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**Abstract**

Sick-pay is a common provision in labor contracts. It insures workers against a sudden loss of income due to unexpected absences and helps them smooth consumption. Therefore, many governments find sick-pay socially desirable and choose to mandate its provision. But sick-pay is not without its problems. Not only it suffers from moral hazard but more importantly it is subject to a potentially serious adverse selection problem (higher sick-pay attracts sicker workers). In this paper we report results of an experiment which inquires to the extend and the severity of the adverse selection when sick-pay is voluntary versus when it is mandatory. Theoretically, mandating sick-pay may be effective in diminishing adverse selection. However, our data provide clean evidence that counteracting effects are more salient. Mandatory sick pay exacerbates moral hazard problems by changing fairness perceptions and, as a consequence, increases sick pay provision far above the mandatory levels.

**JEL codes:** J3, C7, C9.
**Keywords:** sick pay, sick leave, experiment, gift exchange.

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# 1 Introduction

Sick-pay is one of the most controversial provisions in labor contracts. It insures workers against a loss of income from unexpected absences. When a worker suffers a spell of absence, sick-pay covers some portion (or all) of his wages for that period. This smooths out workers' income streams and may led to substantial welfare gains especially for those who have tight budgets and bad access to credit. But to firms, sick-pay could seem like a waste of money. Not only do workers have no explicit incentives to make up for the losses caused by their absences (moral hazard), but what's worse, sick-pay attracts primarily the sicker and the riskier workers (adverse selection). This immediately begs a question why would any firm want to offer sick-pay? There are at least two explanations: (i) sick-pay is considered a "perk" and inspires the workers to provide an extra effort; and/or (ii) in many countries sick-pay is simply mandated by the government.

The controversy revolves around the question of regulation. Should it be left to the markets to supply sick-pay or should the government impose a mandatory minimum[1]. A voluntary provision by firms is only possible if its individually rational. This requires that the workers are sufficiently reciprocal and the gift-value of sick-pay is sufficiently high so that the problems of moral hazard and adverse selection are overcome. If this is the case then there is no need for the government to intervene. But when the workers act opportunistically, the markets are likely to fail and then it may be in the interest of the government to regulate sick-pay.

A single minimum standard accomplishes two objectives: (i) it provides all workers with an equal access to at least some level of sick-pay; and (ii) by "leveling the playing field," it reduces the possibility of adverse selection. When all contracts are similar to each other it becomes difficult for the sicker workers to find those that are most generous. But the reduction in adverse selection may come at a high cost of aggravating moral hazard. If all firms have to provide sick-pay to everyone, then the opportunistic workers will exhaust the benefits to the fullest. But this is not all. Even the reciprocal workers are adversely affected. When sick-pay is mandated it is no longer considered a perk but rather an entitlement. The reciprocity motive disappears. This may force the firms to either offer higher than required sick-pay in an attempt to restore its gift-value (e.g., Falk et al., 2006), or withdraw all sick-pay in excess of the minimum in order to minimize the costs. However, both alternatives can be quite costly. In each case the

[1] reference discussion about regulation...

reciprocity motive is crowded out by the mandatory minimum which reduces the size and the value of the gift. Therefore, crowding out of incentives may play a major role in driving the opportunity cost of government regulation.

The welfare effects of mandated sick-cannot be evaluated without understanding the trade-off between adverse selection[2] and crowding out of incentives[3]. In this paper we take an experimental approach and implement a labor market similar to Fehr et al. (1998) in which four firms offer contracts with sick-pay to four workers. Following Duersch et al. (2009) a contract can condition the wage on whether the worker has "showed up for work" (wage $w$ when effort is positive) or "stayed at home" (replacement rate $r$ when effort is zero). A worker observes a menu of contracts and can accept one of them at any time. Once all workers are employed each of them chooses a costly effort. A nonzero effort creates a positive profit on the side of the firm only with probability $p$. With probability $(1-p)$ the worker is "sick" and then his effort is automatically set to zero.

We study the effect of adverse selection by contrasting the case where all workers have the same probability of being sick ($p$) with the case where exactly half of the workers has a low $p_l$ and the other half has a high $p_h$ ($p_l < p < p_h$). We are particularly interested in studying the contract choices of different types of workers. Adverse selection implies that the high-risk workers (with $p_h$) are more likely to accept contracts with high sick-pay benefits. But notice that on its own adverse selection is not necessarily harmful to the firms. The high-risk workers may also be more appreciative of the higher benefits and provide higher efforts in return. Our experiment provides a clear evidence that the adverse selection is present and the workers' reciprocal behavior is not sufficient to neutralize its negative effect on the firms' profits.

As we discussed earlier, the government has a way of fighting adverse selection by requiring a minimum level sick-pay. But whether this is effective or not depends on how much of the reciprocal behavior is lost due to crowding out of incentives. A second dimension of our experiment inquires into this question. We implement a "mandatory condition" in which the firms are forced to provide a minimum level of sick-pay $\bar{r}$[4]. Our results indicate that adverse selection is alive and well even under mandated sick-pay. This happens because the distribution of sick-pay does not simply collapse around $\bar{r}$. Firms offer large variety of sick-pay in excess of the mandatory minimum[5].

