In Good Times and Bad - Reciprocal Behavior at the Workplace in Times of Economic Crises*

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April 2013

Abstract

We analyze employer-employee relationships under the threat of an exogenous shock. In a two-period gift-exchange game the employer can be hit by an economic shock in the second period. The mere threat - irrespective of whether the shock later occurs for sure or only with a certain probability - encourages the employer to pay significantly higher wages in the first period. This difference in the first period translates into increased effort levels in the second period, independent of the actual occurrence of the shock. Our results imply that the exogenous threat of a shock can strengthen cooperation between individuals and even have a positive impact on overall payoffs.

JEL Codes: C91, J30, M52

Keywords: Gift-exchange, wage cuts, reciprocity

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*We would like to thank Johannes Abeler, Iwan Barankay, Gary Charness, Ruben Durante, Florian Englmaier, Armin Falk, Guido Friebel, Simon Gächter, Lorenz Götte, Georg Kirchsteiger, Alexander Koch, Joep Konings, Michael Kosfeld, Julia Nafziger, Daniel Schunk, Heiner Schumacher, Joël van der Weele, Ferdinand von Siemens and seminar participants at the MPI in Bonn as well as the conference audiences at the European Economic Association Meeting in Oslo 2011 and at the Workshop on Behavioral Personnel Economics in Mannheim 2011 for useful comments. Financial support from Goethe University Frankfurt is gratefully acknowledged.

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1 Introduction

Research in various fields of the social sciences has provided evidence that reciprocity is an important mechanism to overcome crises and exogenous shocks. For instance social psychological studies indicate that people do not simply seek their own benefits in times of distress, but instead often help their comrades. In particular Batson et al. (1979) show that individuals support others who are in need of their help if they share a common threat. They argue that the main motivation for helping is to ensure that the party who has received one’s help reciprocates it in the future and supports oneself if necessary. Similarly, Bowles and Gintis (2011) and Henrich and Henrich (2007) suggest in their evolutionary framework on altruism and cooperation that reciprocity has been an important mechanism to overcome exogenous shocks in human history. In a more recent context the development economics literature discusses a comparable idea that considers reciprocity as a risk sharing device (see Fafchamps, 2008 for an overview).2

In the domain of employment relations several authors conducted interviews with either managers or workers to study the behavioral effects of recessions and other exogenous shocks (e.g. Agell and Lundborg, 1995; Bewley, 1999, 2005; Blinder and Choi, 1990; Campbell and Kamlani, 1997; Charness and Levine, 2002 and Kahneman et al., 1986). These studies all agree in their finding that employees act reciprocally in times of economic distress and are in principle willing to help their firms.

While the previous studies have investigated reciprocity as a means to overcome crises, the goal of this paper is to study if and how a crisis, in our case an exogenous shock, affects reciprocity. In particular the focus of our study is on how the mere threat of a shock that can potentially hit the employers influences the reciprocal relationships between employers and employees. Is reciprocity spoiled in the face of a shock? Or, conversely, does the threat of a shock strengthen reciprocal behavior? The answer to these questions is important given that employment relations are frequently affected by changing market environments and employers often have to rely on their employees’ goodwill in times of economic distress.

In our laboratory experiment we conduct a two-period gift-exchange game. Compared to the analysis of field data, this simple experimental setup allows to study reciprocal behavior under the threat of an exogenous shock in isolation. In our three treatments wages and effort levels are costly and not contractible. The Prob0 treatment is a standard gift-exchange game: In both periods the employer chooses a wage and subsequently the employee chooses an effort level. In the Prob50 and Prob100 treatments the payoff functions in the first period are the same as in the Prob0 treatment. However, in the second period, the employer is either hit by an exogenous shock with 50% probability (Prob50)

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1 Quote taken from Shapiro (2006).

2 Related to this Durante (2010) shows that trust levels are higher in regions which have been frequently affected by weather shocks over the last centuries.
or for certain (Prob100). Being hit by the shock implies a reduction in worker’s marginal productivity. If the shock does not occur in the Prob50 treatment, the payoff functions are the same as in the Prob0 treatment. In all treatments both parties have full information about the probabilities and the actual realization of the shock.

Our results suggest that the mere threat of an exogenous shock is sufficient to encourage employers to pay higher wages in the first period - irrespective of whether the shock later occurs with 50% probability or for certain. In the second period we observe that employers pay relatively low wages if they are hit by the shock. However, these low wages are not negatively reciprocated by their employees with low or even zero effort choices. This finding is independent of the probability of the shock realization. Moreover, comparing the employment relations in the Prob0 and the respective relations in the Prob50 treatment which are not hit by the exogenous shock, we find slightly higher wages and significantly higher effort levels in the second period in the Prob50 treatment. Taken as a whole, we observe exploitative low effort choices in the final period of the game only in the Prob0 treatment. Our results thus imply that an exogenous shock need not necessarily have a negative impact on payoffs. On the contrary, the threat of a shock can reinforce reciprocity between contracting parties.

Our study also contributes to the recent literature in experimental economics on behavior in times of economic distress. Kocher and Strasser (2011) and Linardi and Camerer (2012) use adapted versions of Brown et al. (2004) labor market experiment. In their 15 period labor market Kocher and Strasser (2011) model economic cycles by varying the employees’ productivity. They show that although firms cut wages in times of economic distress, workers reduce effort levels in these periods only slightly. In Linardi and Camerer’s (2012) setup firms can be hit by a publicly observable stochastic shock in each of the trading periods that prevents hiring for the coming three periods. The authors find that these stochastic disturbances of working relations do not have negative effects on wages and effort levels.

In contrast to the existing studies the focus of our experimental study is on employment relations in which the employer is threatened to be hit by an exogenous shock. We exclude confounding factors such as opportunities to lay off workers or market interactions by using a fixed and exogenous matching rule. Furthermore, we provide information about the actual occurrence of the shock to both parties. This allows us to rule out potential tensions between contracting parties emerging from information asymmetries.\(^3\)

2 Experimental design

At the beginning of the experiment subjects are randomly assigned either the role of an employer or that of an employee and exogenously matched on a one-to-one basis. Interaction takes place anonymously.\(^4\) We run a two-period gift-exchange game, using

\(^3\)Cf. Li and Matouschek (2011), who study the impact of asymmetric information in a relational contracts model.

\(^4\)We apply a natural framing using expressions such as “employer”, “employee” and “economic crisis” in the instructions. Those can be found in the Appendix.
Brandts and Charness (2004) symmetric and linear payoff functions. The first period payoff functions of employers and employees are equal across all three treatments. At the beginning of period 1 both parties receive an endowment of 10. First the employer chooses a wage $w$ from the integer set \{0, 1, ..., 10\}. The wage is multiplied by 5 and transferred to the employee. The employee subsequently decides which effort level $e$ from the integer set \{0, 1, ..., 10\} she wants to give back. This effort level is multiplied by 5 and sent to the employer. In both periods and in all treatments the employer furthermore indicates a desired non-binding effort level. This is communicated to the employee besides the chosen wage level before she makes her effort decision.

In our benchmark treatment without shock realization (Prob0) the endowments, procedures and payoff functions in the second period are the same as in the first. In our main treatment (Prob50) the second period payoffs are in 50% of the cases the same as in the Prob0 treatment. In the other 50% of the cases employers are hit by an exogenous shock in the second period. In the second benchmark treatment (Prob100) the employer is hit by the shock in the second period for certain. If the shock occurs in the Prob50 and Prob100 treatment both parties still receive an endowment of 10 at the beginning of the second period. The employer’s wage choice is still multiplied by 5, but the effort level chosen by the employee is only multiplied by 2.5. The decreased marginal productivity resembles an exogenous shock like an economic crisis, in which firms receive a lower marginal gain on the product market for the same amount of their employees’ effort.\(^5\)

The main focus of the following analysis will be on the Prob50 treatment. First, it is in a sense more comparable to reality than the Prob100 treatment as a firm faces a future period of economic distress only with a certain probability (which is in most cases not equal to 1). Second, it comes with the methodological advantage that we can compare the Prob50 treatment variants in terms of payoffs to either of the respective benchmark treatments. Third, a comparison of the two second period variants of the Prob50 treatment allows us to study the behavior in the face of the shock holding the history from period 1 constant. And finally, this treatment provides the opportunity to study the behavior of employers who have been threatened but are finally not hit by the shock in the second period.

Table 1 summarizes employers’ and employees’ payoff functions for all treatments. Note that subjects have full information about the whole procedure of the experiment. In particular, the fact that the employer is going to (or can potentially) be hit by an exogenous shock in the second period in the Prob100 and Prob50 treatment and the resulting payoff functions are explained to both parties before the start of the experiment. Moreover, at the beginning of period 2 the employer as well as the employee are informed whether the shock actually occurs or not. To clarify the payoff calculations two examples are given in the instructions. Additionally, we ask control questions concerning the sequence of actions during the experiment and the monetary consequences of the subjects’ decisions.

