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Abstract

Sick pay is a common provision in most labor contracts. This paper employs an experimental gift-exchange environment to explore two related questions using both managers and undergraduates as subjects. First, do workers reciprocate generous sick pay with higher effort? Second, do firms benefit from offering sick pay? Our main finding is that workers do reciprocate generous sick pay with higher effort. However, firms benefit from offering sick pay in terms of profits if and only if there is competition among firms for workers. Consequently, competition leads to a higher voluntary provision of sick pay relative to a monopsonistic labor market.

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

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1 Introduction

Sick pay or sick leave provisions are standard in most labor contracts around the world.[1] Internationally, there is a large variety of different forms of sick pay.[2] Some of this variation is due to regulation. But in countries like the US or the UK, where legal standards are minimal, variety is mainly due to the choice of firms. This poses two interrelated questions. First, how do workers react to different sick pay schemes? Second, will sick pay emerge endogenously because it is profitable for firms to provide it?

By offering sick pay, the firm (partially) insures the worker against income loss due to illness. This does not come without costs for the firm. Apart from the expected payments to the worker there are well–know moral hazard and adverse selection problems when workers pretend to be sick or when workers are attracted who are sick frequently.[3] Thus, when we observe rational firms voluntarily offering sick pay, they must either expect a higher productivity from the worker or some other part of the compensation package, e.g. the wage, needs to be appropriately adjusted in order to compensate for the expected cost.

In this paper, we use a modified version of the standard gift–exchange experiment in a labor market setting (see e.g. Fehr et al. 1993, 1997, 1998, 2007) to explore these questions.[4] Employers offer a wage scheme

[1] Sick pay stipulates a replacement rate, that is, a percentage of the usual wage a worker receives in case of sickness. Sick leave specifies a number of days per year that can be missed without pay reductions. In the following we shall concentrate on sick pay although much of the analysis also applies to sick leave as they are equivalent in a static framework.

[2] See e.g. Treble (2002) and Barmby et al. (2002) for partial surveys.

[3] See e.g. Henrekson and Persson (2004) on the empirical effects of sick pay on absentee rates.

[4] See also Berg et al. (1995), Charness (2004), Hannan et al. (2002), and many others.

and workers choose effort levels. A crucial design feature we introduce is an exogenous probability for workers to become "sick", i.e. they cannot show up for work even if they wanted to exert effort. The second design feature is that firms can offer contracts with two components: a wage if the worker shows up for work and sick pay if he does not, either because he is sick or because he pretends to be (which the employer cannot distinguish). The fact that labor contracts now involve lotteries makes risk preferences an important input and we elicit them through a Holt and Laury (2002) procedure.

Sick pay may have very different effects depending on whether one considers a monopsonistic firm or firms that need to compete for workers. We first explore to what extent sick pay affects a firm's profit directly through enhanced effort from workers. We shall call this the "gift–exchange effect." The second, indirect effect may work through self–selection of workers.[5] If it is the case that workers who value sick pay are also those that are productive and provide higher effort, then firms may want to attract these workers by offering contracts with sick pay provision.[6] Our treatments are designed to separate those two effects. In our (M)onospony treatment, each worker is matched to just one employer. In this treatment, only the gift–exchange effect effect can operate. In our (S)election treatment, there is competition among employers for workers such that the selection efect can operate.

Falk (2007) finds support for gift-exchange in a field experiment.

[5] This important theme has been stressed by Chiappori and Salaine (2003) in empirical work on contracts and by Coles and Treble (1993) in theoretical work on sick leave.

[6] Surveys suggest that sick pay and health care are important determinants for the attractiveness of employers to workers. See e.g. Fortune's "100 Best Companies to Work For" list (2008).

Firms may end up with no workers or with several workers depending on the attractiveness of their contract offers.

Finally, another important design feature is that we use both managers and undergraduate students as subjects. It is often argued that undergraduates are not representative of the population that is relevant for the questions at hand such as, in our case, labor market relations. Undergraduates who lack the experience of actual labor relationships may in fact behave systematically different from more experienced workers or managers. Furthermore, in the context of sick pay, the question of whether one has the responsibility for a family may become important. For these reasons, it is important to start to expand the usual subject pool used by experimental economists to include older and more experienced people.[7]

Our main finding is that the gift–exchange effect is rather weak in terms of efforts and actually negative in terms of profits. Although workers react to higher sick pay with higher effort, this does not compensate for the higher expected wage bill of firms. The results are very different when we allow for competition among employers. In order to attract any workers, firms have to offer either generous sick pay or a very generous wage. The self–selection of workers is such that offering sick pay becomes the more cost efficient way for firms to induce the same effort level. As a result, profits are higher with sick pay provision. This, in turn leads to a higher provision of sick pay when

[7] Several studies have found significant treatment differences between the behavior of managers and the typical subject population of undergraduate students. Managers are found to be more prosocial in the gift-exchange game, Hannan et al. (2002); more trusting in the trust game, Fehr and List (2004); and display higher level of strategic play in the "ratchet effect" game, Cooper et al. (1999). Other studies found small and insignificant differences, see e.g. Drehmann, Oechssler, and Roider (2005).

firms compete for workers relative to a monopsonistic labor market.

Most of our qualitative results are the same for undergraduates and managers. If anything, sick pay contracts are more profitable in the manager treatment. The main reason for this is that our manager subjects have a larger tendency to reciprocate generous contracts with higher effort.

The remainder of the paper is organized as follows. In the next section we describe the experimental design and procedures. Results are analyzed and discussed in Section 3. Finally, we close with a brief summary of our findings.