[2] related literature: selection.

[3] related literature: crowding out.

[4] $\bar{r}$ is set to the average of what the firms normally provide under no restrictions.

[5] A similar finding is reported in Falk et al. (2006) in the context of a minimum wage

Because the firms chose to be extra generous there is a smaller scope for crowding out of incentives, but on the other hand, the extra generosity also implies higher cost of sick-pay and leads firms into making losses.

The rest of the papers is organized as follows....

Literature footnotes:

[Crowding out:] The negative effect of crowding out of incentives is well documented. For example Gneezy and Rustichini (2000a,b) conduct a series of experiments in which subjects are confronted with various tasks. They find a positive relationship between monetary rewards and performance. The striking result, however, is that the performance of subjects who get no reward what so ever is often higher than for those who get low but positive payments. This is attributed to the fact that monetary incentives crowd out the intrinsic motivation which is associated with completing the task rather than with the monetary reward. Falk and Kosfeld (2006) study a control game in which the recipient can enforce a certain size of the gift from the dictator. They find a strong effect of crowding out of incentives. The recipients are on average about 30% better off not controlling, i.e., letting the dictators choose the amount freely, than enforcing a certain minimum. The finding is attributed to the negative effect of distrust which is implicit in the forcing action of the recipient.

[Selection:] Duersch, Oechssler and Vadovic (2009) the selection treatment; Charness and Cabrales (2008), Güth, Königstein, Kovács, and Zala-Mezõ (2001) - but these papers are not about selection into contracts but rather about responses by individual types to offered contracts. (Not sure whether we want to also reference some (auction/oligopoly) market entry and exit experiments.)

[Minimum wages:] Brandts and Charness (2004), Falk, Fehr, Zehnder (2006)...

## 2 Experimental design and procedures

In our experiment, we implement a modified gift–exchange game between employers and workers. In all periods of the experiment, employers choose a contract to offer to their employees and workers choose efforts given those offered contracts. Workers can choose intended efforts, $\tilde{e}$, from the set $\{0, 1, ..., 10\}$. An effort of 0 is interpreted as skipping work. Then, there is a random draw by the computer, independent across periods and subjects,

regulation.

which with probability $p = 1/3$, sets the chosen effort to 0. This random draw models the probability that workers become sick and cannot appear at the workplace. Thus, with probability 2/3, *realized effort*, $e$, equals intended effort, $\tilde{e}$; with probability 1/3, realized effort is zero. Note that the employer cannot distinguish the cases when realized effort is zero because the worker chose an intended effort of zero or because the worker became sick. Effort costs for the workers are a function of realized effort as shown in Table 1.[6] The effort cost function for $e > 1$ follows the usual convex shape. To model the fact that showing up at the work place takes some extra effort, the marginal cost from zero effort (staying at home) to an effort of 1 (showing up for work) is increased to 3.[7]

Table 1: The agent's effort cost function

| $e$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $C(e)$ | 0 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 17 | 20 | 24 |

Employers offer contracts $(w, r)$ which consists of two components, a wage, $w \in W := \{0, 1, ..., 100\}$, and a sick pay (replacement) rate, $r \in R := \{0\%, 1\%, ..., 100\%\}$. The wage, $w$, is paid whenever the worker shows up for work (i.e. when $e > 0$). Whenever the worker does not show up for work (i.e. when realized effort is zero), he receives sick payment, which is the product of the wage and the replacement rate, $rw$. The fact that wage payments can only be contingent on whether realized effort is larger than zero, is based on the assumption that employer can only verify whether workers show up for work or not. As usual, different effort levels $e > 0$ cannot be contracted upon e.g. because they cannot be verified in court.[8] A lower bound on the replacement rate, $\underline{r}$, is a treatment variable which reflects a minimum mandatory sick pay.

The payoffs resulting from contract and effort choices are as follows. Each unit of effort yields a gross profit of 20 to the employer. Deducting

[6] That is, when agents are sick, they have effort costs of 0.

[7] In the instructions we used neutral language like "the computer set efforts to zero" rather than term "illness" or being "sick". However, Duersch et al. (2008) show that this frame does not affect results in a similar experiment. In all treatments, we used an employer–worker frame since this seems to be the natural setting. Note, however, that according to results by Fehr et al. (2007), the employer–worker frame and a seller–buyer frame yield essentially identical results.

[8] If they were, there would be, of course, no interesting incentive problem.

wage payments we obtain

$$\pi^E = \begin{cases} -rw & \text{if } \ e = 0 \\ 20e - w & \text{if } e > 0 \end{cases} .$$

The worker's payoff is given as

$$\pi^W = \begin{cases} rw & \text{if } \ e = 0 \\ w - c(e) & \text{if } e > 0 \end{cases} .$$

In the labor market, firms compete for workers and workers compete for jobs. Throughout the experiment, a group of 4 workers interacts with a group of 4 employers in a series of repetitions, which we call periods. The experiment is repeated for 20 periods. Each period is split into two stages: (i) the job market stage and (ii) the production stage. In the job market stage runs as a continuous time posted offer market and lasts 60 seconds. Employers make publicly observable offers to workers. Each employer is allowed to post only one offer at a time; however, this offer can be withdrawn and/or changed anytime. Workers can accept any or none of the outstanding offers. Once an offer is accepted by a single worker, it disappears form the screen, and the employer can post another (possibly equal) offer. This way, a single employer can end up with any number of workers ranging from 0 to 4. Equally well, a worker who is hesitant may end up with no job at all. One restriction imposed by the design, and which we feel is a realistic feature of labor markets, is that while firms can employ several workers at the same time, a single worker cannot hold multiple jobs. After the 60 seconds are over, workers still have time `(how much?)` to accept any outstanding offers. The job market stage ends when either all 4 workers have accepted an offer or indicated that they are not interested in accepting one.

