frac{1}{2}}-\eta e^{\eta-1}=0\Leftrightarrow$$

$$e=\left(\theta_A\cdot\sqrt{\frac{\theta_M^2}{\beta_M^2+\theta_M^2}k}\frac{1}{2\eta}\right)^{\frac{2}{2\eta-1}}.$$

The first derivative of the objective function is always strictly positive when $\theta_M,\theta_A>0$. Hence, $e=0$ if either $\theta_M=0$ or $\theta_A=0$.

The agent will choose $e=\overline{e}$ if the first derivative of the objective function is strictly positive at $e=\overline{e}$, which is equivalent to

$$\left(\theta_A\sqrt{\frac{\theta_M^2}{\beta_M^2+\theta_M^2}k}\frac{1}{2\eta}\right)^{\frac{2}{2\eta-1}}>\overline{e}.$$

When there is an internal solution, the first derivative of $e$ with respect to $\theta_A$ is

$$\frac{\partial e}{\partial\theta_A}=\frac{2}{2\eta-1}\theta_A^{\frac{3-2\eta}{2\eta-1}}\cdot\left(\sqrt{\theta_M^2/\beta_M^2+\theta_M^2\,k}\frac{1}{2\eta}\right)^{\frac{2}{2\eta-1}}$$

and the cross derivative is

$$\frac{\partial^2 e}{\partial\theta_A\partial\theta_M} = 4k/(2\eta-1)^2\,\theta_A^{\frac{3-2\eta}{2\eta-1}}(1/2\eta)^{\frac{2}{2\eta-1}}(\theta_M^2/\beta_M^2+\theta_M^2\,k)^{\frac{2-2\eta}{2\eta-1}}\theta_M\beta_M^2/(\beta_M^2+\theta_M^2)^2 > 0$$

■

**Proof of Proposition 3:**

By inserting the manager's donation decision and the agent's optimal effort choice we obtain

$$(1-\beta_M)\Pi(r,g) = (1-\beta_M)\sqrt{k\left(\theta_A\cdot\sqrt{\frac{\theta_M^2}{\beta_M^2+\theta_M^2}k}\frac{1}{2\eta}\right)^{\frac{2}{2\eta-1}}\left(1-\frac{\theta_M^2}{\beta_M^2+\theta_M^2}\right)}$$

which can be simplified to

$$(1-\beta_M)\Pi(r,g) = \sqrt{k}\beta_M(1-\beta_M)\left(\frac{\theta_A}{2\eta}\right)^{\frac{1}{2\eta-1}}\frac{(k\theta_M^2)^{\frac{1}{4\eta-2}}}{(\beta_M^2+\theta_M^2)^{\frac{\eta}{2\eta-1}}}.$$

The first derivative with respect to $\theta_M$ is strictly positive iff

$$\frac{1}{4\eta-2}(k\theta_M^2)^{\frac{1}{4\eta-2}-1}k(\beta_M^2+\theta_M^2)^{\frac{\eta}{2\eta-1}} - (k\theta_M^2)^{\frac{1}{4\eta-2}}\frac{\eta}{2\eta-1}(\beta_M^2+\theta_M^2)^{\frac{\eta}{2\eta-1}-1} > 0$$

$$\Leftrightarrow \frac{\beta_M^2}{2\eta-1} > \theta_M^2$$

such that it is increasing in $\theta_M$ iff $\theta_M < \frac{\beta_M}{\sqrt{2\eta-1}}$. ■

## Instructions

*Below you find translated instructions for the "Real Effort and Exogenous Manager Assignment" treatment. The instructions for other two treatments are equivalent and can be provided under request. Original instructions were in German.*

**Instructions (Part I)**

Welcome to our experiment! Please read the instruction carefully. If you have a question, please raise your hand. We will come over to you and answer your question. Communication with other participants is not allowed. If you break this rule, we will have to exclude you from the experiment and you will not receive any payment. Please switch off your mobile phone or any other devices which may disturb the experiment.
Every participant will receive 2.50 Euros for attending, which will be paid out independently of the decisions made in the experiment.
Furthermore, you can get additional payoffs in this experiment. The procedure is described more precisely below. In the experiment, experimental currency units (ECU) are used. The payoff in ECU will be converted into euros and paid in cash. The exchange ratio is:

**10 ECU=1 Euro**

Neither during the experiment, nor after the experiment will any of the participants be informed about the identity of other participants or about their payoffs.
The experiment consists of three parts.