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, 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.[8]

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

Table 1: The agent's effort cost function

e	0	1	2	3	4	5	6	7	8	9	10
$C(e)$	0	1	2	4	6	8	10	12	15	18	22

Employers have to choose one contract from a menu of contracts. Each contract is a pair (w, s) consisting of a wage, w, paid whenever the worker shows up for work (i.e. when $e > 0$), and sick pay, s, which is paid in case the worker does not show up for work (i.e. when realized effort is zero). 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.[9]

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 wage payments we obtain

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

The worker's payoff is given as

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

The menu of contracts employers can choose from is shown in Table 2.[10] Contracts (0,0), (50,0), and (75,0) provide no sick pay and mimic therefore

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

[10] We restricted the number of contracts to 5 in order to obtain a sufficient number of observations for each contract.

standard gift exchange contracts with varying levels of generosity. Contracts (50,20) and (35,35) provide partial and complete replacement rates, respectively.

Table 2: The menu of five contracts

	contract				
	(75,0)	(50,20)	(50,0)	(35,35)	(0,0)
wage when $e > 0$	75	50	50	35	0
wage when $e = 0$	0	20	0	35	0

Note: Realized effort e equals intended effort with probability 2/3 and 0 with probability 1/3.

A rational, self–interested worker who maximizes his expected payoff would choose $e = 0$ for contracts (35,35) and (0,0) and $e = 1$ for all other contracts. Given this, a self–interested employer would minimize his losses by offering the (0,0) contract. Thus, obviously the (0,0) contract needs to be included in the menu of contracts as a benchmark. The choice of the other contracts in the menu was motivated by the informative comparisons they allow. The (35,35) contract is a full insurance contract that dominates (0,0) for all workers regardless of risk–aversion. The interesting question is whether workers will reciprocate by providing sufficiently high effort to make this contract profitable. The next comparison is between (35,35) and (50,0). Note that the latter contract provides no insurance at all and pays a lower expected wage.[11] Thus, workers should prefer contract (35,35) while employers would favor contract (50,0) for given effort choices.

Comparing contract (50,20) to contract (50,0) allows to isolate the effect

[11] If workers exert individually rational efforts, they receive expected payments of $\pi^W(50,0) = 2/3 * (50 - 1) = 32.67$ versus $\pi^W(35,35) = 35$.

of sick pay versus no sick pay for the same wage level. Again, the question is whether workers will reciprocate the more generous sick pay with higher effort levels. Finally, it should be interesting to compare the three contracts (35,35), (50,20), and (75,0), which are not dominated by another contract from the worker's viewpoint. Contract (35,35) should appeal to workers with a very high degree of risk aversion, contract (50,20) to workers with a medium degree of risk aversion, and contract (75,0) to workers with low degrees of risk aversion and to risk neutral or risk–loving types. Thus, depending on the preferences of workers, any of these three contracts could be seen as the best contract in the menu.

The experiment consists of four treatments (see Table 3 for details). In treatment M (short for *monopsony*) we randomly and anonymously match each worker with one employer. Simultaneously, the employer chooses a contract, and the worker chooses intended efforts for each of the five contracts. We use the strategy method since otherwise it would be difficult to collect sufficient data on less attractive contracts.[12] Then, the computer randomly (with probability 1/3) decides whether the worker's effort is set to zero. The payoffs of the employer and the worker are determined based on the chosen contract and the realized effort.

A variation of treatment M is treatment M-f (M-"framed"), which is exactly the same as M with the exception that in the instructions the term "illness" or being "sick" is used instead of neutral language like "the computer set efforts to zero." We included this treatment to check whether using

[12] To the extent that the use of the strategy method reduces the amount of reciprocal behavior, our results will provide a lower bound for the effectiveness of gift–exchange behavior.

the potentially loaded terms sickness etc. would trigger a different response from subjects.[13]

In treatment S (short for *selection*), there is competition among employers, who can now employ more than one worker. Again, employers choose a contract, and workers choose intended efforts for each of the five contracts. But now workers have to indicate a preference ranking for the five contracts from the most preferred choice, 1, down to the least preferred choice, 5. Then, we match workers and employers according to their preferences. Each worker is assigned to that employer who had offered his most preferred contract. If the most preferred contract is not available, then the worker is assigned to the employer offering the next preferred contract and so on. In case there are several employers offering the same contract, workers are distributed between them as equally as possible. If an employer attracts no workers in a given period, his profit is 0. This is an important consequence of self–selection and competition in labor markets. If the offered contract is unappealing, then employers may not find any interested workers. On the other hand, if an employer attracts several workers, his total profit in this period is the sum of profits from all his workers.[14]

Finally, the fourth treatment, treatment S-M (S-“managers”), is like treatment S, except that subjects in this treatment are managers instead of undergraduate students.[15] Subjects in this treatment are between 31 and 45

[13] 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.

[14] Another option would have been to use the average profit generated by workers. However, using total profits seemed more realistic to us for labor markets. Also, we wanted to maximize competitive pressure among employers.

[15] For obvious reasons we did not have unlimited access to a subject pool with managers.

years old, most with at least 10 years of work experience. Most subjects are already quite advanced in their career (vice president or similar) and have leadership experience. Motivating their coworkers and hiring new staff are routine tasks in their work day.

Table 3: Treatments

treatment name	subject pool	frame*	competition among employers	number of subjects
M	undergrads	neutral	no	40
M-f	undergrads	sickness	no	20
S	undergrads	neutral	yes	60
S-M	managers	neutral	yes	30

Note: *Thus refers to the explanation for the exogenous probability of 0 effort. In all treatments a worker–employer frame is used.

The experiment is repeated for 10 rounds using a perfect stranger matching (such that no employer is matched twice to the same worker) in treatments M and M-f. In treatments S and S-M, stranger matching is not possible and we match subjects in fixed groups of 10 subjects, 5 workers and 5 employers. This choice was made with the intention of minimizing repeated game effects and maximizing the competition among employers while still producing a sufficient number of independent observations.

Subjects' feedback at the end of each period is limited to results from their own match to rule out reputation effects. Workers learn which wage offer their employer made, whether the effort was set to 0 by the computer, and their wage. Employers only learn their own payoff. Subjects cannot observe their partner's past behavior.

We therefore chose to let them play the selection treatment as we expected the most interesting effects to occur in this treatment.