In the production stage, each worker submits his intended effort. Then, the random draw by the computer determines whether a worker is "sick" or not. To minimize reputation and/or possible group effects, we limit the information displayed between periods to the outcome of the individual match. The worker observes wage offer, intended and realized effort as well as the resulting payoff of the respective period. Employers are reminded how many workers they could attract, which contracts were accepted and whether the realized effort for the respective contracts was equal to zero or greater than zero. Additionally, they learn their own payoff. Subjects are neither allowed to observe their partners' identities nor their past behavior.

Our experiment has a $2 \times 2$ design (see Table 2) with treatment variables: (i) minimum mandatory sick pay and (ii) homogenous versus heterogenous likelihood of getting sick. Our first treatment "HomFree" imposes no restriction on the replacement rate, and all workers have the same probability of getting sick, $p_i = 0.2$. With the second treatment, "HomMan," we isolate the effect of mandatory sick pay by setting a minimum replacement rate of 40%.[9]

In the remaining two heterogenous treatments ("HetFree" and "HetMan"), we allow for the possibility of adverse selection by inducing heterogenous probabilities of getting sick. Out of 4 workers in each group, 2 workers are "low–risk" workers with $p_i = 0.1$ and 2 workers are "high–risk" workers with $p_i = 0.3$. HetFree imposes no minimum replacement rate, while HetMan imposes a minimum rate of 40%.

Table 2: Treatments

| minimum sick pay rate | prob. of being sick homogeneous 0.2 | heterogenous 0.1/0.3 |
|---|---|---|
| 0% | HomFree | HetFree |
| 40% | HomMan | HetMan |

At the end of the gift–exchange experiment there is a questionnaire (see Appendix **??**) with a number of questions regarding subjects' demographics. Finally, a second questionnaire elicits risk preferences following the method introduced by Holt and Laury (2002). This questionnaire is incentivized in the usual way by randomly selecting one pair of lotteries by the throw of a 10–sided die. The chosen lottery is then resolved by throwing the die again.

In total, 192 subjects participated in our experiment. They were mostly undergraduate students from the University of Jena. There were 8 sessions and no subject participated in more than one session. The experiments were conducted in the computer lab of the Max–Planck Institute in Jena. Subjects were recruited via the ORSEE online recruiting system (Greiner, 2004).

For the experiment, we used the z–tree software package provided by Fischbacher (2007). After reading the instructions (see Appendix), subjects had to answer a series of detailed questions in order to make sure that they understood the experimental instructions and were able to do all necessary

[9] We conducted treatment HomFree first and set the minimum replacement rate in the Het treatments such that it roughly corresponded to the median offered sick pay rate of treatment HomFree.

calculations.

To avoid wealth effects, subjects were paid their earnings from one randomly selected period from the gift–exchange experiment. Each subject threw a die to determine which period's payoff was being paid. Payoffs from this period were paid out with an exchange rate of 10?? points = 1 euro. Additionally, subjects received their outcome from the Holt–Laury questionnaire plus a show–up fee of 7.50 euro. The average payoff was about 14.32 euro (about US $19 at the time of the experiment). Experiments lasted about 120 minutes including instruction time.

# 3 Behavioral hypotheses

The standard prediction based on rational self–interested and risk neutral individuals can be obtained as follows. Given that contracts can only condition on whether $e \geq 1$ or $e = 0$, self–interested workers will never choose an effort level above 1. Workers are second movers and therefore choose an effort of 1 if $(1 - p_i)\,[w - c(1)] + p_i rw \geq rw$, which yields the incentive constraint

$$r \leq (w - 3)/w, \tag{IC}$$

and 0 otherwise. Therefore, if employers want to induce an effort of 1, they have to offer a wage of at least 3. In HomMan and HetMan, where $r \geq 0.4$, the lowest equilibrium wage compatible with (IC) is 5.

Employers will only offer a contract if they make no losses given the worker they attract with this contract chooses an intended effort of 1. This yields the participation constraint for employers

$$(1 - p_i)(20 - w) - p_i wr \geq 0. \tag{PC}$$

Obviously, given (PC) employers will never offer wages above 20. In HomMan and HetMan the highest equilibrium wage compatible with (PC) is 18.

Together, the two constraints yield the following predictions.

**Hypothesis (self–interested)** If individuals are rational and self–interested, we obtain the following predictions.

1. In treatment HomFree and HetFree, workers choose an intended effort level of 1. Employers offer wages between 3 and 20.
2. In treatments HomMan and HetMan, workers choose an intended effort level of 1. Employers offer wages between 5 and 18.