**Part I:**

You and all other participants will receive a starting cash balance of 25 ECU. You can decide which amount you want to donate to the charity organization "Ärzte ohne Grenzen e.V." You can pick any amount between 0 and 25 ECU.
Your payoff and the donation in part I will be calculated in the following way:

| |
|---|
| Your payoff = 25 – your donation<br><br>Donation = your donation |

After the experiment, the donations will be accumulated and transferred to „Ärzte ohne Grenzen e.V.". We will donate the money immediately after the experiment. If you want to receive the proof about the donation, please write down your email address and we will send the proof to you.

After part I is over, all participants will receive instructions for part II. That is, all participants will have information about the content of part II only after part II is over.
If you have any questions, please raise your hand.

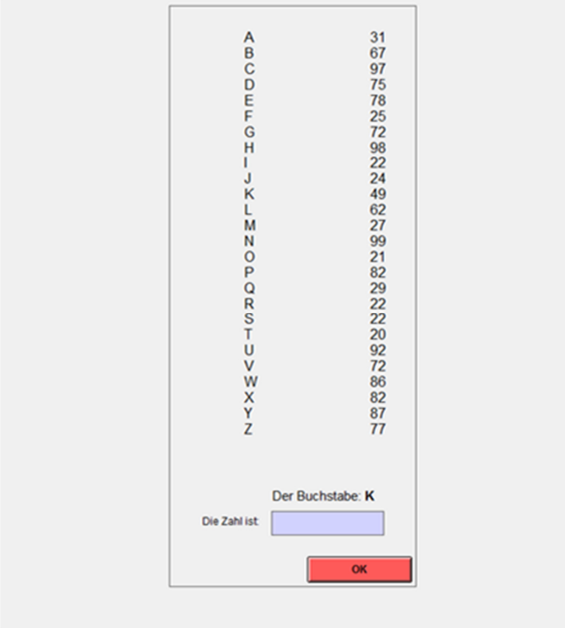
## Comprehension questions

To make sure that every participant understands the instruction, please answer the following questions. The payoffs in the answers should not include the show-up fee.
Question 1: You donated 20 ECU. What are your payoff and the donation in part I?
Your payoff: ___ ECU
Donation: ___ ECU

Question 2: You donated 2 ECU. What are your payoff and the donation in part I?
Your payoff: ___ ECU
Donation: ___ ECU

## Instructions (Part II):

On your computer screen, you will see a table with two columns (one column with letters and one column with numbrs), which looks similar to this table:




Your task is to decode the letter in the middle of the bottom of the screen. The number which is in the same row as the letter is the code of the letter. In the example above, letter “K” needs to be decoded. From the table it follows that the number which decodes “K” is “49”, because they are placed in the same row. So your task is to write “49” in the middle of the bottom of the screen. After typing in the number, please click on the OK-button.
As soon as the letter is decoded correctly, a new table will show up and your task will be to decode a new letter. If you will make a mistake when decoding a letter, a message will appear and you will have to correct the mistake to move forward.
You will have 90 seconds for this task. You will receive 1 ECU for every correctly decoded letter. The remaining time will be shown on the screen.

| |
|---|
| Your payoff = 1 ECU * amount of correctly decoded letters |

After part II is finished, you will receive instructions for part III. That is, all participants will find out about the content of part III only after part II is over.
If you have any questions please raise your hand.

**Instructions (Part III)**

In this part of the experiment there are three types of participants: owners, managers and employees. One owner, one manager and one employee build a "firm". The roles are assigned randomly and stay the same for the whole experiment.
In a minute, you will be shown your role on the computer screen. Please write down your role and then keep reading the instructions.

My role: _____

Managers will be divided into two groups/types depending on their donation in the first part of the experiment. The managers who donated the least (the managers who donated less than the half of the participants in previous sessions of the experiment) build the group X. The managers who donated the most (the managers who donated the same or more than the half of the participants in previous sessions of the experiment) build group Y. All participants will be informed about the group of the manager.

The owners make no decisions.