At the end of the gift–exchange experiment there is a questionnaire (see Appendix A.3) with a number of questions regarding subjects' demographics and preferences with respect to hypothetical labor contracts with varying levels of sick pay. 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, 150 subjects participated in our experiment. No subject participated in more than one session. The experiments were conducted in the computer lab at the University of Mannheim. All undergraduate subjects were recruited via the ORSEE online recruiting system (Greiner, 2004). The managers were participants in an Executive MBA class. The experiment was conducted during lunch break of the course and participation in the experiment was voluntary. However, most participants chose to take part in the experiment.

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 calculations. Subjects who could not correctly answer the questions after additional explanation were replaced before proceeding.

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 round 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 15.82 euro (about US $25 at the time of the experiment).[16] Experiments lasted about 90 minutes including instruction time.

3 Results

As a first step we note that there are no significant differences between sessions conducted with a "sickness frame" in treatment M and those without. Neither the contract offers by employers nor the effort choices by workers differ significantly between treatment M-f and treatment M, according to MWU–tests. Thus, from now on, we pool the data from these two treatments.

3.1 Effort choices and profits

Table 4 summarizes the effort choices of workers. Note that given the employed strategy method each worker chose efforts for each possible contract in each period.

In all treatments, effort choices are ordered in the following way,

$$e(75,0) \underset{(p<0.001)}{>} e(50,20) \underset{(p=0.006)}{>} e(50,0) \underset{(p=0.002)}{>} e(35,35) \underset{(p<0.001)}{>} e(0,0).$$

The above p–values were obtained from running OLS regressions on the

[16] Undergraduate subjects and managers were paid according to the same rules to preserve comparability. Note however, that we did not have to compensate the managers for their (considerably higher) opportunity cost of time since the experiment took place in class. They were also quite obviously intrinsically motivated to do well.

Table 4: Mean intended effort choices of workers

	contract offered				
	(75,0)	(50,20)	(50,0)	(35,35)	(0,0)
treatment M	3.89	2.65	2.41	1.76	0.22
treatment S	3.18	2.87	2.56	2.28	0.17
treatment S-M	4.40	3.86	3.53	3.22	0.46

Note: Mean intended effort is averaged over all workers and periods.

entire data set with effort as dependent variable.[17] Explanatory variables were dummies for the contract offered by employers, treatment dummies, a period variable, and variables encoding all questions from the questionnaire (see Appendix A.3). In order to account for repeat observations of the same subjects, we adjusted standard errors through clustering by subjects. The only variables that significantly influenced effort choice were the contract dummies.

The standard gift–exchange result is replicated in our experiment. Although workers in treatment M are certain of never meeting again the same employer, they reciprocate higher wage offers with higher effort as $e(75,0) > e(50,0) > e(0,0)$. Furthermore, offering sick pay also increases efforts, as $e(50,20) > e(50,0)$. However, a sick pay contract with 100% replacement rate is unprofitable for the employer. Although contract (50,0) yields a lower expected wage than contract (35,35), and therefore comes at lower cost for the employer, the effort choices for the former are significantly higher than those for the latter.

One interesting observation is that effort choices of managers in treat-

[17] For treatment M, where each worker counts as an independent observation, we also ran Wilcoxon–tests for related samples taking each worker's average effort over all rounds as one observation. The obtained p-values are qualitatively the same.

ment S-M are substantially higher than effort choices of undergraduates in treatment S. This holds for all offered contracts although the ranking of effort choices is exactly the same as those of undergraduates. More prosocial behavior in the gift-exchange environment similar to ours has already been observed by Hannan et al. (2002). In their study, MBA students offer on average about 20% higher wages in the role of an employer and provide anywhere between 10 - 50% higher efforts in the role of the employee than their undergraduate counterparts. Fehr and List (2004) compare the behavior of Costa Rican CEOs and undergraduate students in a trust game and find that both, the amounts sent and the amount returned are about 30% higher for the CEOs. Our results are consistent with this literature. The more cooperative behavior of the managers could be attributed to their richer experience about how powerful trust and reciprocity can be in the workplace. But is could also be attributed to an age effect as it has been shown (see e.g. List, 2004; Egas and Riedl, 2008; and Charness and Villeval, 2008) that age is positively related to cooperation in similar situations.

Managers in our experiment are also less afflicted by the obvious moral hazard problem which results from offering sick pay without medical examination. Rational, self–interested workers would "skip work" (i.e. choose zero intended effort) when offered contracts (35,35) and (0,0). For contract (35,35) about 31.5% of undergraduates skip work,[18] which is high but not as high as the 100% that one would expect if workers were rational and self–interested. The frequency of skipping work of managers is even lower at 8.7%. Finally, about 90% of all workers skip work when the employer offers

[18] See Table 8 in the Appendix for the exact numbers.

no compensation at all.

We can summarize all this in

Result 1 (Effort choices)

1. The standard gift exchange result is replicated in our experiment: higher wage offers significantly increase effort choices of workers.
2. Offering sick pay also significantly increases efforts of workers.
3. Managers exert higher efforts and "skip work" less frequently than undergraduate students.

In order to decide whether it is worthwhile for an employer to offer sick pay, we have to look at profits generated from offering the various contracts. However, one should be aware of the fact that the absolute level of profits depends on the parametrization of the profit function. Thus, statements about the profitability of contracts need to be treated with care. Having said this, we calculate expected profit of employer j when offering contract (w, s) as

$$E\pi_j(w,s) = \frac{2}{3}\left(20\sum_{i\in W_j}\tilde{e}_i - \sum_{i\in W_j:\tilde{e}_i>0} w - \sum_{i\in W_j:\tilde{e}_i=0} s\right) - \frac{1}{3}\sum_{i\in W_j} s, \qquad (1)$$

that is, given the *intended* efforts $\tilde{e}_i$ of employer j's workers $i \in W_j$. By using intended efforts rather than realized efforts, which can be set to zero by illness, we eliminate the noise due to the random incidences of illness. Figure 1 shows the mean number of workers an employer attracted and the mean expected profits of employers depending on the contract offered to workers. The left panel of Figure 1 refers to treatment M. Given the one-to-one matching structure in M, obviously each employer had one worker. With respect to expected profits, we observe that the best contract is contract (75,0) closely followed by (0,0). As seen in Table 4, contract (75,0) elicits the highest efforts from workers and in treatment M, this overcompensates for the high wage payments. Somewhat surprisingly, a few workers exert effort even when offered no wage at all, which causes positive profits for the (0,0) contract. On the other hand, both contracts that offer sick pay produce losses for employers on average. In order to assess significances, we again run OLS regressions of expected profits on dummies for treatment/contract combinations and the period variable, and rotate the omitted treatment/contract dummy. Although we use a relatively conservative approach by clustering for subjects, we find that in treatment M, profits with contract (75,0) and with (0,0) are both significantly higher than those with (35,35) at the 5% level.[19]