Using Brandts and Charness (2004) payoff functions in our experimental setup comes with several advantages: First, due to their linearity the marginal effect of effort is inde-

\(^5\)A similar idea is for example also used in the search and matching literature (see e.g. Mortensen and Pissarides, 1999).
ependent from the wage. Second, given the symmetry in all periods in which the employer is not hit by the shock, equality of wage and effort yields a simple benchmark for evaluating the degree of employees’ social preferences. And finally, the non-symmetry in case the shock occurs makes it transparent how it affects the employer.

Table 1: Payoff functions across treatments

<table>
<thead>
<tr>
<th></th>
<th>Period 1</th>
<th>Period 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No shock</td>
<td>Shock realized</td>
</tr>
<tr>
<td><strong>Prob0</strong></td>
<td>$\Pi_{employer} = 10 - w + 5e$</td>
<td>$\Pi_{employer} = 10 - w + 5e$</td>
</tr>
<tr>
<td></td>
<td>$\Pi_{employee} = 10 - e + 5w$</td>
<td>$\Pi_{employee} = 10 - e + 5w$</td>
</tr>
<tr>
<td><strong>Prob50</strong></td>
<td>$\Pi_{employer} = 10 - w + 5e$</td>
<td>$\Pi_{employer} = 10 - w + 2.5e$</td>
</tr>
<tr>
<td></td>
<td>$\Pi_{employee} = 10 - e + 5w$</td>
<td>$\Pi_{employee} = 10 - e + 5w$</td>
</tr>
<tr>
<td><strong>Prob100</strong></td>
<td>$\Pi_{employer} = 10 - w + 5e$</td>
<td>$\Pi_{employer} = 10 - w + 2.5e$</td>
</tr>
<tr>
<td></td>
<td>$\Pi_{employee} = 10 - e + 5w$</td>
<td>$\Pi_{employee} = 10 - e + 5w$</td>
</tr>
</tbody>
</table>

Effort $e \in [0, 10]$ , wage $w \in [0, 10]$ 

The experiment was conducted at the FLEX laboratory of Goethe University Frankfurt. All subjects were undergraduate students from different disciplines at the university and were recruited via ORSEE (Greiner, 2004). Altogether 129 employer-employee pairs participated (258 subjects in total), split into 35 independent observations in the **Prob0**, 60 observations in the **Prob50** (30 with shock realization, 30 without) and 34 observation in the **Prob100** treatment. A session lasted approximately 60 minutes. All decisions were made on a computer screen using z-Tree (Fischbacher, 2007). During the sessions, a fictitious experimental currency called “Taler” was used at an exchange rate that was announced in advance (1 Taler equates 0.15 Euro). Talers were converted into Euros at the end of the experiment when subjects got paid out in private. On average subjects earned 15.02 Euro including a show-up fee of 5 Euro.

3 Potential effects of the exogenous shock

The predictions under standard assumptions of payoff maximizing individuals are straightforward. As the game is finitely repeated and wage and effort choices above the minimum level are costly, neither employers nor employees will choose positive wage or effort levels in any treatment.

Obviously, the resulting payoffs are Pareto-dominated by more cooperative play and there is considerable scope for cooperation to improve joint payoffs. Numerous experiments have shown that many individuals do not act in a purely selfish manner, but reveal social preferences (for an overview see Fehr and Schmidt, 2006). Reciprocal behavior is a commonly observed pattern in experiments. Particularly interesting for our study are experiments based on Akerlof’s (1982) gift-exchange theory showing that the norm of reciprocity is an effective contract enforcement device in the presence of incomplete contracts (see among others Fehr et al., 1993 and Fehr et al., 1997). The main result in these studies is that workers’ efforts are positively related to the wage level provided. For employers, who anticipate that a non-negligible proportion of the population is endowed
with reciprocal preferences, it pays off to choose generous wages, thereby appealing to their employees’ reciprocity.

With the present experiment we want to investigate how reciprocal behavior is affected if one of the contracting parties - in our case the employer - is threatened to be hit by an exogenous shock. Given that the shock affects the behavior of employers and their employees, it might in general lead to two contrasting behavioral hypotheses: On the one hand, reciprocity could be spoiled as both parties, especially the employer, want to save their endowments in the face of the shock. This would lead to similar behavioral predictions as under standard assumptions. Employers shy away from investing into a reciprocal employment relationship and pay the lowest possible wages. In this case selfish as well as reciprocal employees react with zero effort choices. We would thus expect to observe on average lower wages and associated effort levels in the Prob50 and Prob100 compared to the Prob0 treatment.

On the other hand, reciprocal behavior might be enhanced if individuals try to mitigate the negative consequences of the shock by stronger cooperation. In the following we will derive hypotheses in accordance with this view.

Considering the second period we first focus on the behavior if the shock occurs. Observations from interview studies indicate that employees are willing to help their firms in difficult economic times, such as recessions by accepting wage reductions (e.g. Bewley, 1999, 2005; Charness and Levine, 2002; Kahneman et al., 1986). Also lab experiments on first movers’ intentions (Charness, 2004; Falk and Fischbacher, 2006) and field experiments on wage reductions (e.g. Chen and Horton, 2009) support this thesis. Their results suggest that low wages are not negatively reciprocated, as long as the employer can credible claim that she was forced to take this step by exogenous factors. As the employer in our experiment has no influence on the occurrence of the shock in the second period of the Prob50 and Prob100 treatment, we predict that employees do not negatively reciprocate lower wages with lower or even zero effort choices if the shock occurs, but instead help their employers.

Next we turn to the first period. Due to the prospect of a future shock, employers in the Prob50 and Prob100 treatment are (or at least perceive to be) more reliant on the generous behavior of their employees. For them the only way to compensate for the potential “loss” resulting from the shock in the second period is receiving a correspondingly higher effort level from the employee’s side. A well-functioning gift-exchange relation is a prerequisite for this. We expect employers to lay its foundations at an early stage: By paying comparatively high wages already in period 1 they induce their employees to exert non-zero effort levels if they are hit by the shock in period 2. In that sense, employers appeal to their employees’ reciprocity as a kind of insurance device against losses if the shock occurs. Andreoni and Samuelson (2006) describe a similar mechanism in their paper. The authors show theoretically and experimentally that as the second period in a two-period prisoner’s dilemma game becomes relatively more important in terms of payoffs, individuals are increasingly willing to invest in cooperation already in the first period to

Footnote: For instance in Fischbacher et al.’s (2001) study approximately half their population are conditional cooperators.
encourage second period cooperation from the conditional cooperative types.\textsuperscript{7} We thus hypothesize to observe higher first period wages in the \emph{Prob50} and \emph{Prob100} treatment compared to the \emph{Prob0} treatment.

4 \hspace{1em} Results

In line with previous gift-exchange experiments our results indicate an overall positive relationship between wage and effort choices across all treatments. Table 2 provides an overview of wage and effort choices in both periods of the game. In the following we will study the interplay of both parties’ behavior in more detail.

Table 2: Average wages and effort levels across treatments

<table>
<thead>
<tr>
<th></th>
<th>Period 1</th>
<th>Period 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>wage</td>
<td>effort</td>
</tr>
<tr>
<td>\emph{Prob0}</td>
<td>6.286</td>
<td>6.486</td>
</tr>
<tr>
<td></td>
<td>(s.d. 2.27)</td>
<td>(s.d. 2.85)</td>
</tr>
<tr>
<td>\emph{Prob50}</td>
<td>7.283</td>
<td>6.817</td>
</tr>
<tr>
<td></td>
<td>(s.d. 1.90)</td>
<td>(s.d. 2.23)</td>
</tr>
<tr>
<td>\emph{Prob100}</td>
<td>7.059</td>
<td>6.235</td>
</tr>
<tr>
<td></td>
<td>(s.d. 2.56)</td>
<td>(s.d. 3.15)</td>
</tr>
</tbody>
</table>

4.1 Gift-exchange in the second period if the shock occurs

In a first step we analyze the employers’ behavior if the shock actually occurs. For this we compare second period wage choices from the two treatment variants of the \emph{Prob50} treatments. As both have in terms of expectations the same history from period 1, comparing the treatment variant in which the exogenous shock occurs to the one in which it does not offers a clean way to study the behavioral effects of the shock. As reported in Table 2 the average wages amount to 5.333 in case the shock realizes compared to 6.833 when the employers are not hit by the shock.

The lower two histograms in Figure 1 display the wage distribution in these treatment variants. As becomes evident from Table 2 and Figure 1, employers pay significantly lower wages when they are hit by the shock (Mann-Whitney rank-sum test, p = 0.045).\textsuperscript{8} Thus, we indeed find that the shock has a negative effect on wage choices.

The corresponding employees’ average effort choices across treatments are presented in the last column of Table 2. The average effort amounts to 5.133 if the shock realizes and 6.100 if it does not. This difference is insignificant according to a Mann-Whitney rank-sum test (p = 0.237). To evaluate the employees’ reciprocal behavior in a cleaner

\textsuperscript{7}Note that their model describes a simultaneous game, whereas we use a sequential setup. Nevertheless we expect similar mechanisms to be at work in our experiment.