In fact, the predictions cannot be sharpened as there are subgame perfect equilibria in HomFree and HetFree in which all the surplus goes to workers and others in which all the surplus goes to employers. Recall that workers have ??? seconds to accept any outstanding offers after the posted offer period of 60 seconds has ended. In this subgame, workers will accept the best available offer. Thus, if there are still four workers available in $t = 60$, employers offer $(3, 0\%)$ or $(3, 1\%)$ in equilibrium. Hence, the following two subgame perfect equilibria are the equilibria with the lowest and with the highest possible wages, respectively, in HomFree and HetFree.

**Equilibrium (20,0%)** Employers offer $(20, 0\%)$ in all $t < 60$. If four workers are still available in $t = 60$, employers offer $(3, 0\%)$. If less than four workers are available, employers offer $(20, 0\%)$ in $t = 60$. Workers accept only offers of $(20, 0\%)$ in all $t \leq 60$ and accept the best available offer thereafter.

**Equilibrium (3,0%)** Employers post no contract as long as $t < 60$ and no contract offer has been posted. If any employer posts a contract in $t < 60$, each employer immediately offers $(20, 0\%)$ in all $t < 60$ afterwards. If 4 workers are available in $t = 60$, employers offer $(3, 0\%)$. If less than four workers are available, employers offer $(20, 0\%)$ in $t = 60$. Workers accept the best available offer that is at least as good as $(3, 0\%)$ in all $t \leq 60$ and accept the best available offer thereafter.

An alternative hypothesis to Hypothesis (self–interested) based on a large number of gift–exchange experiments is the following. The hypothesis is well established in the literature with respect to wages. It has not been tested with respect to sick pay so far.

**Hypothesis (reciprocity)** Higher wage and sick pay offers are reciprocated by workers with higher efforts. Consequently, efforts above 1 and wages above 20 can be expected.

With respect to the introduction of a required minimum rate of sick pay (in treatments HomMan and HetMan) there are again two different hypotheses. Both are based on the well established idea (see e.g. Falk et al. 2008) that *intentions matter*. That is, it matters for the outcome of a game not only what players consider to be fair outcomes but also what they consider to be fair intentions of their opponents. The idea that mandating minimum standard could lead to a crowding out of good intentions seems to be plausible.

**Hypothesis (crowding out)** The voluntary provision of sick pay is reduced by the introduction of a mandatory minimum level of sick pay (i.e. there are fewer sick pay rates with $r \geq 0.4$ in HomMan and HetMan than in HomFree and HetFree). The argument would be that control undermines the kindness of offering sick pay and is therefore reciprocated less. As a consequence, employers find it unprofitable to offer sick pay.[10] Or more directly, employers who would have offered sick pay above 40% consider the mandated level as a signal for what one should offer and offer then exactly 40%.[11]

**Hypothesis (anchoring)** In the presence of a mandatory minimum level of sick pay, sick pay is not just raised to the mandated level of 40% but shifts the entire distribution of sick pay upwards. The reason for this could be that the introduction of a legal minimum sets a new anchor and thus affect subjects' perceptions of fairness (see Falk, Fehr, and Zehnder, 2006 for this in the context of minimum wages).

**Hypothesis (adverse selection)** In treatments HetFree and HetMan there is adverse selection of workers with a high probability of becoming sick into contracts that offer high sick pay rates. As a consequence, employers offer less or even no sick pay.

