Fair Wages When Employers Face the Risk of Losing Money

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Abstract

We study the behavior of employers and employees in a gift exchange game and find that employers offer lower wages when there is the risk of losing money. This, however, does not lead to lower effort level choices. In fact, effort per wage unit is significantly higher in the treatment with potential employer losses. This result can be in line with social comparison theories that are based on relative payoff differences. Alternatively, this result is also in line with the hypothesis that the risk of losing money increases the credibility of the employer's trust signal and, thus, the employee's reciprocity.

Keywords

fair wage, efficiency wage, social comparison, loss aversion

JEL Codes

C92, D22, J41

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1. Introduction

The reciprocity (or "gift exchange") phenomenon in labor relations (Akerlof 1982) has found strong experimental support both with real effort tasks (Fahr and Irlenbusch 2000; Brüggen and Strobel 2007) and without (Fehr, Kirchsteiger, Riedl 1993; Fehr, Kirchler, Weichbold, Gächter 1998; Charness 2004). In these experiments, the employer can pay a wage above the minimum wage in the anticipation that the worker will reciprocate with an effort level that lies above the minimum effort. The principle finding in these studies is that a majority of the experimental employers trust their employees and pay relatively high wages. In response, most of the experimental employees reciprocate by choosing effort levels that positively correlate to the wages and are above the minimum effort level. As a consequence of trust and reciprocity, the efficiency in these "fair wage" (or "efficiency wage") partnerships is much higher than in the non-cooperative equilibrium of the game with rational money-maximizing agents.

So far, however, experimental research on fair wages has not taken into account the effect of potential losses for the employers. In this paper, we compare an employment setting without losses to one in which the employer may incur a financial loss if the wage is high enough and the work effort chosen by the employee is low enough. We find support for the hypothesis that losses affect the effort provision per wage unit, leading to a significantly higher productivity with potential losses than without. This, we conjecture, indicates that employees take the risk of losing money that employers face into account when assessing the fairness of wage offers and deciding on their effort choices. The observed employee behavior is in line with the models of social comparison that take relative payoff differences into account (e.g. Bolton and Ockenfels 2000), but not with those concerned with absolute payoff differences. The observed employer behavior, however, is in line with neither of the models.

2. Related Literature

Most experimental studies of labor relations are based on the game originally suggested by Fehr, Kirchsteiger, and Riedl (1993) and the related "bilateral gift exchange game" presented by Fehr, Kirchler, Weichbold, and Gächter (1998). In these games, the wage is deducted from the employer's endowment *before* the employee chooses an effort level and the production begins. Since the production is modeled as a multiplication of effort times what is left of the endowment, the employer's income can never be negative.

Some of the newer studies (e.g. Brown, Falk, and Fehr 2004; Maximiano, Sloof, and Sonnemans 2007) adopt a different model, in which employers may incur a financial loss, because

the wage is deducted from the firm's output *after* the effort is chosen and the production is completed.[1] The focus of these papers, however, is not to identify the effect of potential losses on the labor relationship. To do so, two (almost) identical settings must be compared that only differ on whether employers face losses or not. To our knowledge, such a comparison cannot be found in the literature so far.[2]

3. Experimental design

In our two-player sequential moves games, the employer first makes a wage offer. If the employee rejects, both receive nothing. In case the offer is accepted, the employee chooses an effort level *e* with a strictly increasing cost *c(e)*.

In the version *LOSS* the employer's payoff is: $\Pi_{Employer}^{LOSS} = v \cdot e/10 - w$, where *v* represents the endowment of the employer and *w* the wage offer (between zero and *v*). In the version *NO LOSS* the employer's payoff is $\Pi_{Employer}^{NO\,LOSS} = v \cdot e/10 - w + 90$

The added lump sum of 90 is high enough to cover any possible loss for the employer in *NO LOSS*.

The employee's payoffs are: $\Pi_{Employee}^{LOSS} = w - c(e)$ and $\Pi_{Employee}^{NO\,LOSS} = w - c(e) + 90$

Effort *e* is bounded between 10 and 100, with an exponentially increasing cost. We employ the same cost table as the previous studies cited above.