\textsuperscript{8}Note that all p-values from Mann-Whitney rank-sum tests reported in this paper are two-sided.
way, we construct a variable that conditions on the previously paid wages. It measures the employment relation’s specific effort-wage ratio, which is for each period $t$ separately defined as

$$reciprocity_t = \frac{\text{effort}_t}{\text{wage}_t}, t = 1, 2.$$  

For an employee who behaves completely reciprocally, this variable takes on the value one.

The distribution of this reciprocity measurement for the second period across treatments is depicted in Figure 2. The lower histograms present the reciprocity measures in

Note that this measure is only defined for non-zero wage choices. This leads to two missing values in the first period and five missing values in the second period. To deal with this fact we use the difference between effort and wage choices as a second reciprocity measure. Applying this second measure yields similar results to those reported in the paper.
the two Prob50 treatment variants. It turns out that employees do not react significantly different on received wages depending on whether their employers are hit by the shock or not (mean values: 1.005, s.d. 0.51 vs. 0.914, s.d. 0.40), Mann-Whitney rank-sum test, \( p = 0.413 \)). This is remarkable given that, as we have seen above, employers lower their wages significantly if they are hit by the shock. This leads us to conclude:

Result 1: *Although employers pay on average lower period 2 wages if they are hit by the shock, these wages are not negatively reciprocated by their employees.*

To investigate whether there is a supplementary effect of the shock that occurs for certain we compare the employers’ and employees’ second period behavior in the Prob100 to those cases from the Prob50 treatment in which the shock occurs. However, we find neither for employers’ wages nor for employees’ reciprocity any significant treatment effects (Mann-Whitney rank-sum tests, \( p = 0.645 \) and \( p = 0.422 \), respectively).10

### 4.2 Gift-exchange in the second period if the shock does not occur

Apart from the results regarding reciprocal behavior if the shock occurs, we wonder whether there is any effect of having been threatened, but finally not being hit by the exogenous shock. For this purpose we compare the second period decisions in the Prob0 treatment to those cases from the Prob50 treatment where the employers are not hit by the shock. Ex-post both treatments have identical payoff structures.

Results regarding wage setting behavior can be drawn from the two left histograms in Figure 1. For the cases from the Prob50 treatment, in which the shock does not occur, the wage distribution is shifted to the right compared to the Prob0 treatment. As reported in Table 2 The average period 2 wage amounts to 6.833, which is slightly, but insignificantly higher than the average chosen wage of 5.714 in the Prob0 treatment (Mann-Whitney rank-sum test, \( p = 0.170 \)).

The question arises how employees react to these fairly similar wages. The employees’ reactions are depicted in the two left histograms in Figure 2. For the Prob0 treatment we find the usually observed drop in effort levels in the last period of experiments, which is reflected in the mean value of the reciprocity measure of 0.561 (s.d. 0.46). On the contrary, in the Prob50 treatment the observations are more centered around 1, indicating that employees choose on average the same effort level as they have received as wage (mean reciprocity: 0.914, s.d 0.40). The difference in effort reciprocity is highly significant according to a Mann-Whitney rank-sum test, \( p = 0.010 \).11 The finding is summarized in our next result:

Result 2: *In case employers are not hit by the shock, employees’ second period reciprocity is significantly higher if their employers have previously been threatened by the shock.*

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10 For the sake of completeness, the average employees’ reciprocity amounts to 0.936 (s.d. 0.74) in the Prob100 treatment.

11 A further Mann-Whitney rank-sum test confirms that also the difference in effort levels across the Prob0 and the respective Prob50 treatment is highly significantly (\( p = 0.005 \)).
Figure 2 reveals an additional interesting fact. In all histograms except in the one for the *Prob0* treatment the reciprocity measure’s distribution is virtually centered around 1. In the *Prob0* treatment on the contrary the mass of the distribution is below 1. Thus, in all cases in which the employer has been threatened by the shock in the first period, employees are significantly more reciprocal in the second period (Mann-Whitney-rank-sum tests: $p = 0.024$ for *Prob0* vs. *Prob100*, $p = 0.002$ for *Prob0* vs. cases in which shock occurs from *Prob50*). We will discuss possible explanations for the observed second period behavior in Section 2.5.

4.3 Gift-exchange in the first period

To investigate how the threat of the exogenous shock affects wages and efforts already in the first period, we start by comparing those decisions from the *Prob0* and the *Prob50* treatment. In terms of payoff functions the treatments are the same. They only differ in the fact that employers in the *Prob50* treatment can potentially be hit by the shock in the next period.

Figure 3: Wage choices in period 1, by treatment

The employers’ wage decisions are depicted in Figure 3. The upper and middle histogram reveal an interesting fact: The modal value of chosen wages is 5 in the *Prob0* treatment compared to 10 in the *Prob50* treatment. Furthermore, the distribution of wages is shifted to the right in the *Prob50* treatment (Mann-Whitney rank-sum test, $p = 0.027$). As displayed in Table 2, employers in the *Prob50* treatment pay an average wage of 7.283 compared to 6.286 in the *Prob0* treatment.

The wage setting behavior in the *Prob100* treatment is almost identical to the one observed in the *Prob50* treatment (Mann-Whitney rank-sum test, $p = 0.920$). The modal value of wages is also 10, the average wage amounts to 7.059 which leads to our third result:

Result 3: *Employers who are threatened to be hit by the shock in the second period pay higher wages in period 1. There is no difference with regard to whether the shock occurs*
for certain or only with 50% probability.

Figure 4 depicts the distributions of the above defined reciprocity measure applied to the first period wage and effort choices. We observe no significant differences in employees’ reciprocal behavior in the first period across treatments (Mann-Whitney rank-sum tests: p = 0.428 for Prob0 vs. Prob50, p = 0.291 for Prob50 vs. Prob100). This is interesting, as it indicates that employees in the Prob50 and Prob100 treatments do not help their employers beforehand, but only in the second period of the game when the shock actually occurs.

Figure 4: Employees’ reciprocity in period 1, by treatment

5 Intertemporal link between first and second period behavior

The question remains what explains the considerably more reciprocal behavior of employers in the second period of the Prob50 and Prob100 treatments compared to the Prob0 treatment. Models of inequity aversion (e.g. Fehr and Schmidt, 1999 and Bolton and Ockenfels, 2000) cannot provide an answer, as according to them the employees’ behavior should not differ across treatments. However, one explanation for this finding could be the employers’ wage choices, in particular those in period 1. As suggested by Andreoni and Samuelson’s (2006) findings they potentially lay the foundation to cooperative behavior in future periods.

In a first step we study the effect of being threatened by the shock. For this purpose we restrict our analysis to employment relations from the Prob0 and Prob50 treatment that are not hit by the shock. They have ex-post identical payoff structures and differ

\[ \text{mean values amount to 1.118 (s.d. 0.74) in the Prob0, 0.950 (s.d. 0.27) in the Prob50 and 0.887 (s.d. 0.35) in the Prob100 treatment.} \]
only in the fact that employers in the \textit{Prob50} treatment have ex-ante been threatened to be hit by the shock.

In an OLS regression we study the impact of first period wages on second period effort levels. For this we include period 1 wages, a treatment dummy (which is set to 1 for the \textit{Prob50} treatment) and an interaction term of this wage and the treatment dummy as independent variables.\footnote{Note that we cannot include second period wages as a control variable because of their high correlation with first period wages.} Second period effort levels are used as the dependent variable. As shown in column (1) in Table 3, we find a highly significant positive effect of first period wages on last period effort choices in the baseline treatment, namely the \textit{Prob0} treatment.\footnote{A similar observation has been made in Brown et al.’s (2004) 15-period gift-exchange experiment. They show that high effort levels in the last period of the game can be explained by a successful reciprocal employer-employee relationship in previous periods.} Furthermore, the coefficient of the interaction term is not significant. This indicates that the effect of the first period wage on second period effort is not statistically different between the \textit{Prob0} and the \textit{Prob50} treatment. Hence, period 1 wages have in both treatment variants a positive effect in second period effort choices.

<p>| Table 3: Determinants of second period effort choices, OLS regression |
|---------------------------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th></th>
<th>No shock</th>
<th>Shock realized</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Wage in period 1</td>
<td>0.666***</td>
<td>0.744***</td>
</tr>
<tr>
<td></td>
<td>(0.24)</td>
<td>(0.21)</td>
</tr>
<tr>
<td>\textit{Prob50} Treatment</td>
<td>3.776</td>
<td>5.357*</td>
</tr>
<tr>
<td></td>
<td>(2.85)</td>
<td>(2.76)</td>
</tr>
<tr>
<td>Wage in period 1 x \textit{Prob50} Treatment</td>
<td>-0.264</td>
<td>-0.696*</td>
</tr>
<tr>
<td></td>
<td>(0.40)</td>
<td>(0.36)</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.560</td>
<td>-0.576</td>
</tr>
<tr>
<td></td>
<td>(1.59)</td>
<td>(1.60)</td>
</tr>
<tr>
<td>Sample size</td>
<td>65</td>
<td>64</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.240</td>
<td>0.173</td>
</tr>
</tbody>
</table>

\textit{***} \textit{p} < 0.01, \textit{**} \textit{p} < 0.01; Standard errors are given in parenthesis. Note that in model (1) we use the \textit{Prob0} treatment as baseline treatment, in model (2) the \textit{Prob100} treatment.