Each employee has 10 minutes to work on the decoding task. The task is identical to the task in part II. The task is to decode the letter in the middle of the bottom of the screen. As soon as the letter is decoded correctly, a new table will show up and the employee can decode then a new letter. There is a maximum of 250 tables that will appear one after the other. That is, the employee can decode a maximum of 250 letters.
In this part of the experiment, the employee receives a fix amount of 100 ECU. Before the employee starts working, he will be informed about the type of the manager. The employee will be informed, whether the manager who was assigned to him is type X (relatively low donation) or type y (relatively high donation).
The employee decides who much he wants to work on the task. For each correctly decoded letter there will be 1 ECU added to the resources of the company (you will learn more about it in a bit). Each ECU that the employee adds to the resources of the company will be multiplied with 400.

The resources will be calculated in the following way:

| |
|---|
| Resources = amount of correctly decoded letters * 400 ECU |

In the next step, the manager learns about the resources generated by the employee and decides on how to invest the resources. The investments generate the profit of the firm and a donation to

social causes. The manager decides which part of the resources X he invests in profits and which part 1-X he invests in a donation. The donation goes to the charity „Ärzte ohne Grenzen e.V.“ The generated profit will be divided between the owner and the manager. In other words, the higher is the donation, the less earn the manager and the owner.
The payoffs of managers, owners, employees and the donation will be calculated in the following way:

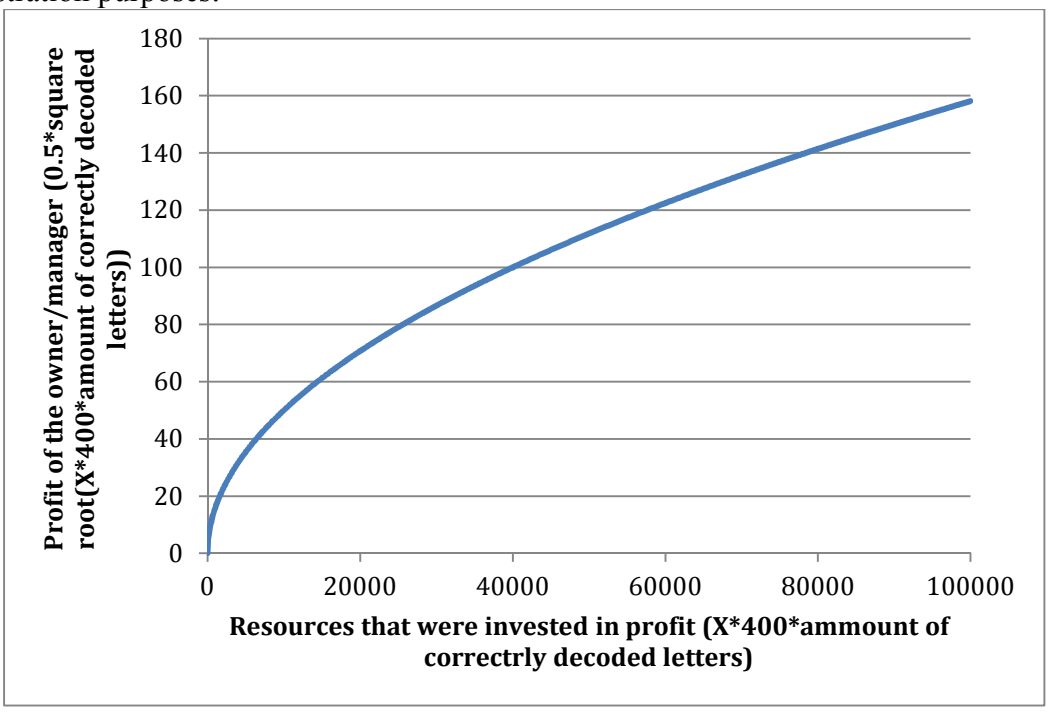
$$Payoff_{Manager} = 0{,}5 * \sqrt{X * 400 * amount\ of\ correctly\ decoded\ letters}$$

