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REPUTATION OR RECIPROCITY? AN EXPERIMENTAL INVESTIGATION

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Abstract

Recent evidence highlights the importance of social norms in many economic relations. However, many of these relationships are long-term and provide repeated game incentives for performance. We experimentally investigate interaction effects of reciprocity and repeated game incentives in two treatments (one-shot and repeated) of a gift-exchange game. In both treatments we observe reciprocity, which is strengthened in the repeated game. A detailed analysis shows that in the repeated game some subjects imitate reciprocity. Thus, reciprocity and repeated game incentives reinforce each other. Observed behaviour is robust against experience. We conclude that a long-term interaction is a "reciprocity-compatible" contract enforcement device.

Keywords: Reciprocity, reputation, repeated games, incomplete contracts.

JEL Classification: J30, C91.

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1. Introduction

Two features characterise many important economic relationships: They are contractually *incompletely specified* and they involve *repeated interactions.* A contract is incomplete if important aspects are not contracted in a way that can be verified by a third party (see, e.g., MacLeod and Malcomson (1998)). The labour relationship is a prime example. In a typical labour contract performance may be observable but is to a large degree not enforceable. Facing this incompleteness, standard economic theory – at least for spot market transactions – yields a pessimistic prediction with respect to workers' performance: If, as is usually assumed, effort is costly, workers will perform only at the enforceable level. Such behaviour is inefficient if the joint surplus of a better performance outweighs the additional effort costs. In this paper we present an experiment that allows us to analyse how *social norms and repeated game effects* can help to overcome this inefficiency.

Evidence in favour of the importance of social norms in labour relations comes, for example, from questionnaire studies with owners and managers of firms (e.g., Agell and Lundborg (1995); Bewley (1999)). One may conclude that "persistent social norms are an independent and important cause of wage rigidity, going beyond the legal constraints emphasised in the political debate" (Agell (1999), p. F144). Controlled laboratory experiments have also established the importance of social norms for economic behaviour. In particular, there is mounting evidence from various contexts that many people are motivated by the norm of reciprocity. For example, in an experiment that is similar in spirit to ours, Keser and van Winden (forthcoming) show that in voluntary contribution games many people behave conditionally cooperative, i.e., they reciprocate others' contribution to a public good.[1]

Particularly relevant for our present paper is the finding that social norms are an effective contract enforcement device in the presence of incomplete contracts (e.g., Fehr, Kirchsteiger and Riedl (1993); Güth, Klose, Königstein and Schwalbach (1998)). By paying generous wages and thereby appealing to the workers' reciprocity, firms can induce performance above the enforceable level. Even in highly competitive institutions, market forces do not necessarily overrule the impact of norm driven behaviour (Fehr and Falk (1999); Dufwenberg and Kirchsteiger (forthcoming)).

However, social norms are not the only remedy against inefficiently low performance. Another mechanism that has received attention is related to the long-term nature of most labour

[1] Many other studies report (some form of) reciprocal behaviour. For example, Berg, Dickhaut and McCabe (1995) and Jacobsen and Sadrieh (1996) find reciprocity in the "investment game"; McCabe, Rassenti and Smith (1996) in an extensive form game; Bolle (1998) in trust games; van der Heijden, Nelissen, Potters and Verbon (forthcoming) in a gift exchange game; Clark and Sefton (1999) in a sequential prisoner's dilemma; Dufwenberg and Gneezy (2000) in an experimental "lost wallet game"; and Abbink, Irlenbusch and Renner (2000) in the "moonlighting game".

relations. Labour relations can rarely be viewed as spot market transactions where anonymous trading partners interact only once. Rather, employers and employees play a repeated game that opens up the possibility for implicit contracts and repeated game incentives, i.e., material incentives that arise because of reward and punishment opportunities due to a repeated interaction.

In this paper we analyse possible interaction effects of social norms (in the form of reciprocity-driven voluntary cooperation) and repeated game effects on economic behaviour. Our main interest is to determine the extent to which the inefficiency inherent in contractually incompletely specified relationships is mitigated by reciprocity and some repeated game incentives.

As mentioned, previous research has already established the importance of reciprocal behaviour under many circumstances. This raises the question to what extent material incentives that are present in repeated games alter many subjects' willingness for reciprocity-driven "voluntary cooperation". We believe that this question is of great importance for many principal-agent relationships because voluntary cooperation is relevant in many real world contexts. Whenever agents have discretion over the intensity or the type of activity they perform voluntarily, cooperation is very valuable for the principals. Since a repeated interaction provides, in principle, material incentives for such voluntary cooperation the question arises whether these repeated game incentives are indeed compatible with reciprocal motivations. This is an open empirical question, in particular, since there is a large literature in social psychology (and a growing one in economics), which suggests that there may be "hidden costs of financial incentives" (Deci and Ryan (1985); Frey (1997)). Indeed, in an experiment that uses a similar framework to ours, Fehr and Gächter (2000) find that in their setup financial incentives led to an almost complete "crowding out" of reciprocity. The results of a field experiment by Gneezy and Rustichini (forthcoming) also suggest detrimental effects of financial incentives.