In a next step we focus on those treatment variants in which the shock is realized in period 2. For this purpose we concentrate on employment relations from the \textit{Prob100} and \textit{Prob50} treatment that are hit by the shock. Note that both have ex-post identical payoff structures. They only differ in the fact that employers in the \textit{Prob100} treatment know ex-ante that they are going to be hit by the shock for certain. Again we use second period effort choices as the dependent variable and regress them on wages in period 1, a treatment dummy (which is set to 1 for the \textit{Prob50} treatment) and an interaction term of those two variables. In this regression the \textit{Prob100} treatment constitutes the baseline treatment. As shown in column (2) of Table 3 also in the \textit{Prob100} treatment period 1 wages have a significantly positive effect on second period effort choices when the shock occurs. But the interaction term’s coefficient indicates that the effect of first period wages
is significantly less strongly pronounced in the \textit{Prob50} treatment (although the total effect is still positive). However, as indicated by the positive coefficient of the treatment dummy, effort levels in the \textit{Prob50} treatment are in general significantly larger compared to the \textit{Prob100} treatment.

6 Efficiency

In a final step we investigate whether the introduction of a (potential) exogenous shock has a positive or negative effect on overall payoffs and efficiency. For this purpose we compare the sum of employer’s and employee’s payoffs over both periods across treatments. The mean overall payoffs amount to 128.457 (s.d. 38.68) in the \textit{Prob0}, 136.783 (s.d. 29.99) in the \textit{Prob50} and 122.662 (s.d. 34.84) in the \textit{Prob100} treatment. Average overall payoffs in the \textit{Prob50} treatment are thus slightly higher compared to the two benchmark treatments, but the differences across treatments are only marginally significant or even insignificant.\footnote{Comparing the distribution of overall payoffs in the \textit{Prob0} and the \textit{Prob50} treatment the Mann-Whitney rank-sum test reveals a p-value of 0.305. The respective p-value for the comparison of the \textit{Prob0} and the \textit{Prob100} treatments equals 0.653 and amounts to 0.092 when comparing the \textit{Prob50} and the \textit{Prob100} treatment.}

In all treatments the employees receive the major part of the overall payoffs. The average employers’ share is 44.96\% (s.d. 9.46\%) in the \textit{Prob0}, 45.28\% (s.d. 6.64\%) in the \textit{Prob50} and 40.82\% (s.d. 9.35\%) in the \textit{Prob100} treatment.

Note that the absolute overall payoffs must be taken with a grain of salt as the realizable amount of overall payoffs differs across treatments due to the lower productivity factor in case the shock is realized. To take this into account we define a more sound measure which we call realized efficiency. This variable is defined as

\[
\text{realized efficiency} = \frac{\text{actual employer's and employee's total earnings}}{\text{max. possible employer's and employee's total earnings}}.
\]

Here the maximum possible sum of payoffs would be achieved if both parties had always invested their full endowments.\footnote{To give an example: For the treatment variants without shock in the second period the maximum achievable efficiency amounts to 200 points. If both parties choose wage and effort levels of 5 in both periods, the efficiency equals 120 points. The realized efficiency measure is thus 120/200 = 60\%.} This measure takes into account that the realizable amount of maximum efficiency is lower when the employer is hit by the shock. The box and whiskers diagram in Figure 5 illustrates the distribution of realized efficiency levels across treatments. The upper and lower limits of the boxes indicate the 75th and 25th percentile, respectively. The horizontal lines inside the boxes denote the median.

Interestingly, we find a positive effect of the shock on realized efficiency. Employment relations realize on average 64.22\% (s.d. 19.34\%) of the achievable efficiency in the \textit{Prob0} treatment. The corresponding numbers for the \textit{Prob50} and \textit{Prob100} treatments are 72.90\% (s.d. 14.89\%) and 70.09\% (s.d. 19.91\%), respectively. The comparison of the \textit{Prob50} and the \textit{Prob0} treatment indicates that the employer’s threat of being hit by the shock has a significant positive impact on realized efficiency (Mann-Whitney rank-sum test, p = 0.044). The findings concerning realized efficiency are almost identical in the
Figure 5: Realized efficiency, by treatment

Prob50 and Prob100 treatments (Mann-Whitney rank-sum test, p = 0.708), suggesting that similar arguments of disciplining effects of exogenous shocks on cooperative behavior and thus on efficiency can be given.

Result 4: Introducing a (potential) exogenous shock has a positive effect on overall realized efficiency.

Interestingly, the worst performing employment relations benefit the most from the threat of an exogenous shock: We conduct a quantile regression using realized efficiency as the dependent and Prob50 and Prob100 treatment dummies as independent variables. The Prob0 treatment serves as the baseline. The results are reported in Table 4. For the first quartile we find a large positive and significant impact of being threatened by the shock on efficiency in the Prob50 as well as in the Prob100 treatment. The effect decreases for the second quartile and vanishes for the third quartile.

Table 4: Realized efficiency across treatments and quartiles, quantile regression

<table>
<thead>
<tr>
<th>Treatment</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prob50</td>
<td>0.166**</td>
<td>0.080*</td>
<td>0.020</td>
</tr>
<tr>
<td></td>
<td>(0.07)</td>
<td>(0.04)</td>
<td>(0.05)</td>
</tr>
<tr>
<td>Prob100</td>
<td>0.151**</td>
<td>0.074</td>
<td>-0.023</td>
</tr>
<tr>
<td></td>
<td>(0.08)</td>
<td>(0.05)</td>
<td>(0.06)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.460***</td>
<td>0.640***</td>
<td>0.800***</td>
</tr>
<tr>
<td></td>
<td>(0.05)</td>
<td>(0.03)</td>
<td>(0.04)</td>
</tr>
</tbody>
</table>

Sample size 129 129 129
Pseudo $R^2$ 0.065 0.134 0.004

*p < 0.10, **p < 0.05, ***p < 0.01. Standard errors are given in parenthesis.
7 Conclusion

Does the threat of a shock hamper or strengthen the cooperation between individuals? To shed light on this question we ran a two period gift-exchange experiment.

In our main treatment, the employer is hit by an exogenous shock with 50% probability ($\text{Prob50}$) in the second period. In the benchmark treatment $\text{Prob0}$ employers are never affected by the shock, whereas in the $\text{Prob100}$ treatment the shock occurs for certain. We find that employers who are threatened to be hit by the shock offer significantly higher wages in the first period, irrespective of whether the probability of the later shock realization is 50% or if the shock occurs for certain. With these comparatively high wages they make an investment into a cooperative relationship with their employees, who indeed reciprocate their decision. In particular, employees in both, the $\text{Prob50}$ and the $\text{Prob100}$ treatment, reward the behavior of their employers by choosing an exceptional high effort level in the final period of the game - even if they are not hit by the shock. Our results thus imply that an exogenous shock need not necessarily have a negative impact on overall payoffs. On the contrary, in our experiment the realized efficiency is even higher if the employers have been threatened by the shock in period 1.

We therefore suggest that economic shocks can potentially have a positive impact on working relations as they lead employers to focus on and invest into reciprocal aspects of their employment relationships. In our experiment the only “gift” employers could make to their employees is to pay a comparatively high wage. In reality, however, firms have additional possibilities to invest into cooperative relationships with their employees, e.g. by providing job security or offering a good work-life-balance, which provide them with the opportunity to reap the benefits of this actions in economic downturns.
References


Appendix A: Translated Instructions [Not for Publication]

[All treatments:

Instructions for the experiment
For your punctual presence you will be paid 5 Euro, independent of your decisions in the experiment. During the experiment you can earn additional money depending on your decisions and those of the other participants. The total amount of money will be paid to you in cash at the end of the experiment.
In the following you will find the instructions for the experiment. Please read them carefully. Afterwards the experiment will be run on the computer.
Important:

- During the experiment we use a currency called Taler. You will be paid in Euros at the end of the experiment. One Taler equals 0.15 Euro.
- In the experiment you are randomly matched to another person.
- You participation is absolutely anonymous. Also after the experiment no identities will be revealed.
- Please do not communicate with other participants during the experiment.
- If you have any questions, please raise your hand and we will come to help you.

Instructions

During the experiment you will either assume the role of an employer or that of an employee. The role will be assigned to you randomly. The information is given by the computer at the beginning of the experiment.
During the experiment each employer is matched to one employee. The experiment consists of two periods. In both periods you are matched with the same employer or employee, respectively.

Summary

The experiment consists of two periods. In both periods, the employer first decides about the wage that he pays to the employee. Subsequently the employee decides about his effort level.

[Prob50 and Prob100 additionally:

In the first period the wage and effort choices take place under normal economic conditions.]

[Prob50 additionally:

Independent of the decisions in the first period, the employer can be hit by an economic crisis in the second period with 50% probability. As a result, his economic situation worsens.]