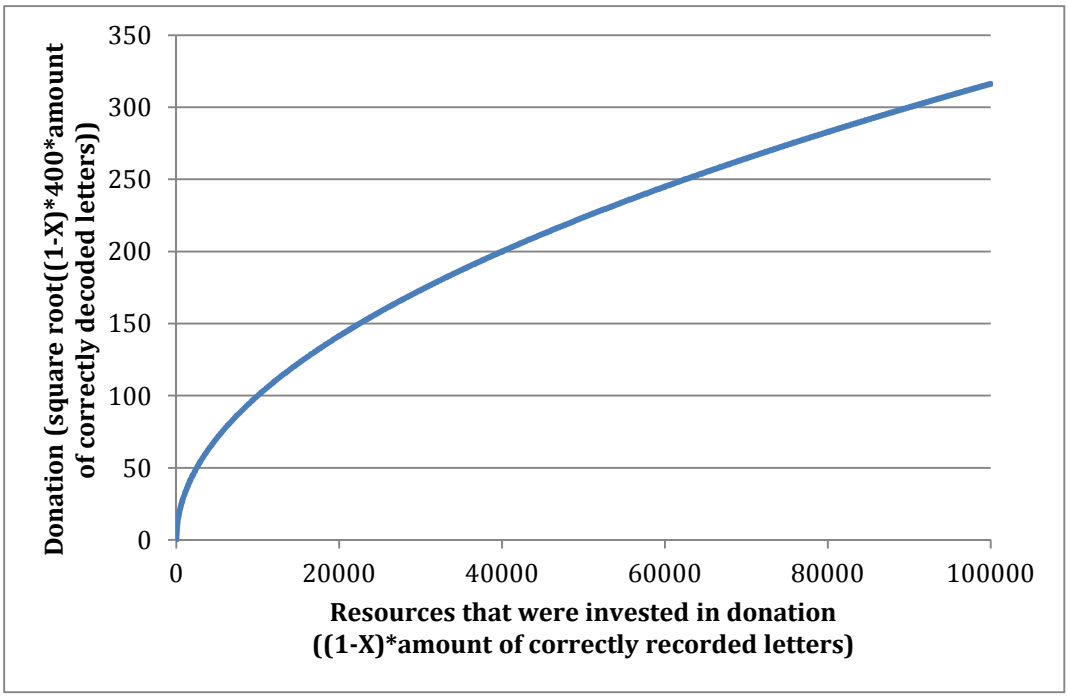
$$Payoff_{Owner} = 0{,}5 * \sqrt{X * 400 * amount\ of\ correctly\ decoded\ letters}$$

$$Donation = \sqrt{(1 - X) * 400 * amount\ of\ correctly\ decoded\ letters}$$

$$Payoff_{employee} = 100$$

For illustration purposes:






Before the employees and managers make their decisions, all participants will participate in a trial round. In the trial round, there will be calculator shown on the computer screen and you can try out different values of the amount of decoded letters and the share X to calculate the profit and donation. In this way, you will get a feeling about the structure of the payoff.
After the trial round, the order of part III will be the following:

1. The managers will be assigned to either group X or group Y dependent on the previous donation. The manager will be informed about his group. The employee and owner who are assigned to the manager will also be informed about the type of the manager.
2. The employee works on the task and therewith determines the size of the resources.
3. The manager observes the size of the resources and decides which part of the resources he invests in profit and donation.
4. All participants find out about their payoffs.

After the experiment, the donations will be accumulated and transferred to „Ärzte ohne Grenzen e.V.“. We will donate the money immediately after the experiment. If you want to receive the proof about the donation, please write down your email address and we will send the proof to you.
If you have any questions please raise your hand.

**Comprehension questions**

Question 1: The manager has donated 4 ECU in the first part of the experiment. The half of participants in previous sessions has donated at least 14 ECU. In which group is the manager?

- X
- Y

Question 2: The employee has decoded 10 letters. The manager set the share X (profits) to 0.3. How large are the payoffs in part III?
Profit employee: ___ECU
Profit manager: ___ECU
Profit owner: ___ECU
Donation: ___ECU

Question 3: The employee has decoded 200 letters. The manager set the share X (profits) to 1. How large are the payoffs in part III?
Profit employee: ___ECU
Profit manager: ___ECU
Profit owner: ___ECU
Donation: ___ECU

Question 4: The employee has decoded 100 letters. The manager set the share X (profits) to 0.7. How large are the payoffs in part III?
Profit employee: ___ECU
Profit manager: ___ECU
Profit owner: ___ECU
Donation: ___ECU