Economics Letters 121 (2013) 473–477

Contents lists available at ScienceDirect

Economics Letters

journal homepage: www.elsevier.com/locate/ecolet

Fair wages survive multiple sources of income inequality

Karina Gose *

Faculty of Economics and Management, University of Magdeburg, PO Box 4120, 39016 Magdeburg, Germany

HIGHLIGHTS

- I study gift exchange settings with income inequality to the employee's disadvantage.
- Wages that are considered fair by the employees are positively reciprocated.
- A unit of effort is costlier than in a game without payoff inequality.
- The source of disadvantageous income inequality does not affect effort choices.
- Employee behavior seems to follow a tit-for-tat pattern.

ARTICLE INFO

Article history:
Received 6 June 2013
Received in revised form
14 September 2013
Accepted 27 September 2013
Available online 5 October 2013

JEL classification:
C91
D31
M52

Keywords:
Gift exchange
Fair wage–effort hypothesis
Reciprocity
Inequity aversion
Tit for tat

ABSTRACT

When an employee in a gift exchange game earns significantly less than the employer, the source of employer income does not affect effort choices. However, to induce one unit of effort, the employer has to pay higher wages than in a game without payoff inequality.

1. Introduction

Over the years, a large body of literature has emerged around the fair wage–effort hypothesis (Akerlof and Yellen, 1990, 1988) as well as the gift exchange game (Fehr et al., 1993), which is employed to provide the corresponding experimental evidence. Whereas early experimental studies focus on the relationship between one employer and one employee (e.g. Fehr et al., 1998; Gächter and Falk, 2002), newer studies consider multi-worker relationships (e.g. Maximiano et al., 2007; Gächter and Thöni, 2010). Studying these multi-lateral gift exchange games can provide insights into employee behavior in organizations of higher complexity. Furthermore, the efficiency of work relationships, in which the employee faces disadvantageous payoff inequality, can be examined.

Since no study has yet investigated whether the source of disadvantageous payoff inequality has an effect on employee effort provision, this study systematically investigates this question using controlled lab experiments. The results indicate that receiving a wage that is perceived as fair leads employees to choose positively reciprocal effort levels irrespective of the source of payoff inequality. However, when the employer earns significantly more than an employee, he has to pay higher wages to induce effort choices similar to those observed in situations without payoff inequality. Since receiving a fair wage seems to drive the results rather than inequity concerns, I propose to describe behavior in multi-round gift exchange games using a tit-for-tat model that comprises generosity.

2. Experimental design

I compare behavior in three gift exchange settings: two bilateral games (treatments *1o1* and *165*) in which an employer has a work relationship with a single employee, and a 13-lateral game (treatment *Large Group* (*LG*)) in which an employer has work relationships with 12 employees. Thus, in the bilateral treatments, both employer and employee earn from only one work relationship. In

* Tel.: +49 391 67 18796; fax: +49 391 67 11355.
E-mail address: karina.gose@ovgu.de.

0165-1765/$ – see front matter © 2013 Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.econlet.2013.09.031

Table 1
Cost of effort schedule.

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

LG, however, the employees earn from one work relationship with their employer, while the employer earns from 12 different work relationships.

In the first stage of the bilateral game, the employer submits a wage offer $w \in [0, 100]$. After the employee receives the wage offer, the employee can either accept ($a = 1$) or reject ($a = 0$) the wage offer. In case the employee decides to accept the wage offer, he chooses an effort level e and incurs a non-linear cost of effort $c(e)$ (see Table 1). In case the employee rejects the wage offer, neither the employer nor the employee receives earnings from the work relationship. In both bilateral game settings, *1o1* and *165*, the employee earns $(w - c(e)) \cdot a$.

In *1o1*, the employer earns the effort minus the wage paid: $\pi^{1o1}_{employer} = (e - w) \cdot a$. In *165*, the employer receives a lump sum payment of *165* in addition to the production and earns $\pi^{165}_{employer} = (e - w) \cdot a + 165$.

I choose *165* since each employee contributes an average of 15 experimental currency units of employer earnings in *1o1*. *165* then simulates the efficiency of eleven co-workers. *165* is thus introduced to test if the source of employer income has an effect on effort choices, i.e. whether employees' effort choices are different, once the employer actually has to work for the additional earnings by managing 12 work relationships, or is simply rich by nature.