[Prob100 additionally:

Independent of his decisions in the first period, the employer is going to be hit by an economic crisis in the second period. As a result, his economic situation worsens.]

[All treatments:

Employer specific instructions
An employee is randomly matched to you as the employer. Your matching is fixed for
both periods (i.e. over the whole course of the experiment).

*Period 1*
Both you and the employee, respectively receive an endowment of 10 Taler. First, you as
the employer decide about the wage for your corresponding employee. The wage can be
between 0 and 10 Taler; only integer amounts can be selected. The wage generates costs
for you equal to the amount of the wage. The wage is multiplied by 5 and paid to the
employee. Moreover, you can indicate a desired effort level that you wish to receive from
him. However, he need not stick to your wish.
After you have entered your decisions into the computer, they are communicated to the
employee. Subsequently he decides about the effort level he provides.
The effort level can be between 0 and 10; only integer amounts can be selected. The effort
choice generates costs for the employee equal to the amount of the effort level. The effort
level is multiplied by 5 and paid to you.

[Prob50 and Prob100 additionally:
In the first period the economic conditions are normal.]
[All treatments:
In total, your income and the income of your corresponding employee in the first period are calculated as follows:
Your income (as an employer): 10 Taler - (Your wage choice in Taler) + (Employee’s chosen effort in Taler) * 5
Income of your corresponding employee: 10 Taler - (Employee’s chosen effort in Taler) + (Your wage choice in Taler) * 5
After the employee has taken his decision you are informed about your income and the income of your corresponding employee, respectively. This terminates the first period.]

[All treatments:
Period 2
In the second period, the same employee as in the first period is matched to you.]

[Prob0:
The experiment proceeds exactly like in the first period. Both, you and the employee receive an endowment of 10 Taler. First you take your decision on the wage between 0 and 10 Taler, which you pay to the employee and state a desired effort level. The wage, which you pay to the employee, is multiplied by 5 and paid to him. Subsequently the employee decides about his effort level (also between 0 and 10). As in period 1, the effort level of the employee is multiplied by 5 and is paid to you.]

[Prob50:
The experiment proceeds similarly to the first period. However, there is one distinguishing feature: With 50% probability there are the same normal economic conditions as in period 1, with 50% probability you as employer are hit by an economic crisis. Whether you are hit by the crisis is determined randomly by the computer and is announced to you and the employee before the commencement of the second period.
In case of normal economic times as well as in the case of an economic crisis the basic design of the experiment is equivalent to the one from period 1. As in period 1 both, you and the employee receive an endowment of 10 Taler. In both cases you take your decision on the wage between 0 and 10 Taler, which you pay to the employee and state a desired effort level. Subsequently the employee decides about his effort level (also between 0 and 10).
In case of normal economic conditions the effort level of the employee is multiplied by 5 and paid to you, as in period 1. Also the wage, which you pay to the employer, is multiplied by 5 and paid to him.]

[Prob100:
The experiment proceeds similarly to the first period. However, there is one distinguishing feature. You as an employer are hit by an economic crisis in the second period. The basic design of the experiment in the economic crisis is the same as in period 1. As in period 1, both you and the employee receive an endowment of 10 Taler. First you take your decision on the wage between 0 and 10 Taler, which you pay to the employee and state a desired effort level. Subsequently the employee decides about his effort level (also between 0 and 10).]

[Prob 50 and Prob100:
The crisis affects you in that the effort level of the employee is in this case not multiplied by 5 anymore, but only by 2.5 before being paid to you. The wage that you pay to the employee is still multiplied by 5 and paid to him.
IMPORTANT: Only you as the employer are hit by the crisis in the second period, as the
employee’s effort level is only multiplied by 2.5 in times of crisis.

[All treatments:
In total, your income and the income of your corresponding employee in the second period are calculated as follows:]

[Prob0:
Your income: 10 Taler - (Your wage choice in Taler) + (Employee’s chosen effort in Taler) * 5]

[Prob50:
Your income (as an employer):
If you are not hit by the crisis (probability: 50%): 10 Taler - (Your wage choice in Taler) + (Employee’s chosen effort in Taler) * 5
If you are hit by the crisis (probability: 50%): 10 Taler - (Your wage choice in Taler) + (Employee’s chosen effort in Taler) * 2.5]

[Prob100:
Your income (as an employer in times of crisis): 10 Taler - (Your wage choice in Taler) + (Employee’s chosen effort in Taler) * 2.5]

[All treatments:
Income of your corresponding employee [in Prob50 additionally: (in both cases)]: 10 Taler - (Employee’s chosen effort in Taler) + (Your wage choice in Taler) * 5
After the employee took his decision you are informed about your income and the income of your corresponding employee, respectively.]

[All treatments:
Employee specific instructions
An employer is randomly matched to you as the employee. Your matching is fixed for both periods (i.e. over the whole course of the experiment). Both you and the employer, respectively receive an endowment of 10 Taler.
First, your corresponding employer decides about your wage. The wage can be between 0 and 10 Taler; only integer amounts can be selected. The wage generates costs for the employer equal to the amount of the wage. The wage is multiplied by 5 and paid to you. Moreover, the employer can indicate a desired effort level that he wishes to receive from you. However, you need not stick to his wish.
After the employer has entered his decisions into the computer, they are communicated to you. Subsequently you decide about your effort level. The effort level can be between 0 and 10; only integer amounts can be selected. The effort choice generates costs for you equal to the amount of the effort level. The effort level is multiplied by 5 and paid to the employer.

Period 1]
[Prob50 and Prob100 additionally:
The economic conditions are normal in the first period.]

[All treatments:
In total, your income and the income of your corresponding employer in the first period are calculated as follows:}
Your income (as an employee): 10 Taler - (Your effort choice in Taler) + (Employer’s wage choice in Taler) * 5
Income of your corresponding employer: 10 Taler - (Employer’s wage choice in Taler) + (Your effort choice in Taler) * 5
Subsequently you are informed about your income and the income of your corresponding employer. This terminates the first period.

Period 2
In the second period, the same employer as in the first period is matched to you.

[Prob0:
The experiment proceeds exactly like in the first period. Both, you and the employer receive an endowment of 10 Taler. First the employer takes his decision about the wage between 0 and 10 Taler, which he pays to you and states a desired effort level. The wage that the employer pays to you, is multiplied by 5 and is paid to you. Subsequently you decide about your effort level (also between 0 and 10). As in period 1, the effort level is multiplied by 5 and is paid to the employer.]

[Prob50: The experiment proceeds similarly to the first period. However, there is one distinguishing feature: With 50% probability there are the same normal economic conditions as in period 1, with 50% probability your corresponding employer is hit by an economic crisis. Whether he is hit by the crisis is determined randomly by the computer and is announced to you and the employer before the commencement of the second period. In case of normal economic times as well as in the case of economic crisis the basic design of the experiment is equivalent to the one from period 1. As in period 1 both, you and the employer receive an endowment of 10 Taler. In both cases first the employer takes his decision on the wage between 0 and 10 Taler, which he pays to you and states a desired effort level. Subsequently you decide about your effort level (also between 0 and 10). In case of normal economic conditions the effort level that you have chosen is multiplied by 5 and paid to the employer, as in period 1. Also the wage, which the employer pays, is multiplied by 5 and is paid to you.]

[Prob100:
The experiment proceeds similarly as in the first period. However, there is one distinguishing feature. Your corresponding employer is hit by an economic crisis in the second period. The basic design of the experiment in the economic crisis is the same as in period 1. As in period 1, both you and the employer receive an endowment of 10 Taler. First the employer takes his decision on the wage between 0 and 10 Taler, which he pays to you and states a desired effort level. Subsequently you decide about your effort level (also between 0 and 10).]

[Prob50 and Prob100: The crisis affects the employer in that your effort level is not multiplied by 5 anymore, but only by 2.5 before being paid to him. The wage that the employer pays to you is still multiplied by 5 and paid to you.]

[Prob 50: IMPORTANT: Only the employer can be hit by the crisis in the second period, as the effort level that you as employee choose is only multiplied by 2.5 in times of crisis.]

[Prob100:]
**Important:** Only the employer is hit by the crisis in the second period, as the effort level that you as employee choose is only multiplied by 2.5 in times of crisis.

[All treatments:
In total, your income and the income of your corresponding employer in the second period are calculated as follows:
Your income (as an employee): 10 Taler - (Your effort choice in Taler) + (Employer’s wage choice in Taler) * 5]

[Prob0:
Income of your corresponding employer: 10 Taler - (Employer’s wage choice in Taler) + (Your effort choice in Taler) * 5]

[Prob50:
Income of your corresponding employer:
If he is not hit by the crisis (probability: 50%): 10 Taler - (Employer’s wage choice in Taler) + (Your effort choice in Taler) * 5
If he is hit by the crisis (probability: 50%): 10 Taler - (Employer’s wage choice in Taler) + (Your effort choice in Taler) * 2.5]

[Prob100:
Income of your corresponding employer (in times of crisis): 10 Taler - (Employer’s wage choice in Taler) + (Your effort choice in Taler) * 2.5]

[All treatments:
Subsequently you are informed about your income and the income of your corresponding employer, respectively. This terminates the second period.]