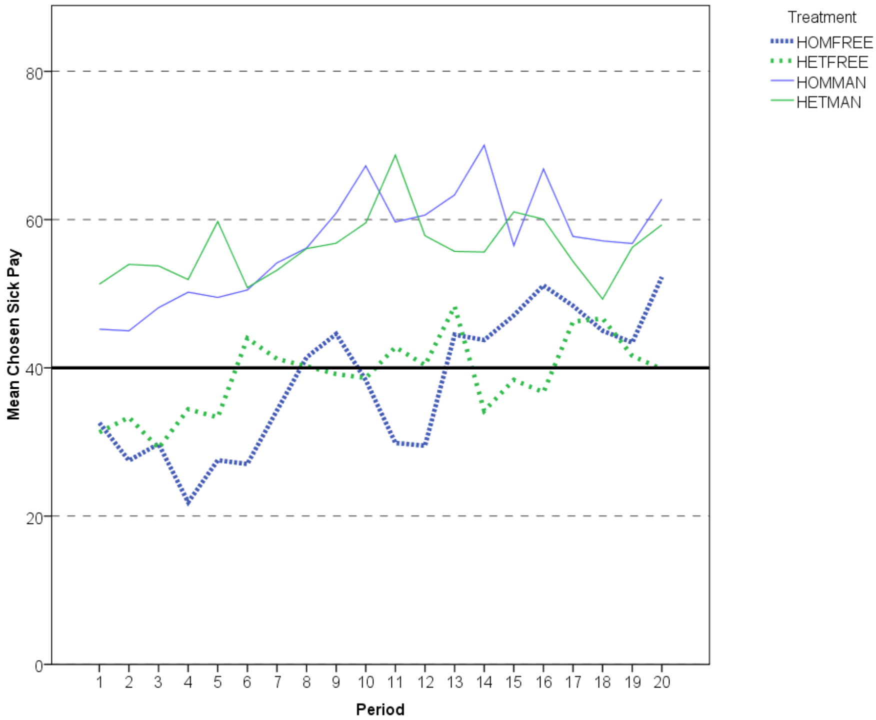
## 4 Results

We begin by presenting some summary statistics of the main variables of interest. Table 3 presents average wages, sick pay rates, and efforts for all *accepted* contracts, separately for our four treatments. Unless otherwise stated, effort always refers to *intended* effort, that is, the effort chosen by subjects before the computer can reduce effort to zero with some probability. Figures 1 through 3 ??? show how the same variables vary over the 20 periods of our experiment. While there seems to be a slight upwards trend in wages and sick pay, there seems to be a downward trend in efforts (see below for a formal confirmation of this through a regression).

Also shown in Table 3 are the average profits of workers and employers per period. As intended, competition by employers for workers is so strong that essentially all the surplus goes to workers.

[10] For a similar effect with respect to minimum wages see Brandts and Charness (2004) and Engelmann and Kübler (2007).

[11] `Jörg: I think we should not mention the "Hidden cost of control" argument anymore (Michael Kosfeld convinced me that it doesn't really fit`


Treatment
HOMFREE
HETFREE
HOMMAN
HETMAN
Mean Chosen Sick Pay
Period
80
60
40
20
0
1
2
3
4
5
6
7
8
9
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11
12
13
14
15
16
17
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19
20

Figure 1:

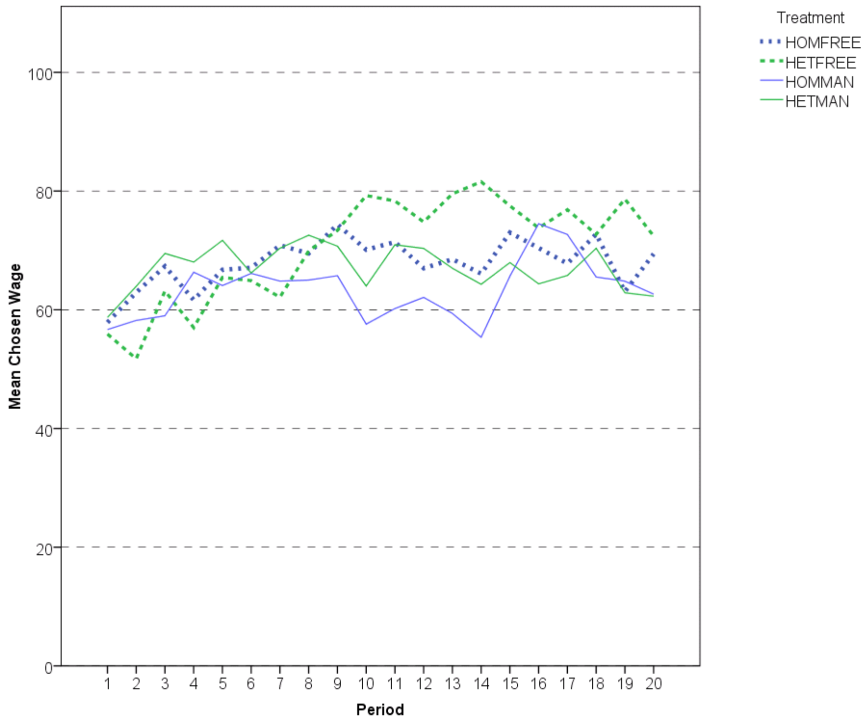
Treatment
HOMFREE
HETFREE
HOMMAN
HETMAN
Mean Chosen Wage
100
80
60
40
20
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Period

Figure 2:

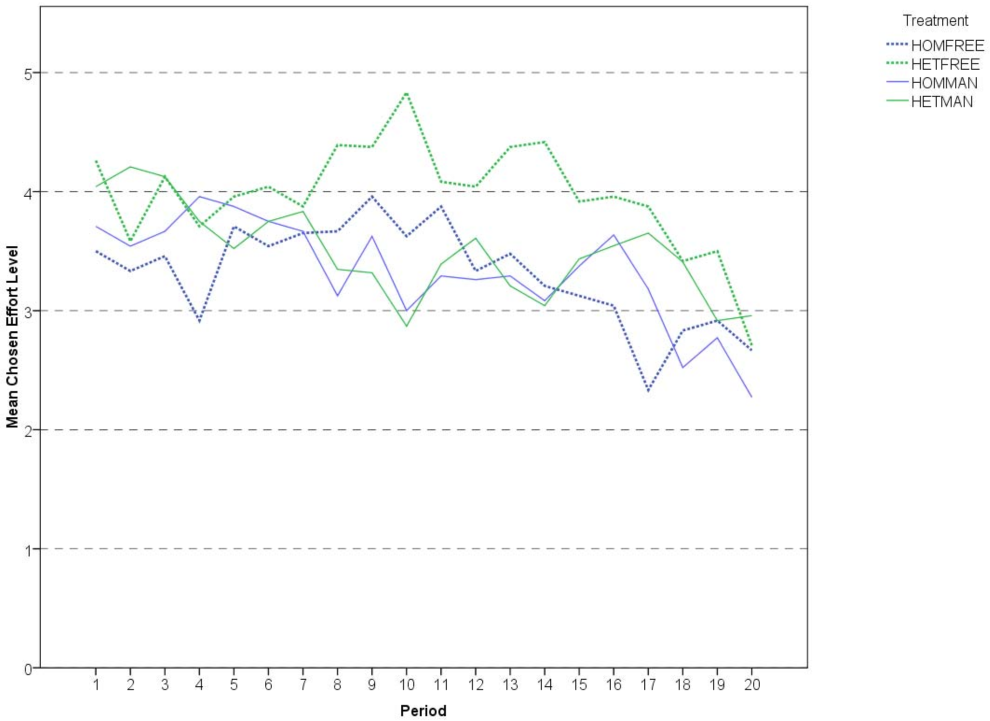
Treatment
HOMFREE
HETFREE
HOMMAN
HETMAN
Mean Chosen Effort Level
0
1
2
3
4
5
Period
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