We investigate the possible interaction effects of reciprocity and repeated game incentives in a so-called "*gift exchange game*". In this sequential game, which we will describe in detail in the next section, "firms" make a wage payment to which "workers" react with an effort choice. In this game inefficiently low effort choices are predicted but "fine-tuned", efficiency-enhancing gift exchanges are possible *if* subjects are motivated by reciprocity and/or are sensitive to repeated game incentives.

We first determine the empirical importance of reciprocity in our setup in a baseline treatment that excludes repeated game incentives by design. In this treatment, which involves a sequence of ten one-shot games (the "OS-treatment"), we investigate the occurrence of reciprocity with a matching scheme that ensures that a particular pair of subjects interacts only *once*. In our second treatment each pair of subjects is informed that they play a ten times *repeated* version of the same game. Since in this "History-treatment" (called the "H-treatment")

a pair of subjects has a common history both reciprocity *and* some repeated game effects are possible. In Section 3 we will derive our respective behavioural hypotheses and research questions for both treatments.

Our data – described in Section 4 – reveal that both reciprocity and repeated game effects are clearly empirically relevant. In both treatments we observe reciprocity, i.e., a significantly positive wage-effort relationship. This relationship, however, is *steeper in the H-treatment than in the OS-treatment*. Moreover, in the H-treatment, effort levels are higher than in the OS-treatment. Hence, in our setup, the material incentives provided by a repeated interaction lead to an efficiency enhancing "crowding in" of reciprocity. This finding is in stark contrast to the "crowding out" result by, e.g., Fehr and Gächter (2000). A detailed analysis of individual behaviour sheds light on the reasons for this observation. In both treatments we find a majority of subjects who is genuinely motivated by reciprocity. Hence, many subjects' reciprocal motivation is left intact by the repeated game incentives. Moreover, in the H-treatment there is a fraction of selfish subjects who imitate reciprocity. Put differently, the repeated game nature of the H-treatment disciplines some selfish individuals who would – in the absence of repeated interaction – play uncooperatively (just as in the OS-treatment). As we will show in Section 5 these behavioural patterns are robust with respect to experience. Section 6 provides some concluding remarks.

2. Design, Parameters and Procedures

The constituent game. In both treatments the game under study is a version of the so-called "gift exchange game" (introduced by Fehr, Kirchsteiger and Riedl (1993)). This game is a two-player sequential move game that consists of two stages. For convenience we call the players "firms" and "workers", respectively. In the first stage, a "firm" offers her "worker" a wage w. In the second stage, the worker can either accept or reject the offer. A rejection ends the game and results in zero profits for both players. Upon acceptance, the worker has to choose an "effort level" e. The higher the effort level, the higher are the associated effort costs, $c(e)$, the worker has to bear. A firm's payoff function in terms of experimental money, π, is given by

$$\pi = (v - w)e \tag{1}$$

where v represents an exogenously given redemption value.

A worker's payoff function in the gift exchange game is simply the difference between the accepted wage, w, and the incurred effort costs $c(e)$ minus some fixed cost of 20:

$$U = w - c(e) - 20. \tag{2}$$

Parameters and procedures. In the experiment, a firm's redemption value was $v = 120$. Wage offers had to be integers and to obey the restriction $w \in [20, 120]$. The feasible effort levels and costs of effort in the experiment were as depicted in Table 1.

Table 1
Effort levels and costs of effort

effort	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1.0**
c(e)	0	1	2	4	6	8	10	12	15	18

At the beginning of the experiment subjects were randomly allocated to their roles as "firms" and "workers", respectively. They kept their role throughout the whole experiment. There were an identical number of workers and firms. After subjects' roles were determined, workers and firms were located in two different, yet adjacent, large rooms in which they sat remote from each other. They were then given written instructions (see Appendix 2), which included a set of control questions. The experiments did not start until all subjects answered all questions correctly. Procedures and payoff functions were common knowledge, i.e., they were explained in the instructions and it was emphasised that they were the same for all firms and workers, respectively. Moreover, to ensure common knowledge, an experimenter summarised procedures and payoff functions.

All experiments were hand-run. Firms made their wage offers by inserting them *privately* into their decision sheets (see instructions). Then an experimenter collected the wage offers and transmitted them to the workers' room. Here, *only* the worker matched with a particular firm was informed about "her" firm's wage offer (a second experimenter in the workers' room wrote the wage offer into the workers' documentation sheet). Following this the workers made their effort choices. Each firm was then informed about the effort choice of its worker (and only its worker). This ended a period. In total, there were ten periods in both treatments. Identities of trading partners were never revealed and subjects were informed that they would never learn a trading partner's identity.