The picture changes when we consider competition among employers as in treatment S (see the center panel of Figure 1). Now the (75,0) contract, which was best in M, is the worst contract (the difference in profits for the (75,0) contract between treatments M and S is is significant at the 5% level, for both the OLS regression and MWU–tests).[20] However, it attracts by far the most workers. Three contracts, namely (50,20), (50,0) and (0,0) are about equally good for employers in terms of profits but only (50,20) manages to attract large number of workers. Not surprisingly, employers

[19]MWU–tests with data aggregated over periods show that profits with (75,0), (0,0), and (50,0) are all significantly higher than those with (35,35) in treatment M.

[20]Due to the clustering of standard errors, profits in S for contract (75,0) turn out to be only marginally lower than those for (50,0) and (0,0) at $p < 0.06$.

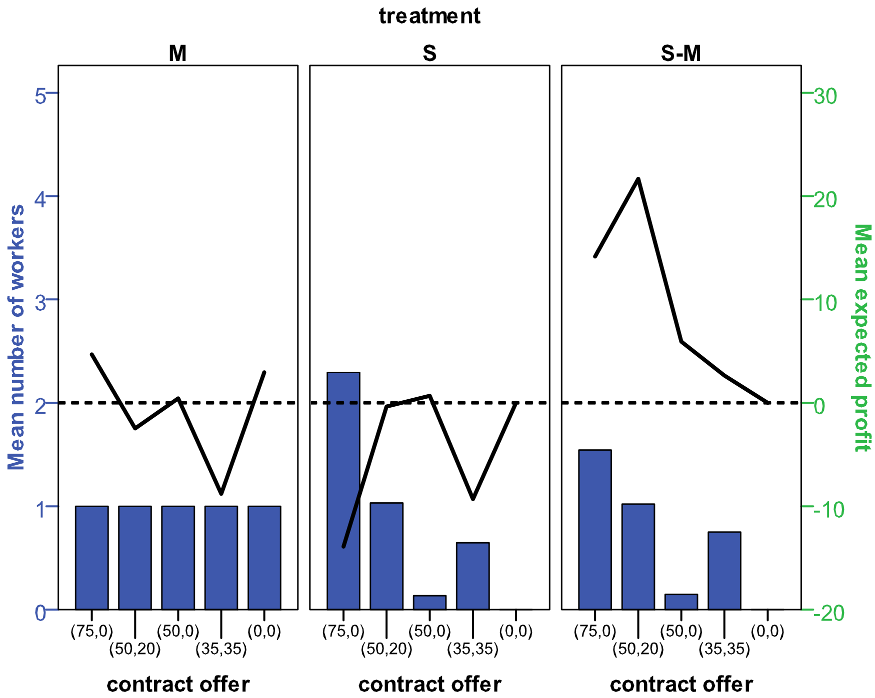

Figure 1: Average number of workers per employer (bars, left scale) and average total profit of employers form all workers (line, right scale) in treatments M (left panel), S (center panel), and S-M (right panel).

who offered contract (0,0) failed to attract a single worker. The full insurance contract (35,35) remains a loss maker for employers but attracts its share of workers.[21]

The number of workers that each contract attracts is very similar in treatment S-M with managers (see the right panel of Figure 1). However, given that managers consistently exert higher efforts, all contracts that offer a positive wage now become profitable for employers. But again, the (50,20) contract, a contract that offers partial sick pay, seems to be the optimal contract for employers as it produces the highest profits and attracts a substantial number of workers.[22] In contrast to treatment S, even the full insurance contract (35,35) is now slightly profitable.

Result 2 (Profits)

1. Without competition among employers (treatment M), sick pay is not a profitable contract option for employers. Both contracts that offer sick pay are loss makers. The contract with the most generous wage and no sick pay, contract (75,0) is the most profitable.
2. With competition among employers (treatments S and S-M), the (50,20) contract, a contract that offers partial sick pay, is the optimal contract for employers. In treatment S, it is the only contract that roughly breaks even and attracts a substantial number

[21] Profits with (35,35) are significantly lower than those with (50,0) and (0,0) at the 1% level according to the OLS regressions.

[22] Expected profits with contract (50,20) are significantly higher than those with (50,0) and (0,0) at the 5% level. All other differences are not significant, at least when standard errors are clustered.

of workers. In treatment S-M, it is the most profitable contract and attracts a sufficient number of workers.

3.2 Contract offers

Figure 2 compares the contracts offered by employers in treatments M, S, and S-M. While in treatment M contracts that offer low wages and no sick pay dominate, in treatment S the (50,20) contract becomes the most frequently offered contract, followed by the high wage contract (75,0). The same two contracts are the two most frequently offered contracts in treatment S-M. Thus, it seems that competition among employers yields more provision of sick pay. Striking is in particular the difference in the frequency of the (0,0) contract. Being the most frequent contract in treatment M, it is rarely offered in treatment S because subjects immediately realized that they could attract no workers with this contract.[23] The full insurance contract (35,35) is among the least popular contracts in both treatments. To assess the significance of differences we ran multinomial logit regressions as a function of a treatment dummy, period, and all variables from the questionnaire, clustered by subject, using contract (35,35) as the base. Contract (50,20) is offered significantly more frequently in treatments S and S-M than in treatment M ($p < 0.01$). Also, contract (75,0) is offered more frequently in treatment S-M than in treatment M ($p < 0.05$). On the other hand, contract (0,0) is offered significantly less frequently in treatments S and S-M (at $p < 0.05$ and $p < 0.01$, respectively).[24]

[23] There is no noticable time trend in the data on offered contracts.