Figure 3:

Table 3: Average wages, sick pay, efforts, and profits in the various treatments

| | Wage | Sick pay | Effort | Profit worker | Profit employer |
|---|---|---|---|---|---|
| HomFree | 67.89 | 37.98% | 3.31 | 54.73 | −7.06 |
| HomMan | 63.23 | 56.84% | 3.34 | 50.96 | −4.93 |
| HetFree | 70.48 | 39.01% | 3.97 | 55.78 | 2.01 |
| HetMan | 67.05 | 56.22% | 3.50 | 53.81 | −3.78 |

### 4.1 Gift exchange with respect to sick pay

With respect to wages, the data are consistent with the patterns found in most previous gift–exchange experiments. Wages are far higher than would be compatible with any equilibrium for selfish and rational agents. Average wages are between 60 and 70 whereas the selfish prediction is between 0 and 20. Workers reciprocate those wages with efforts that are far above the predicted selfish level of 1. Those results hold uniformly for all of our four treatments. In fact, MWU–tests, taking each group of 8 subjects as one observation, show no significant difference for wages, efforts, and profits. Only sick pay rates in the Man treatments are significantly higher than those in the Free treatments (5% level, two–sided).

The interesting question is whether the well–known gift exchange effect for wages also works with respect to sick pay.

Preliminary Result: sick pay increases effort in Free treatments but not in Man treatments.

`[include Stefan's regressions, either fixed effects or tobit]`

Table 4: Regressions of contracts on efforts

| | Treatments | | | |
|---|---|---|---|---|
| | HomFree | HetFree | HomMan | HetMan |
| wage | | | | |
| sickpay | | | | |
| period | | | | |
| constant | | | | |

Note: ***, **, * denotes significance on 1, 5, and 10% level respectively. n = 478

`in).`

Effectiveness of raising the wage vs. raising sick pay rate: in Free treatments coeff. of wage: 0.044 (HomFree) or 0.061 (HetFree). This is 4.6 (7.36) times as large as coeff. of sick pay. But each dollar more wage costs in expectation $0.8w + 0.2wr$, which evaluated at mean of $r$ is 0.876. Each percentage point sick pay costs $0.2wr$, which is 0.136. That is, raising effort through wages in Free treatments is about as expensive as raising effort through sick pay.

**Result 1 (reciprocity to sick pay):** Higher wage are strongly reciprocated by workers with higher efforts. High sick pay offers are reciprocated by workers in the Free treatments. However, this gift exchange effect becomes insignificant if a minimum level of sick pay is mandated.

## 4.2 The consequences of mandating sick pay

As we have discussed above, there are competing hypotheses with respect to the effects of mandating sick pay. The crowding out hypothesis would predict that employers who would have liked to offer sick pay below 40%, would now opt for the required minimum of 40%. And employers who without regulation would have offered sick pay above 40%, would now also just offer 40%. The alternative anchoring hypothesis would predict that the entire distribution of sick pay shifts upwards as the minimum rate sets a new, higher anchor.

Figures ?? and ?? [`cumm. distribution and density`] show clearly that there is no crowding out. The distribution function for the two Man treatments is everywhere to the right of the one for the Free treatments, indicating that the anchoring hypothesis is supported by our data. Kolmogorov-Smirnov cannot reject the hypotheses that the distributions are the same `[Rado, how did you run this test? I get a sign. difference when I treat each contract as one obs. which, however, does not seem to be right]`. Note, in particular, the pronounced increase in sick pay contracts that offer a 100% replacement rate.

**Result 2 (crowding out vs. anchoring):** The imposition of a mandatory sick pay rate shifts the entire sick pay distribution upwards.