[All treatments:

Payoff examples

Example 1 (period 1):
The employer chooses a wage of 7 Taler and states a desired effort level of 7. The employee chooses an effort level of 4.
The employer thus earns: 10 Taler - 7 Taler + (4 Taler) * 5 = 23 Taler.
The employee earns: 10 Taler - 4 Taler + (7 Taler) * 5 = 41 Taler.]

[Prob0: Example 2 (period 2);] / [Prob50: Example 2 (period 2, the crisis does not occur);]

[Prob0 and Prob50:
The employer chooses a wage of 3 Taler and states a desired effort level of 5. The employee chooses an effort level of 5.
The employer thus earns: 10 Taler - 3 Taler + (5 Taler) * 5 = 32 Taler.
The employee earns: 10 Taler - 5 Taler + (3 Taler) * 5 = 20 Taler.]

[Prob50 (additionally) and Prob100:
Example 2 (period 2, the crisis occurs):
The employer chooses a wage of 5 Taler and states a desired effort level of 8. The employee chooses an effort level of 5.
The employer thus earns: 10 Taler - 5 Taler + (5 Taler) * 2.5 = 17.50 Taler.
The employee earns: 10 Taler - 5 Taler + (5 Taler) * 5 = 30 Taler.]
[All treatments:]

**Control questions**

Please answer the following control questions. They merely serve to familiarize you with the experimental design and the payoffs, which result from the participants’ decisions.

1) Which of the following statements applies?
   - In the first as well as in the second period first the employee chooses an effort level and subsequently the corresponding employer chooses the wage. / In the first as well as in the second period first the employer chooses a wage and subsequently the corresponding employee chooses an effort level. / In the first period, first the employer chooses a wage and subsequently the corresponding employee chooses an effort level. In the second period, first the employee chooses an effort level and subsequently the employer a wage.

[Prob50 additionally:]
2) When will the employer and his corresponding employee receive the information whether the employer is actually hit by an economic crisis? Before the first period starts / before the second period starts / at the end of the experiment.

[Prob50 and Prob100 additionally:]
3) How does the economic crisis affect the employer, how does it affect the employee?

[Prob0:]
4) In the first period, the employer decides to pay a wage of 4 Taler to his corresponding employee and states a desired effort level of 10. The employee chooses an effort level of 6.
   a) How much does the employer earn, how much does the employee earn in the first period?
   b) How much does the employer earn in the second period, how much does the employee earn in the second period?

5) In the first period, the employer decides to pay a wage of 6 Taler to his corresponding employee and states a desired effort level of 5. The employee chooses an effort level of 4.
   a) How much does the employer earn, how much does the employee earn in the first period?
   b) How much does the employer earn in the second period, how much does the employee earn in the second period?

[Prob50:]
4) In the first period, the employer decides to pay a wage of 4 Taler to his corresponding employee and states a desired effort level of 10. The employee chooses an effort level of 6.
   a) How much does the employer earn, how much does the employee earn in the first period?
   b) How much does the employer earn in the second period, how much does the employee earn in the second period?
5) In the first period, the employer decides to pay a wage of 6 Taler to his corresponding employee and states a desired effort level of 5. The employee chooses an effort level of 4.
   a) How much does the employer earn, how much does the employee earn in the first period?
   b) How much does the employer earn in the second period, how much does the employee earn in the second period?

At the beginning of the second period both parties receive the information that the employer is not hit by the economic crisis. The employer decides to pay a wage of 8 Taler and states a desired effort level of 7. The employee chooses an effort level of 5.
   b) How much does the employer earn in the second period, how much does the employee earn in the second period?

At the beginning of the second period both parties receive the information that the employer
is hit by the economic crisis. The employer decides to pay a wage of 5 Taler and states a
desired effort level of 10. The employee chooses an effort level of 8.
b) How much does the employer earn in the second period, how much does the employee
earn in the second period?

[Prob100:
4) In the first period, the employer decides to pay a wage of 4 Taler to his corresponding
employee and states a desired effort level of 10. The employee chooses an effort level of 6.
a) How much does the employer earn, how much does the employee earn in the first period?
In the second period, the employer decides to pay a wage of 8 Taler and states a desired effort level of 7. The employee chooses an effort level of 5.
b) How much does the employer earn in the second period, how much does the employee
earn in the second period?
5) In the first period, the employer decides to pay a wage of 8 Taler to his corresponding
employee and states a desired effort level of 7. The employee chooses an effort level of 5.
a) How much does the employer earn, how much does the employee earn in the first period?
In the second period, the employer is hit by the economic crisis. The employer decides to
pay a wage of 5 Taler and states a desired effort level of 10. The employee chooses an
effort level of 8.
b) How much does the employer earn in the second period, how much does the employee
earn in the second period?

Appendix B: Original Instructions [Not for Publication]

[Alle treatments:
Anleitung zum Experiment
Für Ihr pünktliches Erscheinen erhalten Sie unabhängig von Ihren Entscheidungen im
Rahmen des Experiments 5 Euro. Im Laufe des Experiments können Sie durch Ihre
eigenen Entscheidungen und die Entscheidungen der anderen Teilnehmer zusätzliches Geld
verdienen. Der Gesamtbetrag des von Ihnen verdienten Geldes wird Ihnen am Ende des
Experiments von den Versuchsleitern bar ausgezahlt.
Im Folgenden finden Sie die Instruktionen für das Experiment. Bitte lesen Sie sich diese
sorgfältig durch. Im Anschluss führen wir das Experiment am Computer durch.
Wichtig:

• Die im Experiment benutzte Währung heißt Taler. Sie werden am Ende in Euro
ausgezahlt. Ein Taler entspricht 0,15 Euro.

• Im Rahmen des Experiments werden Sie zufällig einer anderen Person zugeordnet.

• Sie treten als vollkommen anonymer Teilnehmer auf. Auch im Anschluss an das
Experiment werden keinerlei Identitäten bekannt gegeben.

• Bitte unterhalten Sie sich während des Experiments nicht mit anderen Teilnehmern.

• Sollten Sie Fragen haben, heben Sie bitte die Hand, die Versuchsleiter werden Ihnen
daraufhin zur Hilfe kommen.

Instruktionen

Im Folgenden übernehmen Sie entweder die Rolle eines Arbeitgebers oder eines Arbeit-
nehmers. Welche Rolle Sie übernehmen, wird Ihnen zufällig zugeordnet und wird Ihnen
zu Beginn des Experiments über den Computer mitgeteilt. Im Rahmen des Experiments

Zusammenfassung
Das Experiment besteht aus zwei Perioden. In beiden Perioden entscheidet zuerst der Arbeitgeber über einen Lohn, den er dem Arbeitnehmer zahlt. Im Anschluss entscheidet der Arbeitnehmer über sein Leistungsniveau.

[Prob50 und Prob100 zusätzlich:
In der ersten Periode erfolgt die Wahl des Lohn- bzw. Leistungsniveaus unter normalen wirtschaftlichen Umständen.]

[Prob50 zusätzlich:
In der zweiten Periode kann der Arbeitgeber unabhängig von den in der ersten Periode getroffenen Entscheidungen mit einer Wahrscheinlichkeit von 50% in eine wirtschaftliche Krise geraten. Diese führt dazu, dass sich seine wirtschaftliche Situation verschlechtert.]

[Prob100 zusätzlich:
In der zweiten Periode gerät der Arbeitgeber unabhängig von den in der ersten Periode getroffenen Entscheidungen in eine wirtschaftliche Krise. Diese führt dazu, dass sich seine wirtschaftliche Situation verschlechtert.]

[Alle Treatments:
Spezifische Instruktionen für Arbeitgeber
Als Arbeitgeber wird Ihnen zufällig ein Arbeitnehmer zugeordnet, mit dem Sie über beide Perioden (d.h. über die gesamte Dauer des Experiments) zusammen bleiben.

Periode 1
Sobald Sie Ihre beiden Entscheidungen am Computer eingegeben haben, werden diese dem Arbeitnehmer mitgeteilt. Dieser entscheidet danach über seine Leistung, die er Ihnen bereitstellt.
Sein Leistungsniveau kann zwischen 0 und 10 liegen, es sind jedoch nur ganzzahlige Beträge wählbar. Durch die Leistung entstehen für den Arbeitnehmer Kosten in Höhe des Leistungsniveaus. Das Leistungsniveau wird mit 5 multipliziert und an Sie ausgezahlt.]

[Prob50 und Prob100 zusätzlich:
In der ersten Periode herrschen normale wirtschaftliche Umstände.]

[Alle Treatments:]
Insgesamt berechnet sich Ihr Einkommen bzw. das des Ihnen zugeordneten Arbeitnehmers in der ersten Periode wie folgt:
Ihr Einkommen (als Arbeitgeber): 10 Taler- (Von Ihnen gewählter Lohn in Talern) + (Von Arbeitnehmer gewählte Leistung in Talern) * 5
Einkommen des Ihnen zugeordneten Arbeitnehmers: 10 Taler- (Vom Arbeitnehmer gewählte Leistung in Talern) + (Von Ihnen gewählter Lohn in Talern) * 5
Nach der Entscheidung des Arbeitnehmers wird Ihnen Ihr Einkommen und das des Ihnen zugeordneten Arbeitnehmers mitgeteilt. Hiermit endet die erste Periode.