[24] All significance levels remain unchanged when we drop the questionnaire variables from the regression.

Result 3 (Contract offers)

1. Without competition among employers (treatment M), most employers offer the (50,0) contract or even the (0,0) contract. Sick pay contracts are very rarely offered.
2. With competition among employers, (treatments S and S-M), the sick pay contract (50,20) and the contract with the most generous wage (75,0) become the two most frequently offered contracts. (0,0) is hardly ever offered.

3.3 Does sick pay attract more reciprocal workers?

When there is competition among employers for workers, employers may try to attract more reciprocal workers by offering sick pay. We shall call a worker "more reciprocal" than another if for a given expected wage (including sick pay) he exerts higher effort or if for given effort he is satisfied with a lower expected wage.

Offering sick pay could turn out to be a competitive advantage for firms if one of the following two mechanisms is at work. There is a direct, behavioral mechanism according to which reciprocal workers may see sick pay as a "nice contract",[25] and would self–select accordingly. There is also a more indirect mechanism, which works however only if risk–averse workers are at the same time more reciprocal. Employers could then attract those more reciprocal workers by offering generous sick pay, which would appeal to risk averse workers more. We will try to distinguish among the two mechanisms with

[25] See Fortune's "100 Best Companies to Work For" list (2008).

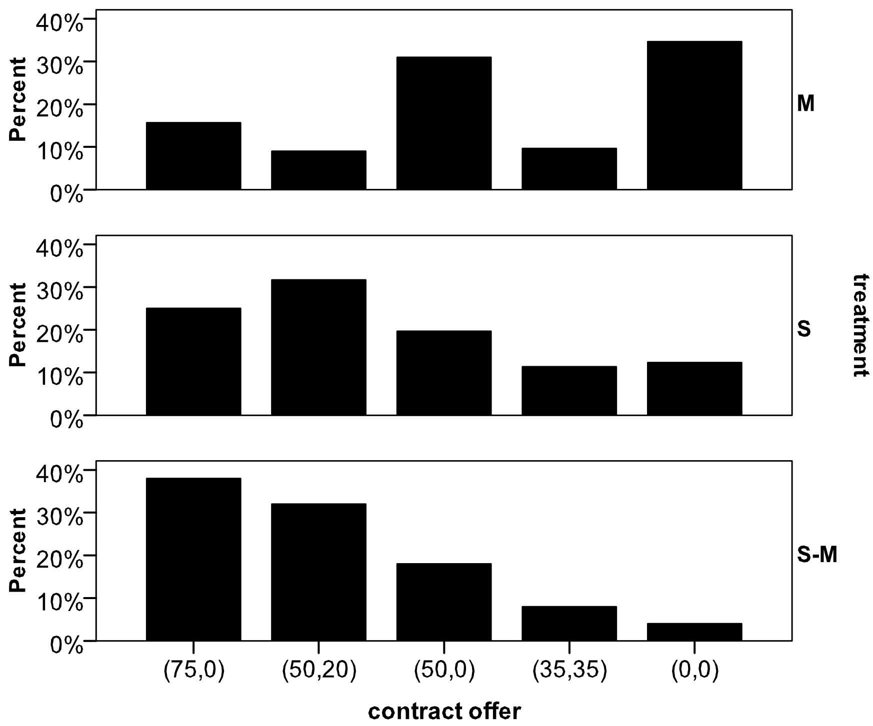

Figure 2: Distribution of contract offers by employers in treatments M (top), S (center), and S-M (bottom).

the use of our questionnaire data on risk aversion and demographics.

Table 5: Most preferred contracts by workers

	contract				
	(75,0)	(50,20)	(50,0)	(35,35)	(0,0)
treatment S	69.3%	20.0%	3.3%	7.3%	0.0%
treatment S-M	55.3%	23.3%	4.0%	17.3%	0.0%

Note: Shown are the percentages of workers who rank a particular contract first. When workers rank contracts differently in different periods, their ranking enter weighted by the number of periods in which they rank this contract first.

Table 5 shows the percentages of workers who rank a particular contract as their first choice. The most popular contract is clearly the (75,0) contract followed by the (50,20) contract. More than 70% of all subjects rank those two contracts as their first *two* choices. The full insurance contract (35,35) is rarely top–ranked by undergraduates but slightly more frequently by managers. The two other contracts are dominated and hardly ever top–ranked. In the following, we therefore concentrate on the (75,0) and (50,20) contracts.

Table 6: Efforts and created profits given preferred contracts

	S		S-M	
by workers who prefer contract...	(75,0)	(50,20)	(75,0)	(50,20)
mean intended effort	3.21	3.17	4.46	5.29
mean profit created	−6.9	2.2	10.6	30.4

Note: Data includes workers who rank either contract (75,0) or contract (50,20) as their first choice. When workers rank contracts differently in different periods, their choices enter weighted by the number of periods in which they rank this contract first.

We find clear evidence in both treatments that the sick pay contract (50,20) attracts reciprocal workers. Table 6 compares the mean intended effort of workers who prefer the (75,0) contract to that of workers who prefer the (50,20) contract, separately for treatments S and S-M. It also shows the mean expected profit created by the respective worker for his employer. In treatment S, mean intended effort is almost the same for both contracts although the expected wage for the (50,20) contract is much lower.[26] Consequently, the second row of Table 6 shows that the mean profit created by a worker who prefers the (50,20) contract is substantially higher. The same holds even more pronounced for treatment S-M. In contrast to the effort choices of all workers (see Table 4), intended efforts of workers who prefer contract (50,20) are actually higher than those of workers who prefer (75,0). The resulting differences in profits created by workers are sizable.