Table 1. Cost of effort.

effort *e*	10	20	30	40	50	60	70	80	90	100
effort cost *c(e)*	0	1	2	4	6	8	10	12	15	18

In both treatments, we set *v*=100. Thus, in *LOSS*, the worst possible outcome for the employer is –90, while it is 0 in *NO LOSS*. We neutralized the income effect across treatments by using

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[1] In this model, the effort does not have a decreasing marginal product in the upper wage ranges and the joint payoff is not an increasing function of the wage.

[2] Dittrich and Ziegelmeyer (2010) provide a comparison of the classical model (Fehr et al. 1998) with the model including potential employer losses (Brown et al. 2004). The focus of their study, however, is to show that fairness concerns evoke different behavior in the two settings. Since they show that behavior in the two models may diverge due to fairness considerations (based on Fehr and Schmidt 1999), a comparison of these two settings cannot identify the effect of employer losses that we study.

different exchange rates. The subjects on average earned Euro 11 (i.e. about $15 at that time) for the one hour experiment. Overall 56 subjects played in randomly matched fixed pairs. We have 14 independent observations per treatment. The subjects were randomly assigned to their roles and played all ten periods in the same role. The communication was computerized using *zTree* (Fischbacher 2007). Instructions were administered to subjects in their cubicles and read aloud.

4. Results

Figure 1 displays the distribution of wage offers. While the distribution of low wages seems similar in both treatments, there are substantially higher wage offers in *NO LOSS* than in *LOSS*. Figure 2 displays the average effort for the ten possible wage intervals. Standard theory predicts that employees will choose the lowest possible effort level for any wage. But, as in previous laboratory studies, we also observe effort levels well above the minimum effort that are increasing in wages.[3]
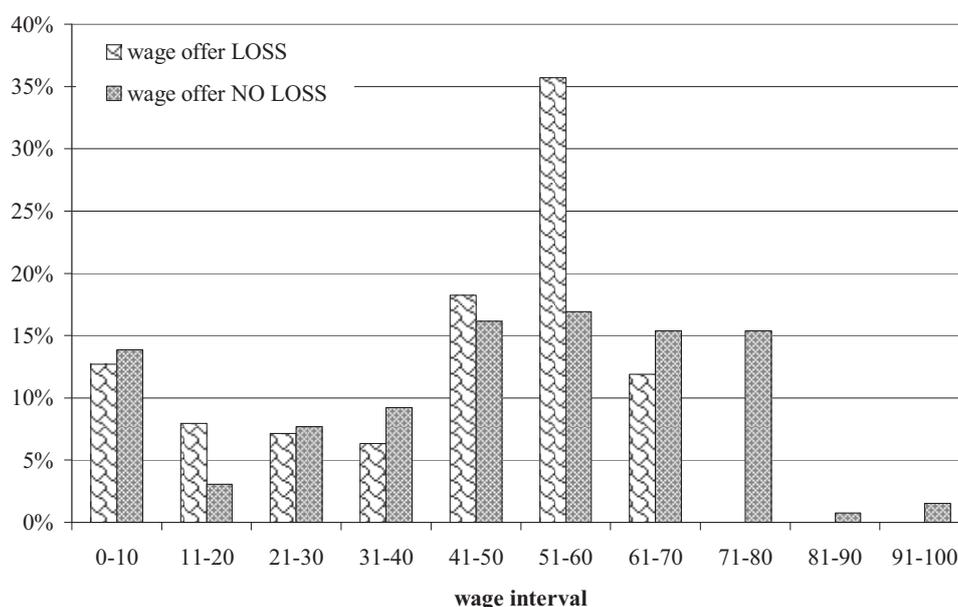
Figure 1. Average wage offers over wage intervals.