[Alle Treatments:
Periode 2
In der zweiten Periode ist Ihnen der gleiche Arbeitnehmer zugeordnet wie in der ersten.]

[Prob0:
Das Experiment verläuft genau wie in der ersten Periode. Sie und der Arbeitnehmer erhalten jeweils eine Grundausstattung von 10 Talern. Sie können sich für einen Lohn zwischen 0 und 10 Talern entscheiden, den Sie dem Arbeitnehmer zahlen und wünschen sich ein Leistungsniveau. Den Lohn, den Sie dem Arbeitnehmer zahlen, wird mit 5 multipliziert und an diesen ausgezahlt. Der Arbeitnehmer entscheidet daraufhin über seine Leistung (ebendas zwischen 0 und 10). Das Leistungsniveau des Arbeitnehmers wird wie in Periode 1 mit 5 multipliziert und an Sie ausgezahlt.]

[Prob50:
Das Experiment verläuft ähnlich wie in der ersten Periode, es gibt jedoch eine Besonderheit: Mit einer Wahrscheinlichkeit von 50% herrschen die gleichen normalen wirtschaftlichen Umstände wie in Periode 1, mit einer Wahrscheinlichkeit von 50% geraten Sie als Arbeitgeber jedoch in eine wirtschaftliche Krise. Ob Sie eine Krise triff, wird zufällig durch den Computer bestimmt und sowohl Ihnen als auch dem Arbeitnehmer vor Beginn der zweiten Periode mitgeteilt.
Der grundsätzliche Ablauf des Experiments ist sowohl bei normalen wirtschaftlichen Umständen als auch bei Eintritt der wirtschaftlichen Krise der gleiche wie in Periode 1. Wie in Periode 1 erhalten Sie sowie der Arbeitnehmer jeweils eine Grundausstattung von 10 Talern. In beiden Fällen können Sie sich für einen Lohn zwischen 0 und 10 Talern entscheiden, den Sie dem Arbeitnehmer zahlen und wünschen sich ein Leistungsniveau. Der Arbeitnehmer entscheidet daraufhin über seine Leistung (ebendas zwischen 0 und 10). Bei normalen wirtschaftlichen Umständen wird das Leistungsniveau des Arbeitnehmers wie in Periode 1 mit 5 multipliziert und an Sie ausgezahlt. Auch der Lohn, den Sie dem Arbeitnehmer zahlen, wird mit 5 multipliziert und an diesen ausgezahlt.]

[Prob100:
Das Experiment verläuft ähnlich wie in der ersten Periode, es gibt jedoch eine Besonderheit. In der zweiten Periode geraten Sie als Arbeitgeber in eine wirtschaftliche Krise. Der grundsätzliche Ablauf des Experiments ist in der wirtschaftlichen Krise der gleiche wie in Periode 1. Wie in Periode 1 erhalten Sie sowie der Arbeitnehmer jeweils eine Grundausstattung von 10 Talern. Sie können sich zunächst für einen Lohn zwischen 0 und 10 Talern entscheiden, den Sie dem Arbeitnehmer zahlen und wünschen sich ein Leistungsniveau. Der Arbeitnehmer entscheidet daraufhin über seine Leistung (ebendas zwischen 0 und 10).]

[Prob50 und Prob100: Die Krise führt dazu, dass die Leistung des Arbeitnehmers nicht mehr mit 5, sondern nur noch mit 2,5 multipliziert und an Sie ausgezahlt wird. Der Lohn, den Sie dem Arbeitnehmer zahlen, wird dagegen weiterhin mit 5 multipliziert und an diesen ausgezahlt. WICHTIG: Nur Sie als Arbeitgeber werden in der zweiten Periode von der Krise getroffen, da die Leistung des Arbeitnehmers im Krisenfall nur noch mit 2,5 multipliziert wird.]
[Alle Treatments:
Insgesamt berechnet sich daher Ihr Einkommen bzw. das des Ihnen zugeordneten Arbeitnehmers in der zweiten Periode wie folgt:]

[Prob0:
Ihr Einkommen (als Arbeitgeber): 10 Taler- (Von Ihnen gewählter Lohn in Talern) + (Vom Arbeitnehmer gewählte Leistung in Talern) * 5]

[Prob50:
Ihr Einkommen (als Arbeitgeber):
Wenn Sie die wirtschaftliche Krise nicht trifft (Wahrscheinlichkeit: 50%): 10 Taler- (Von Ihnen gewählter Lohn in Talern) + (Vom Arbeitnehmer gewählte Leistung in Talern) * 5
Wenn Sie die wirtschaftliche Krise trifft (Wahrscheinlichkeit: 50%): 10 Taler- (Von Ihnen gewählter Lohn in Talern) + (Vom Arbeitnehmer gewählte Leistung in Talern) * 2,5]

[Prob100:
Ihr Einkommen (als Arbeitgeber in der wirtschaftlichen Krise): 10 Taler- (Von Ihnen gewählter Lohn in Talern) + (Vom Arbeitnehmer gewählte Leistung in Talern) * 2,5]

[Alle Treatments:
Einkommen des Ihnen zugeordneten Arbeitnehmers [in Prob50 zusätzlich: (in beiden Fällen)]: 10 Taler- (Vom Arbeitnehmer gewählte Leistung in Talern) + (Von Ihnen gewählter Lohn in Talern) * 5
Nach der Entscheidung des Arbeitnehmers wird Ihnen Ihr Einkommen und das des Ihnen zugeordneten Arbeitnehmers mitgeteilt.]

[Alle Treatments:
Spezifische Instruktionen für Arbeitnehmer
Als Arbeitnehmer wird Ihnen zufällig ein Arbeitgeber zugeordnet, mit dem Sie über beide Perioden (d.h. über die gesamte Dauer des Experiments) zusammen bleiben. Sie und der Arbeitgeber erhalten beide jeweils eine Grundausstattung von 10 Talern.

Periode 1]
[Prob50 und Prob100 zusätzlich:
In der ersten Periode herrschen normale wirtschaftliche Umstände.]

[Alle Treatments:
Insgesamt berechnet sich daher Ihr Einkommen bzw. das des Ihnen zugeordneten Arbeit-
gebers in der ersten Periode wie folgt:
Ihr Einkommen (als Arbeitnehmer): 10 Taler- (Von Ihnen gewählte Leistung in Talern) + (Vom Arbeitgeber gewählter Lohn in Talern) * 5
Einkommen des Ihnen zugeordneten Arbeitgebers: 10 Taler- (Vom Arbeitgeber gewählter Lohn in Talern) + (Von Ihnen gewählte Leistung in Talern) * 5
Im Anschluss wird Ihnen Ihr Einkommen und das des Ihnen zugeordneten Arbeitgebers mitgeteilt. Hiermit endet die erste Periode.

Periode 2
In der zweiten Periode ist Ihnen der gleiche Arbeitgeber zugeordnet wie in der ersten.

[Prob0:
Das Experiment verläuft in der zweiten Periode genau wie in der ersten: Sie und der Arbeitgeber erhalten jeweils eine Grundausstattung von 10 Talern. Der Arbeitgeber entscheidet sich für einen Lohn zwischen 0 und 10 Talern, den er Ihnen zahlt und wünscht sich ein Leistungsniveau. Den Lohn, den der Arbeitgeber Ihnen zahlt, wird mit 5 multipliziert und an Sie ausgezahlt. Sie können daraufhin über Ihre Leistung entscheiden (ebenfalls zwischen 0 und 10). Das Leistungsniveau wird wie in Periode 1 mit 5 multipliziert und an den Arbeitgeber ausgezahlt.]

[Prob50:
Das Experiment verläuft ähnlich wie in der ersten Periode, es gibt jedoch eine Besonderheit: Mit einer Wahrscheinlichkeit von 50% herrschen die gleichen normalen wirtschaftlichen Umstände wie in Periode 1, mit einer Wahrscheinlichkeit von 50% gerät der Ihnen zugeordnete Arbeitgeber jedoch in eine wirtschaftliche Krise. Ob ihn eine Krise trifft, wird zufällig durch den Computer bestimmt und sowohl dem Arbeitgeber als auch Ihnen vor Beginn der zweiten Periode mitgeteilt. Der grundsätzliche Ablauf des Experiments ist sowohl bei normalen wirtschaftlichen Umständen als auch bei Eintritt der wirtschaftlichen Krise der gleiche wie in Periode 1. Wie in Periode 1 erhalten Sie sowie der Arbeitgeber jeweils eine Grundausstattung von 10 Talern. In beiden Fällen entscheidet sich der Arbeitgeber zunächst für einen Lohn zwischen 0 und 10 Talern, den er Ihnen zahlt und wünscht sich ein Leistungsniveau. Sie entscheiden daraufhin über Ihre Leistung (ebenfalls zwischen 0 und 10).
Bei normalen wirtschaftlichen Umständen wird das Leistungsniveau, das Sie wählen, wie in Periode 1 mit 5 multipliziert und an den Arbeitgeber ausgezahlt. Auch der Lohn, den der Arbeitgeber Ihnen zahlt, wird mit 5 multipliziert und an Sie ausgezahlt.]