Given this finding that sick pay attracts reciprocal workers, we now explore whether risk preferences or other observables can account for this self–selection.[27] To test this we ran a regression (Probit, clustered by subject) on the probability of preferring the (50,20) contract among those who ranked (75,0) or (50,20) first with the explanatory variables being the Holt/Laury risk cutoff, period, a treatment dummy, and all questions from the post–experimental questionnaire.[28] The results in Table 7 show that none of the characteristics is significant at the 5% level, although the coefficients for risk aversion (the Holt/Laury risk cutoff) and "has worked full–time" are weakly significant at the 10% level and positive.

[26] Assuming that workers exert an effort of at least 1, the expected wage is 50 for the (75,0) contract and 40 for the (50,20) contract.

[27] See Table 9 in the Appendix for summary statistic of subjects' characteristics.

[28] Except 'having children' since this is strongly correlated with 'married'.

Table 7: Probit analysis: probability of ranking contract (50,20) first

	Coef.	$P > z$	Coef.	$P > z$
Holt/Laury risk cutoff	.203* (.107)	0.057	.183* (.107)	0.087
period	−.026 (.026)	0.312	−.032 (.026)	0.219
treatment S-M	.489 (.344)	0.155	−.335 (.542)	0.537
number of days ill			.012 (.030)	0.692
male			.051 (.525)	0.923
has worked full–time			1.15* (.678)	0.089
thinks unemployed had bad luck			.361 (.416)	0.385
has savings for 3 months			.020 (.474)	0.966
married			.786 (.680)	0.248
prefers sick pay in UK contract			.185 (.375)	0.622
constant	−1.80*** (0.644)	0.005	−2.92*** (1.13)	0.010
Observations	384		384	
Log pseudolikelihood	−202.65		−186.41	
Pseudo R^2	0.057		0.132	

Note: Standard errors in parentheses are robust to heteroscedasticity and clustered by subject; data includes all subjects who ranked either contract (75,0) or (50,20) first. *** significant at 1%-level; * significant at 10%-level.

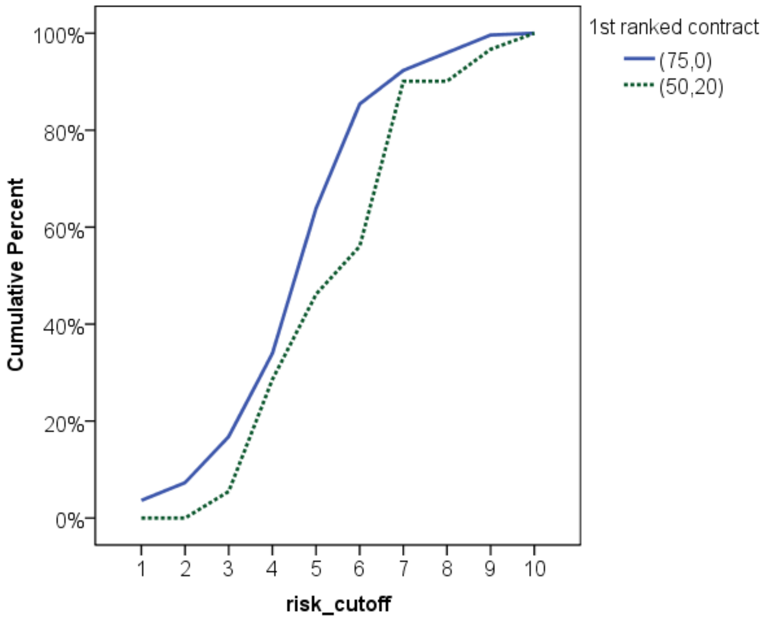

Figure 3: Cumulative distribution functions of risk cutoffs of workers in Holt/Laury questionnaire grouped by their first–ranked contract

Table 7 already shows that workers choosing the two most popular contracts do not seem to differ much according to their mean risk cutoff. This finding also holds when we look at the entire distribution of risk cutoffs (see Figure 3). Although the distribution of risk cutoffs of workers who choose (75,0) is unambiguously to the left (that is, less risk averse) compared to workers who choose (50,20), there is only a small difference, which is not significant according to a Kolmogorov-Smirnov test.

Using the data from the Holt and Laury questionnaire and assuming a constant relative risk aversion utility function $U(x) = x^{1-r}/(1-r)$, we can also compute for each period the utility subjects would gain from choosing each of the five contracts, given *their actually chosen efforts* for these contracts. That way we obtain rankings of contracts which we can compare to the rankings announced by subjects.[29] If subjects' rankings were only influenced by risk aversion, the two rankings should coincide. In fact, the risk aversion ranking matches the real ranking only for 29.8% of cases. Even when predicting just the contract which subjects ranked best, instead of the full ranking, risk aversion alone manages to explain only 60.2% of all cases (which is only moderately better than random choice given that more than 85% of workers chose one of the two contracts (75,0) and (50,20)).[30]

Result 4 (Self-selection of workers) We find clear evidence that employers can attract more reciprocal workers by offering sick pay. How-

[29] Since the Holt and Laury procedure only pins down the parameter of relative risk aversion to an interval, we occasionally get two different rankings for the upper and lower boundary. In those cases, we use the ranking which is closer to the real ranking. Using an exact value for relative risk aversion would lead to even lower explanatory power.

[30] Pooled data from treatments S and S-M. Manager's choices are slightly better explained by risk preferences than undergraduate's.

ever, this self–selection is only weakly influenced by risk preferences and other observable characteristics of workers.

4 Conclusion

The objective of this paper was to better understand the reasons why firms offer sick pay. Sick pay provision is an important part of most labor contracts. It partially insures the workers against sudden loss of income due to illness. Therefore, some level of sick pay may be socially desirable. Indeed, many countries already mandate relatively high levels of sick pay. More importantly, however, even in countries with minimal regulation (e.g. the US), sick pay or sick leave is commonly offered. This poses a puzzle that we address in this paper: if firms are willing to raise their wage bills by offering sick pay, what is it that they get in return? It could be that workers simply reciprocate higher wages with even higher efforts; or it could be that competition for workers allows productive workers to self-select to contracts with sick pay.