Falk et al. (2006) observe similar effect of minimum wages in a simple gift-exchange market. The results 3 and 4 can be viewed as an interesting extension and generalization of this pattern to markets with two-dimensional prices. The important difference is that in their case, had the market collapsed around the minimum wage, the workers could not distinguish between

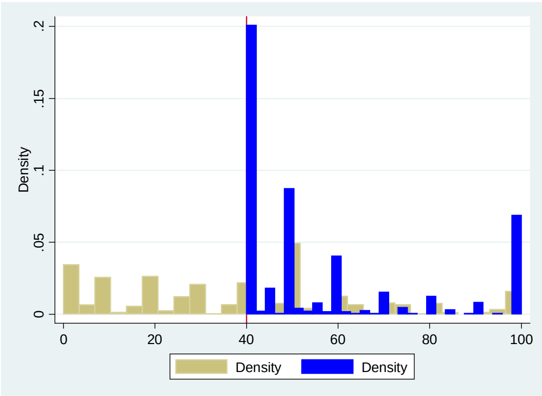


Figure 4:

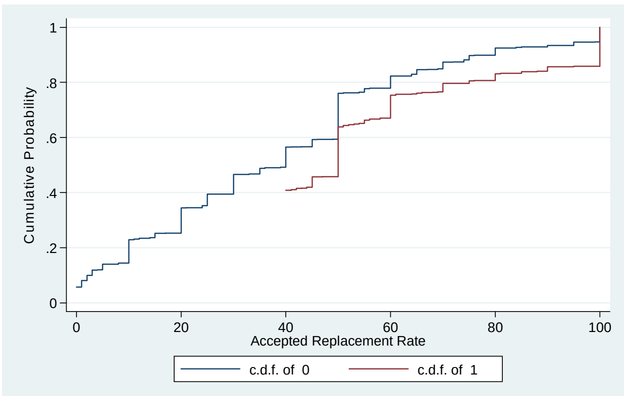


Figure 5:

the employers in any way. The firms might therefore find it extra useful to distinguish themselves by increasing their wages above the level of competition. The competitive forces of the market are particularly strong in their setting. In our case, however, this argument is much weaker because even if the market collapsed around the minimum level of sick-pay, the firms could still compete with each other via wages. This would be consistent with the logic of shifting the resources to the most productive uses. The fact that this does not happen and that the market provides sick-pay well in excess of what is required indicates an important role that sick-pay plays in how firms compete for workers.

The higher sick pay rates in the Man treatments, however, are not reciprocated by workers through an increase in efforts. As shown in Table 3, efforts are not significantly different under the two regimes. Since also employers' profits are about the same, employers must be compensated for higher sick pay rates by lower wages. And this in turn explains why workers do not exert higher efforts.

The last two column in Table 4 show that in contrast to the Free treatments, in the Man treatments there is no significant effect of sick pay on efforts. This seems compatible with the findings of Brandts and Charness (2004) who find that the kindness of wages is less salient if there is a mandated minimum level. In contrast to their findings, however, employers in our experiment do not react by offering less generous sick pay, presumable because they have an alternative way (lowering wages) of keeping the total expected wage bill constant.

### 4.3 Does adverse selection reduce the voluntary provision of sick pay?

As in any insurance market there is potential for adverse selection in the presence of sick pay. Firms offering generous sick pay may end up with a higher percentage of high–risk workers (those with a sickness rate of 0.3 rather than 0.1) which would harm their profits. Thus, we ask two questions in this section: (1) Do firms attract more high–risk workers when offering generous sick pay? And (2), does this potential adverse selection problem become so severe that it leads to a market break down, i.e. to the elimination of sick pay on a voluntary basis?

Table 5 sheds light on the first question. High–risk workers tend to accept contracts with an average sick pay rate which is 3 percentage points higher than those of low–risk workers. Taking the average sick pay rate of low–risk workers in a group as one observation and the corresponding sick pay rate of the high–risk workers in the same group as the other observation, we conduct a Wilcoxon–test for related samples with 12 groups (pooling HetFree and HetMan). According to the Wilcoxon test, sick pay rates of high–risk workers are different from those for low–risk workers at a $p$–value of 0.019 (two–sided test).

On the other hand, wages of high–risk workers are significantly lower ($p = 0.010$) than those accepted by low–risk workers. Thus, high–risk workers in their attempt to obtain higher sick pay *rates*, apparently need to accept lower wages as predicted by screening contracts. However, sick *payment,* the amount paid out when sick, is the product of wage and sick pay rate. The third column in Table 5 shows that high–risk workers actually get a bad deal as their average sick payments are no different from those of low–risk workers.

The forth column of Table 5 shows that high–risk workers do not seem to feel obliged to reciprocate higher sick–pay rates through higher effort (efforts of high–risk and low–risk workers are not significantly different). And in fact, the previous paragraph shows that they should not feel obliged as they receive the same sick payment as low–risk workers. On average, low–risk workers obtain a significantly higher payoff than high–risk workers ($p = 0.023$). However, this difference essentially vanished when a minimum level of sick pay is mandated. Low–risk workers are particularly harmed by the introduction of a mandated minimum sick pay rate.

Table 5: Average wages, sick pay, efforts, and profits of high- and low–risk workers

| | Wage | Sick pay | Sick payment | Effort | Worker's payoff |
|---|---|---|---|---|---|
| HetFree low–risk | 73.47 | 37.12% | 27.32 | 4.08 | 61.10 |
| HetFree high–risk | 67.50 | 40.90% | 26.59 | 3.86 | 50.45 |
| HetMan low–risk | 69.08 | 54.63% | 39.93 | 3.80 | 54.83 |
| HetMan high–risk | 65.14 | 57.73% | 40.26 | 3.21 | 52.80 |

Averages calculated for accepted contracts.