In the 13-lateral game, the employer submits a wage offer $w_i \in [0, 100]$, $i = 1 \ldots 12$ to each employee *i*. The decision to accept the wage offer and the production proceed as described above. Each employee earns $(w_i - c(e_i)) \cdot a_i$. The employer earns the sum of efforts minus the sum of wages:

$$\pi^{LG}_{employer} = \sum_{i=1}^{12} (e_i - w_i) \cdot a_i.$$

Note that the employer in *LG* can potentially avoid the effort of managing 12 work relationships by simply assigning an identical wage offer to every employee. However, in multi-round gift exchange games with fixed roles, employers are inclined to tie pay to past performance (Gose and Sadrieh, 2013). Thus, except for the first round, where there is no information on past employee performance, employers choose to adjust wages according to past decisions of the employees. Looking at the data reveals that out of 112 rounds in which employers had information on last round employee performance, there are only six rounds in which equal wage offers are made to all 12 employees.

All of the treatments lasted for 15 rounds with fixed employer–employee groups and the total payoff amounting to the sum of the round income. In order to determine the role of the employer, I let the subjects answer six standardized multiple-choice GMAT questions within a five-minute time limit. The subject who scored best was assigned the role of the employer. Ties were broken by a random draw.[1]

Overall 182 subjects participated in the study with 25 independent observations for *1o1*, 14 independent observations for *165*, and 8 independent observations for *LG*. Each session lasted about 75 min with earnings ranging between 0.50 euro and 62.30 euro depending on treatment and role.

Table 2
Average effort, wage, and relative wage.

Treatment	Avg effort	Avg wage	Avg relative wage
1o1	52.687	37.887	0.823
LG	50.182	39.583	1.054
165	51.515	45.808	1.203

Table 3
Random effects linear regression with effort as dependent variable.

Effort	Model I		Model II	
	Coefficient	Std. error	Coefficient	Std. error
Wage	0.945***	0.024	1.098***	0.060
LG	−3.537	3.822	3.139	4.665
165	−8.074**	3.514	0.298	5.039
LG wage			−0.177***	0.067
165 wage			−0.211**	0.085
Const	16.422***	2.303	10.690***	3.108

$N = 1743$, model I: Wald $\chi^2 = 1508.78$, $p = 0.000$; model II: Wald $\chi^2 = 1517.86$, $p = 0.000$.
** Significance at 5% level.
*** Significance at 1% level.

3. Results

I observe a positive monotonous relationship between average wage and average effort in all treatments (one-tailed Spearman correlations; all correlations significant at 1%: $\rho_{1o1} = 0.901$, $\rho_{LG} = 0.929$, $\rho_{165} = 0.758$[2]). Fig. 1 shows average effort per wage unit over ten different wage intervals for the three treatments. The size of the circles indicates the frequency with which wages are observed. The diagonal indicates wage–effort combinations that lead to zero employer earnings, i.e. all points above the diagonal result in positive employer payoffs, whereas points below the diagonal result in employer losses.[3] It is thus evident that effort choices in *1o1* lead to highest employer payoffs as the wage–effort combinations lie further above the diagonal than in *LG* and *165*. Positive employer payoffs can also be observed in *LG*, however, not for high wages. Average wage–effort combinations in *165* show a large variance and are also very close to the diagonal, indicating only small employer payoffs from production.

Table 2 reports average effort, wage, and relative wage, i.e. wage paid per unit of effort. Both average effort and average wage are statistically indistinguishable between the three treatments (one-tailed U-test). Nevertheless, average relative wages in *LG* and in *165* are significantly larger than in *1o1* (one-tailed U-test, $p_{LG} = 0.018$, $p_{165} = 0.003$). Note, however, that average relative wages in *LG* are not statistically different from those observed in *165* (one-tailed U-test). This leads to three important results, which are also supported by the regression results (see Table 3):

First, a positive wage–effort relationship results in repeatedly played gift exchange games even if the employees face disadvantageous payoff inequality. This holds for *165* and for *LG*.

Second, when the employer earns more than an employee, he must offer higher wages to induce the same amount of effort.

Third, irrespective of the source of disadvantageous income inequality, employees do not elicit different average effort choices (one-tailed U-test). Thus, when choosing effort levels, employees

1 Note that in reality the number of work relationships may be endogenous and not random. That is, different employers may choose a different number of work relationships. Such a selection might, for instance, be based on managerial skills or entrepreneurial spirit.

2 To exclude repeated game effects from being the sole driver of the results, I conducted a further treatment in which each of the 12 employers in *165* interacted only once with each of the 12 employees. The correlation between wages and effort levels remains highly significant at 1% with $\rho = 0.553$ (one-tailed Spearman correlation).

3 For *165* the diagonal marks the profitability of a work relationship for the employer before the lump sum is added.