[Prob100:
Das Experiment verläuft ähnlich wie in der ersten Periode, es gibt jedoch eine Besonderheit: In der zweiten Periode gerät der Ihnen zugeordnete Arbeitgeber in eine wirtschaftliche Krise. Der grundsätzliche Ablauf des Experiments ist in der wirtschaftlichen Krise der gleiche wie in Periode 1. Wie in Periode 1 erhalten Sie sowie der Arbeitgeber jeweils eine Grundausstattung von 10 Talern. Zunächst entscheidet sich der Arbeitgeber für einen Lohn zwischen 0 und 10 Talern, den er Ihnen zahlt und wünscht sich ein Leistungsniveau. Sie entscheiden daraufhin über Ihre Leistung (ebenfalls zwischen 0 und 10).]

[Prob50 und Prob100:
Die Krise führt dazu, dass die von Ihnen gewählte Leistung nicht mehr mit 5, sondern nur noch mit 2,5 multipliziert und an den Arbeitgeber ausgezahlt wird. Der Lohn, für den der Arbeitgeber sich entscheidet, wird dagegen weiterhin mit 5 multipliziert und an Sie ausgezahlt.]

WICHTIG: Nur der Arbeitgeber wird in der zweiten Periode von der Krise getroffen, da die von Ihnen als Arbeitnehmer bereit gestellte Leistung im Krisenfall nur noch mit 2,5 multipliziert wird.

Insgesamt berechnet sich daher Ihr Einkommen bzw. das des Ihnen zugeordneten Arbeitgebers in der zweiten Periode wie folgt:
Ihr Einkommen (als Arbeitnehmer): 10 Taler- (Von Ihnen gewählte Leistung in Talern) + (Vom Arbeitnehmer gewählter Lohn in Talern) * 5

Einkommen des Ihnen zugeordneten Arbeitgebers: 10 Taler- (Vom Arbeitgeber gewählter Lohn in Talern) + (Von Ihnen gewählte Leistung in Talern) * 5

Wenn ihn die wirtschaftliche Krise nicht trifft (Wahrscheinlichkeit: 50%): 10 Taler- (Vom Arbeitgeber gewählter Lohn in Talern) + (Von Ihnen gewählte Leistung in Talern) * 5
Wenn ihn die wirtschaftliche Krise trifft (Wahrscheinlichkeit: 50%): 10 Taler- (Vom Arbeitgeber gewählter Lohn in Talern) + (Von Ihnen gewählte Leistung in Talern) * 2,5

Im Anschluss wird Ihnen Ihr Einkommen und das des Ihnen zugeordneten Arbeitgebers mitgeteilt. Hiermit endet die zweite Periode.

Auszahlungsbeispiele

Beispiel 1 (Periode 1):
Der Arbeitgeber verdient daher: 10 Taler - 7 Taler + (4 Taler) * 5 = 23 Taler.
Der Verdienst des Arbeitnehmers beträgt: 10 Taler - 4 Taler + (7 Taler) * 5 = 41 Taler.

Beispiel 2 (Periode 2):
Der Arbeitgeber wählt einen Lohn in Höhe von 3 Talern und gibt ein gewünschtes Leistungsniveau in Höhe von 5 an. Der Arbeitnehmer wählt eine Leistung in Höhe von 5.
Der Arbeitgeber verdient daher: 10 Taler - 3 Taler + (5 Taler) * 5 = 32 Taler.
Der Verdienst des Arbeitnehmers beträgt: 10 Taler - 5 Taler + (3 Taler) * 5 = 20 Taler.

[Prob 50 (zusätzlich) und Prob 100:
Beispiel 2 (Periode 2, die Krise tritt ein):
Der Arbeitgeber wählt einen Lohn in Höhe von 5 Talern und gibt ein gewünschtes Leistungs niveau in Höhe von 8 an. Der Arbeitnehmer wählt eine Leistung in Höhe von 5.
Der Arbeitgeber verdient daher: 10 Taler - 5 Taler + (5 Taler) * 2,5 = 17,50 Taler.
Der Verdienst des Arbeitnehmers beträgt: 10 Taler - 5 Taler + (5 Taler) * 5 = 30 Taler.

[Alle Treatments:
Kontrollfragen

Bitte beantworten Sie die folgenden Kontrollfragen. Sie dienen lediglich dazu, Sie mit dem Ablauf des Experiments und der Berechnung der Einkommen vertraut zu machen, die sich bei den unterschiedlichen Entscheidungen der Teilnehmer ergeben.

1) Welche der folgenden Aussagen trifft zu?

[Prob 50 zusätzlich:
2) Wann bekommen der Arbeitgeber und der ihm zugeordnete Arbeitnehmer die Information, ob den Arbeitgeber tatsächlich eine wirtschaftliche Krise trifft? Direkt zu Beginn der ersten Periode. / Direkt zu Beginn der zweiten Periode. / Am Ende des Experiments.

[Prob 50 und Prob 100 zusätzlich:
3) Was genau bewirkt die wirtschaftliche Krise für den Arbeitgeber, was genau beim Arbeitnehmer?

[Prob 0:
  a) Wie viel beträgt das Einkommen des Arbeitgebers, wie viel beträgt das Einkommen des Arbeitnehmers in der ersten Periode?
  b) Wie viel beträgt das Einkommen des Arbeitgebers in der zweiten Periode, wie viel beträgt das Einkommen des Arbeitnehmers in der zweiten Periode?
  a) Wie viel beträgt das Einkommen des Arbeitgebers, wie viel beträgt das Einkommen des Arbeitnehmers in der ersten Periode?
Der Arbeitgeber entscheidet sich in der zweiten Periode für einen Lohn von 5 Talern und gibt ein gewünschtes Leistungsniveau von 10 an, der Arbeitnehmer entscheidet sich für ein Leistungsniveau von 8.

b) Wie viel beträgt das Einkommen des Arbeitgebers in der zweiten Periode, wie viel beträgt das Einkommen des Arbeitnehmers in der zweiten Periode?

[Prob50:

a) Wie viel beträgt das Einkommen des Arbeitgebers, wie viel beträgt das Einkommen des Arbeitnehmers in der ersten Periode?

Zu Beginn der zweiten Periode bekommen beide die Information, dass den Arbeitgeber keine wirtschaftliche Krise trifft. Der Arbeitgeber entscheidet sich in der zweiten Periode für einen Lohn von 8 Talern und gibt ein gewünschtes Leistungsniveau von 7 an, der Arbeitnehmer entscheidet sich für ein Leistungsniveau von 5.

b) Wie viel beträgt das Einkommen des Arbeitgebers in der zweiten Periode, wie viel beträgt das Einkommen des Arbeitnehmers in der zweiten Periode?


a) Wie viel beträgt das Einkommen des Arbeitgebers, wie viel beträgt das Einkommen des Arbeitnehmers in der ersten Periode?

Zu Beginn der zweiten Periode bekommen beide die Information, dass den Arbeitgeber eine wirtschaftliche Krise trifft. Der Arbeitgeber entscheidet sich in der zweiten Periode für einen Lohn von 5 Talern und gibt ein gewünschtes Leistungsniveau von 10 an, der Arbeitnehmer entscheidet sich für ein Leistungsniveau von 8.

b) Wie viel beträgt das Einkommen des Arbeitgebers in der zweiten Periode, wie viel beträgt das Einkommen des Arbeitnehmers in der zweiten Periode?

[Prob100:

a) Wie viel beträgt das Einkommen des Arbeitgebers, wie viel beträgt das Einkommen des Arbeitnehmers in der ersten Periode?

In der zweiten Periode trifft den Arbeitgeber die wirtschaftliche Krise. Der Arbeitgeber entscheidet sich in der zweiten Periode für einen Lohn von 8 Talern und gibt ein gewünschtes Leistungsniveau von 7 an, der Arbeitnehmer entscheidet sich für ein Leistungsniveau von 5.

b) Wie viel beträgt das Einkommen des Arbeitgebers in der zweiten Periode, wie viel beträgt das Einkommen des Arbeitnehmers in der zweiten Periode?


a) Wie viel beträgt das Einkommen des Arbeitgebers in der ersten Periode, wie viel beträgt das Einkommen des Arbeitnehmers in der ersten Periode?

In der zweiten Periode trifft den Arbeitgeber die wirtschaftliche Krise. Der Arbeitgeber entscheidet sich in der zweiten Periode für einen Lohn von 5 Talern und gibt ein gewünschtes Leistungsniveau von 10 an, der Arbeitnehmer entscheidet sich für ein Leistungsniveau von 8.
b) Wie viel beträgt das Einkommen des Arbeitgebers in der zweiten Periode, wie viel beträgt das Einkommen des Arbeitnehmers in der zweiten Periode?