The first conjecture is readily rejected by the data. It is certainly not true that workers provide sufficiently high efforts to justify the usage of sick pay. This can be nicely seen in our monopsony treatment where each worker is randomly assigned to a unique employer. Although the average effort is higher for the contract with sick pay (50,20) than without (50,0), the cost of the increased wage bill is excessive and makes sick pay unprofitable.

The second way how employers can benefit from sick pay is by using it to attract hopefully more reciprocal workers. And indeed we find evidence that sick pay attracts workers who are more reciprocal in the sense that they provide higher effort for the same expected wage or provide the same effort for a lower expected wage.

We find no strong evidence, however, that the selection of workers depends on their risk preferences. If safer contracts attract more risk averse workers who are in addition also more productive, then employers could benefit from offering sick pay. However, this is not borne out by the data. There is no significant difference in risk measures between those workers who rank sick pay contract (50,20) as their first choice and those who rank (75,0) as their first choice.

Our experiments clearly demonstrate that if there is any value to sick pay, then it is driven by competition in the labor market. In our selection treatment, where employers compete for workers, only two contracts are able to attract meaningful number of workers: the most generous contract without sick pay (75,0) and the (50,20) contract with partial sick pay. It would be futile to offer other contracts because firms would not be able to find employees. In a competitive labor market, firms must be concerned not only with the effort of workers but also with the kind of workers that find the contract appealing. In our selection treatment, contract (75,0) attracts more workers than contract (50,20) but efforts are not sufficiently high to compensate for the higher expected wage bill. Thus, the contract with sick pay yields higher profits. Employers clearly seem to realize this because they offer contract (50,20) with the highest frequency in the selection treatment while it is almost never chosen in the monopsony treatment.

Our results support the market driven justification for sick pay. The competition for workers seems to be crucial in sorting the workers into appropriate contracts and making sick pay profitable. Most importantly, our experiments show that competitive labor markets are able to provide sick pay on their own without external intervention. This contributes to the on-going debate on the necessity of regulation and mandatory sick pay provision.

It would be premature, however, to conclude that sick pay provision can be entirely left to the market. Recall that in our setting firms were competing for workers. We would hypothesize that in a setting in which workers compete for jobs, sick pay would be less likely to emerge endogenously. This would be an interesting extension for future work.

Furthermore, all workers in our experiment had equal characteristics and productivities. The fact that employers do condition the provision of sick pay on characteristics of workers is shown by data from the US.[31] A future experiment could therefore consider different types of workers to account for a possible adverse selection problem on top of the moral hazard problem.

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Appendix

A Instructions

A.1 Instructions, Treatments M and M-f

Welcome to our experiment! Please read these instructions carefully. From now on, do not talk to your neighbors. Please turn off your mobile phone and keep it turned off till the end of the experiment. If you have any questions, raise your hand. We will then come to you.

In the experiment, there will be "employers" (E) and "workers" (W). Your role will be assigned by the computer at the start of the experiment.

You will be in the same role during the entire experiment.

The experiment will have **10 periods**. In each period, each worker will be matched with a new employer. That means it will never happen that an worker and an employer will be matched with each other more than once. No employer learns which worker is matched with him/her in any given period. Neither do the workers learn about the identity of their matched employers.

In each period the employer will make a wage offer to the worker. Doing so, he/she can choose between five different *wage offers*. The worker chooses an effort level for each contract. Since at this time the worker does not yet know the wage offer of the employer, he/she has to provide an effort level for all five possible wage offers. However, only the wage offer actually made by the employer determines the payment.

The **effort** can be any integer between 0 and 10. Effort is associated with **costs** for the worker, as given in the table below. All workers have the same cost table. The revenue of the employer is twenty times the effort, but one has to subtract the wage payment from this.

Effort	0	1	2	3	4	5	6	7	8	9	10
Cost for W	0	1	2	4	6	8	10	12	15	18	22
Revenue for E	0	20	40	60	80	100	120	140	160	180	200

With **probability 1/3, the worker falls ill** and the **realized** effort, which determines the payoff to employer and worker, is 0. [In Treatment M this sentence is "With probability 1/3, the effort chosen by the worker will be set to 0 by the computer."] This happens for reasons that neither worker nor employer can influence. The probability of this happening in any period is independent of all previous periods and independent of the effort chosen by the worker.

The **five possible wage offers**, which the employer can make, are:

1. A wage of 75, if the effort of the worker is at least 1, and a wage of 0, if the effort is 0. (abbreviated as: {75,0})

2. A wage of 50, if the effort of the worker is at least 1, and a wage of 20, if the effort is 0. (abbreviated as: {50,20})

3. A wage of 50, if the effort of the worker is at least 1, and a wage of 0, if the effort is 0. (abbreviated as: {50,0})

4. A wage of 35, if the effort of the worker is at least 1, and a wage of 35, if the effort is 0. (abbreviated as: {35,35})

5. A wage of 0, if the effort of the worker is at least 1, and a wage of 0, if the effort is 0. (abbreviated as: {0,0})

Note that the payoff always depends on the **realized** effort (which may have been set to 0 because of illness). [In Treatment M this sentence is "Note that the payoff always depends on the realized effort (which may have been set to 0 by the computer)."]

Payoff in one period

At the end of each period, workers learn which wage offer their employer made, whether they were sick [In Treatment M: "whether the effort was set to 0 by the computer"] and their wage. Employers only learn their payoff.

$$\text{Payoff employer: } 20 \times \text{effort} - \text{wage}$$
$$\text{Payoff worker: wage} - \text{cost of effort},$$

where everything is based on the *realized* effort.

After this, a new period starts. After 10 periods, there will be a questionnaire. At the end of the experiment, we will call you out for payment. A 10–sided die will be used to determine a random period. You will be paid the payoff from this period with an exchange rate of 10 points=1 euro in cash.

Additionally, you will get 7.50 euro for your participation.