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[3] The spearman rank correlation coefficients relating mean efforts to mean wages in both treatments are positive and significantly different from zero: *LOSS*: $r = 0.876$ ($p = 0.000$ one-tailed) and *NO LOSS*: $r = 0.865$ ($p = 0.000$ one-tailed).
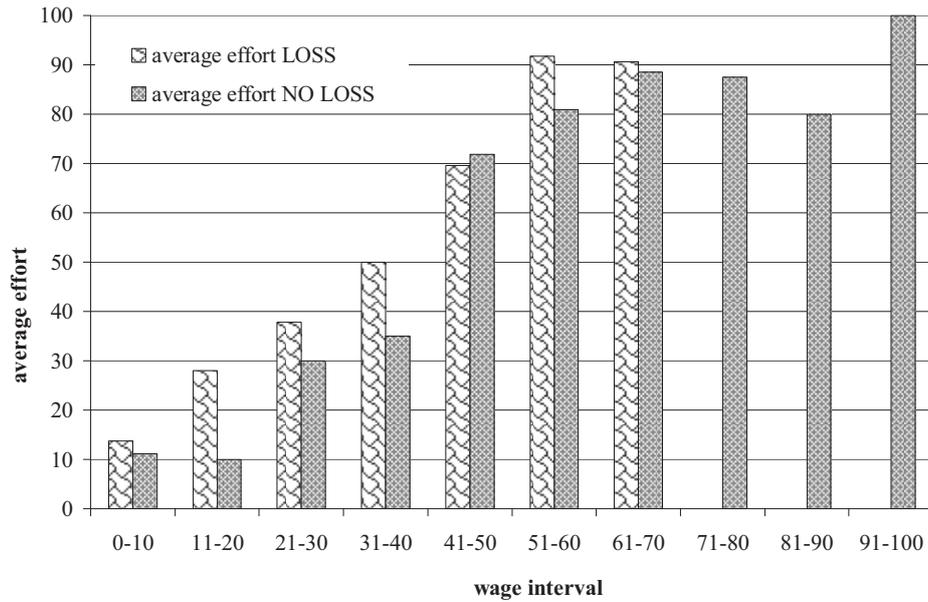
Figure 2. Average effort over wage intervals.

Figure 2 also shows that the effort per wage unit in *LOSS* is greater than in *NO LOSS* (U-Test, p=0.011, one-tailed). This suggests that employee behavior is in contradiction with social comparison theories based on absolute payoff differences, because the payoff differences are identical in the two treatments. Social comparison theories based on relative payoff differences predict lower effort levels in *NO LOSS* than in *LOSS*. The regressions below support this statement.

Table 2 presents the results of two panel regressions. In the first regression wage is a function of last period's effort and a treatment dummy. Because wages were restricted, we use a random effects two-sided Tobit model and find the coefficients for both parameters to be positive and highly significant. Hence, employers reciprocate to past effort choices and react positively to the *NO LOSS* treatment when making wage offers. The second regression studies the impact of wage offers and the treatment dummy on effort choices. We find a significantly positive effect of wages on effort and a significantly negative effect of the treatment.

4

Table 2. Regression results.

Random-effects, two-sided Tobit regression with wage as dependent variable. Wald χ^2=85.58; p=0.00

independent variable	coefficient	standard error	Z	$P > |Z|$
Constant	20.50886	3.159835	6.49	0.000
lagged effort	0.3441423	0.0385123	8.94	0.000
Treatment	7.018887	2.495742	2.81	0.005

Random-effects, two-sided Tobit regression with effort as dependent variable. Wald χ^2=153.44; p=0.00

independent variable	coefficient	standard error	Z	$P > |Z|$
Constant	-13.91906	8.081943	-1.72	0.085
Wage	1.793974	0.1452507	12.35	0.000
Treatment	-14.65857	5.76667	-2.54	0.011

4. Conclusions

We compare two versions of the gift-exchange game in the laboratory. In the *LOSS* setting, employers face the risk of negative payoffs, while they do not in the *NO LOSS* setting. Our experiment shows that wage offers are higher when employers do not face the risk of incurring losses. This result is neither in line with social comparison theories that are based on absolute payoff differences nor on relative payoff differences. The result, however, is in line with the assumption that employers behave loss averse. Furthermore, we find that the employer's risk of losing money has a positive effect on the employee's effort choices. This result can be in line with social comparison theories that are based on relative payoff differences (e.g. Bolton and Ockenfels 2000). Alternatively, this result is also in line with the hypothesis that the risk of losing money increases the credibility of the employer's trust in the employee's reciprocity, as signaled by the wage.

In conclusion, our results indicate that the risk of losing money must be taken into consideration when employer-employee relationships are studied. The shadow of losses looms over the relationship, enhancing the employee's willingness to increase productivity by exerting a higher effort per wage unit.

Our results may also shed some light on the question why employees in small and medium sized enterprises exert more effort than employees in comparable positions in large enterprises. Since the risk of incurring losses is generally greater in smaller firms, fair wage payments in these firms may be perceived as stronger trust signals by the employees, who then reciprocate with relatively high effort level choices. To pursue this hypothesis further, more empirical research and firm level data will be necessary on the link between human resource productivity and operative risk.

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