Already in Table 3 was saw that the lemon problem in the market for sick pay is not very severe. In fact, employers offer about the same sick pay rates in Man treatments as in Free treatments. Although they make lower profits with high–risk workers, they manage to offer the same average rate of sick pay. Profits of employers are even slightly higher in Het treatments as compared to Hom treatments although the difference is not significant (see Table 3).

**Result 3 (Adverse Selection):** We find evidence of adverse selection: workers with higher probability of being sick choose contracts with higher sick pay and vice versa. However, we can reject the hypothesis that adverse selection leads to employers offering less sick pay.

## 4.4 Competition in the labor market and sick pay

The provision of sick pay in labor markets is likely to depend in an important way on the type of competition in this market. This is already shown in Duersch et al. (2009) where markets in which employers compete for workers are compared to markets in which they do not. In markets with one–to–one matching of firms and workers, firms offer sick pay only very rarely. Competition on the other hand evidently forces them to offer sick pay. Thus, our paper mainly applies to labor market for very qualified labor in which there is strong competition for employees. Our finding that sick pay is provided voluntarily agrees with empirical stylized fact (see Economic Policy Institute, 2007) that highly qualified workers are much more likely to obtain sick pay than low qualified ones.[12]

The strong competition on the employer side in our setting stems from the fact that employers can employ more than one worker while workers can only work for one employer. In fact, workers end up with a contract in more than 99% of cases in HomFree and HomMan and in more than 97% of cases in HetFree and HetMan. On the other hand, employers can in many cases attract no worker (between 33% (HetFree) and 41% (HetMan) of cases), while in about 26% of cases, employers attract 2 or more workers.

To assess the question whether competition is strong enough to force employers to offer sick pay, we run a fixed effect linear probability regression to obtain the probability that a proposed contract is being accepted by workers. The explanatory variables are the wage and the sick pay rate. Table 6 shows results of separate regressions for HomFree and HomMan and for the different worker types in the Het treatments. In all cases, higher wages significantly increase the probability of a contract being accepted by

[12]For example, the chances of having access to sick pay are five–times lower for the workers in the low wage category (earning less than \$7.38 per hour) than for the workers in the high wage category (earning more than 29.47 per hour) (see Economic Poliy Institute, 2007).

a worker. This also holds with respect to sick pay in treatment HomFree and for high–risk workers in the Het treatments. The effect is much weaker or insignificant in HomMan and for low–risk workers in the Het treatments. It seems that low–risk workers are much less impressed by high sick pay rates.

Table 6: Linear probability fixed–effect regression: acceptance probabilities of workers

| | Wage | | | Sick pay | | |
|---|---|---|---|---|---|---|
| | coeff. | std. err. | $P$ | coeff. | std. err. | $P$ |
| HomFree | .0058 | .0004 | .000 | .0010 | .0004 | .008 |
| HomMan | .0098 | .0007 | .000 | .0000 | .0007 | .996 |
| HetFree low–risk | .0053 | .0005 | .000 | .0003 | .0004 | .419 |
| HetFree high–risk | .0031 | .0005 | .000 | .0011 | .0004 | .009 |
| HetMan low–risk | .0039 | .0004 | .000 | .0010 | .0005 | .033 |
| HetMan high–risk | .0036 | .0003 | .000 | .0025 | .0005 | .000 |

Figure 6 shows how average wage and sick pay offers develop over the 60 seconds of a period. It appears that employers post better offers are at the beginning of a period. This effect is more pronounced for wages than for sick pay. Clearly there is no bidding war at the end of the period by employers who have not attracted any workers so far.

## 5 Conclusion

[references from old paper]

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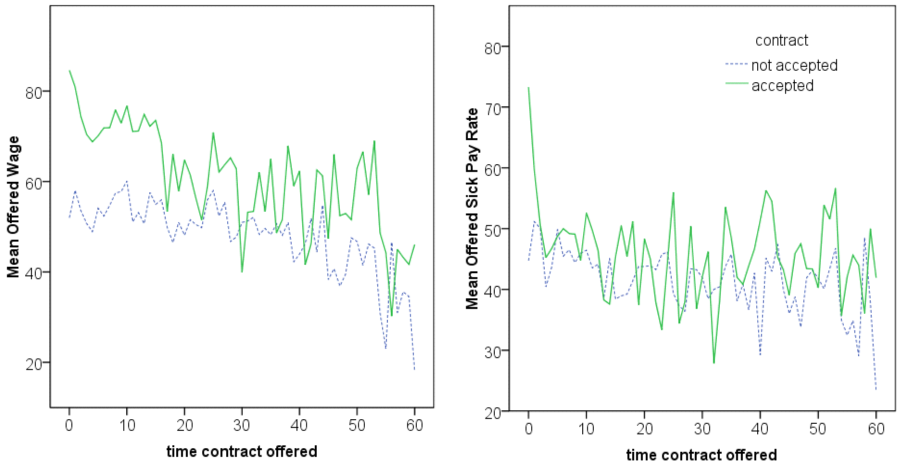


Figure 6: Timing of contract offers in a period (in seconds) regarding wages (left panel) and sick pay rates (right panel), separately for accepted and non-accepted contracts.


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# Appendix

## A Instructions