A.2 Instructions, Treatments S and S-M

Welcome to our experiment! Please read these instructions carefully. From now on, do not talk to your neighbors. Please turn off your mobile phone and keep it turned off till the end of the experiment. If you have any questions, raise your hand. We will then come to you.

In the experiment, there will be "employers" (E) and "workers" (W). Your role will be assigned by the computer at the start of the experiment.

You will be in the same role during the entire experiment.

The experiment will have **10 periods**. You are in a group of 5 workers and 5 employers. In each period, the employers will make wage offers to the workers. Doing so, they can choose between five different wage offers.

The worker chooses an *effort level* for each contract. Since at this time the worker does not yet know the wage offer of the employer he/she will be matched with, he/she has to provide an effort level for all five possible wage offers. Furthermore, the worker provides a ranking of all possible wage offers: The wage offer he/she likes best is assigned a 1, the second best a 2 and so on ... This ranking determines with which employer (and which wage offer) an worker will be matched with. The workers will be split among the employers in the following way. An employer can employ several workers, but an worker can only work for one employer. Among all wage offers made by the employers, the computer will always find that one which is best according to the ranking of the particular worker. The worker will then be matched with this employer. If several employers are offering the same contract, workers who prefer this contract will be split among those employers randomly.

The payoff of an worker is determined by his/her effort and the wage offer made by the employer he/she is matched with.

The payoff of an employer is determined by his/her wage offer and the effort of the workers he/she is matched with. If an employer is not matched with any worker (because all workers preferred the wage offers of other employers), he/she does not get any payoff this period.

No employer learns which worker is matched with him/her in any given period. Neither do the workers learn about the identity of their matched employers.

The **effort** can be any integer between 0 and 10. The effort is associated with **costs** for the worker, as given in the table below. All workers have the same cost table. The revenue of the employer is twenty times the effort, but one has to subtract the wage payment from this.

Effort	0	1	2	3	4	5	6	7	8	9	10
Cost for W	0	1	2	4	6	8	10	12	15	18	22
Revenue for E	0	20	40	60	80	100	120	140	160	180	200

With **probability 1/3**, the effort chosen by the worker will be **set to 0 by the computer**. In this case, the **realized** effort, which determines the payoff to employer and worker, is 0. This happens for reasons that neither worker nor employer can influence. The probability of this happening in any period is independent of all previous periods and independent of the effort chosen by the worker.

The **five possible wage offers**, which the employer can make, are:

1. A wage of 75, if the effort of the worker is at least 1, and a wage of 0, if the effort is 0. (abbreviated as: {75,0})

2. A wage of 50, if the effort of the worker is at least 1, and a wage of 20, if the effort is 0. (abbreviated as: {50,20})

3. A wage of 50, if the effort of the worker is at least 1, and a wage of 0, if the effort is 0. (abbreviated as: {50,0})

4. A wage of 35, if the effort of the worker is at least 1, and a wage of 35, if the effort is 0. (abbreviated as: {35,35})

5. A wage of 0, if the effort of the worker is at least 1, and a wage of 0, if the effort is 0. (abbreviated as: {0,0})

Note that the payoff always depends on the **realized** effort (which may have been set to 0 by the computer).

Payoff in one period

At the end of each period, workers learn which wage offer their employer made, whether the effort was set to 0 by the computer and their wage. Employers only learn their payoff. The payoffs are calculated as following:

$$\text{Payoff employer: } 20 \times \text{effort} - \text{wage}$$
$$\text{Payoff worker: wage} - \text{cost of effort,}$$

where everything is based on the *realized* effort.

After this, a new period starts. After 10 periods, there will be a questionnaire. At the end of the experiment, we will call you out for payment. A 10–sided die will be used to determine a random period. You will be paid the payoff from this period with an exchange rate of 10 points=1 euro in cash.

Additionally, you will get 7.50 euro for your participation.

A.3 Questionnaire

1. Suppose you think of accepting a job in England. In England, options with respect to sick pay vary from firm to firm.

    (a) Firm A offers you a contract with a wage of 3000 Pound per month. In case of illness, you receive the full wage.

    (b) Firm B offers you a contract with a wage of 3450 Pound per month. In case of illness, you receive 1500 Pound sick pay per month.

    (c) Firm C offers you a contract with a wage of 4400 Pound per month. In case of illness, you receive nothing.

    Which firms would you rank best and second best, respectively, when the firms are the same in all other aspects?

2. What would you estimate, how many days in an average year with 220 working days do you miss due to illness?

3. Have you ever held a full–time job for more than a month?

4. With which statement would you agree more?

    (a) The unemployed are primarily themselves responsible for their situation.

    (b) The unemployed most of the time had just bad luck.

5. I own savings sufficient to cover my living expenses for at least three months. (yes, no)

B Additional tables

Table 8: Frequency of skipping work

	contract offered				
	(75,0)	(50,20)	(50,0)	(35,35)	(0,0)
treatment M	0.7%	7.0%	5.0%	36.3%	92.7%
treatment S	2.3%	4.0%	2.3%	26.7%	90.3%
treatment S-M	1.3%	0.0%	1.3%	8.7%	86.7%

Note: The frequency of skipping work is measured as the average frequency of periods in which workers chose an *intended* effort of zero (i.e. not counting cases of illness).

Table 9: Sorting of workers in treatments S and S-M

	S		S-M	
	ranked 1st:		ranked 1st:	
Characteristics of workers	(75,0)	(50,20)	(75,0)	(50,20)
mean Holt/Laury risk cutoff	5.5	6.0	4.0	5.6
mean number of days ill	6.5	6.7	5.6	4.6
% male	57	48	88	100
% has worked full–time	70	95	100	100
% thinking unemployed had bad luck	24	38	45	49
% with savings for 3 months	73	62	89	100
% married	–	–	49	83
% having children	–	–	46	69
% preferring some sickpay in UK labor contract	48	55	49	31

Note: Data from treatments S and S-M. When workers ranked contracts differently in different periods, their characteristics enter weighted by the number of periods in which they ranked this contract first.