To isolate the effect of a repeated interaction, we implemented two main treatment conditions. The first we call "One-Shot" (OS) and the second "History" (H). Subjects only participated in one treatment. To check for the role of experience, in both main treatments we conducted additional trials with "experienced" subjects.

The One-Shot-treatment. In this treatment, anonymous firms and workers were matched only *once*. This was made common knowledge by emphasising it in front of all subjects. Put differently, subjects knew that they were going to be re-matched in each repetition with a

different firm or worker, respectively (we employed the same matching procedure as Cooper et al. (1996)). A post-experimental debriefing confirmed the credibility of this procedure.

The History-treatment. Contrary to the OS-treatment, an anonymous matched firm-worker pair in the H-treatment remained paired for ten periods. This was known to the subjects and verbally emphasised in front of all subjects. In other words, subjects knew that they were going to play a finitely (ten periods) repeated game with the same partner. Again, a post-experimental debriefing confirmed the credibility of this procedure.

The role of experience. In order to check the robustness of our findings with respect to experience and learning chances, we conducted two OS-sessions and two H-sessions with experienced subjects. Subjects did not know in advance that they were going to play a second set of ten periods. After having concluded the first ten periods they were told that there will be one more and final trial of ten periods. All rules and parameters were exactly the same as in the preceding trials. In the "H-experienced trials", *new* firm-worker pairs were formed and subjects were informed about that. These new pairs stayed together for all 10 periods. In the "OS-experienced trials", as before, each firm was matched with the same worker only once, yet in a *new* sequence. Subjects were informed about that. We discuss the results in Section 5.

3. Behavioural Predictions and Research Questions

The OS-treatment. In the one-shot gift-exchange game the *standard prediction* under the assumption of complete information and common knowledge of rationality and selfishness is easy to derive with backward induction: Since effort levels above the minimum are (increasingly) costly and workers are the second movers in this two-stage game, they will choose the minimum effort level given they are rational and only selfishly motivated. A firm's best response is to offer the lowest wage a worker is just willing to accept. Thus, the only strict subgame perfect equilibrium outcome is ($w = 21$, *accept*, $e = 0.1$) in each stage game.[2] Henceforth, this reference outcome will be called w^* and e^*, respectively. As a result, the subgame perfect outcome yields low profits for both firms and workers. In equilibrium, a firm's period profit amounts to $(120 - 21)*0.1 = 9.9$ experimental money units and a worker's payoff is equal to $21 - 20 = 1$ experimental money unit (see payoff functions (1) and (2)). These equilibrium payoffs are Pareto-dominated by more cooperative play. Thus, there is a considerable scope for cooperation to achieve a joint improvement.

[2] A further, however non-strict subgame perfect equilibrium outcome is ($w = 20$, *accept*, $e = 0.1$).

As mentioned in the introduction, previous research has shown that many people are reciprocally motivated and that w^* and e^* are likely not to be the prevalent outcome. Reciprocity is the non-strategic conditional behaviour to reward kind acts (positive reciprocity) and to punish unkind ones (negative reciprocity) even if this is costly for the reciprocating subject.[3] In the rest of this paper we will operationalise reciprocity as follows:[4]

Reciprocity Hypothesis:

Wages and effort levels are positively correlated, i.e., corr(w,e) > 0 *holds.*

Obviously, with our parameters, if firms pay "generous wages" ($w > w^*$) and workers reciprocate by providing $e > e^*$, a joint improvement is achieved. Given previous results we predict that in the OS-treatment the Reciprocity Hypothesis holds.

The H-treatment. In the finitely repeated gift-exchange game it is nearly impossible to derive a precise behavioural prediction; only some qualitative suggestions are possible. There are at least three reasons for this. First, if there are indeed some reciprocal people whose preferences are not completely captured by those induced in the experiment, we are likely to be in an incomplete information framework with different "types" as modelled, e.g., by Kreps, Milgrom, Roberts and Wilson (1982). These authors have shown that even if there is only a small probability that the adversary is, e.g., a "tit for tat" player, cooperative play can be supported until the final period(s). Second, even with complete information but with multiple equilibria in the stage game, cooperative equilibria exist in which wages and efforts above w^* and e^* are observed for all but the last period (Benoit and Krishna (1985)). A third and different source of repeated game effects can arise if subjects do not apply backward induction. In his three-level decision theory Selten (1978) argues that rational solutions "are not easily available" (p. 152). He suggests that strategic decisions – such as backward induction – are usually not made on a rational basis but on the level of imagination. However, facing a large number of periods, imagination does not yield the conclusions of backward induction. As a consequence, a "player may imagine that 'in the beginning' something else will happen than 'towards the end' without having any clear view of the extension of these vaguely defined parts of the game" (p. 153). Whereas in a one-shot game it is easy to imagine the necessary backward induction, this does not hold in repeated games. As a consequence, more people may play cooperatively (or reciprocally) in the H- compared to the OS-treatment, at least in the initial periods.

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[3] On the concept of reciprocity and its modelling, see Rabin (1993); Dufwenberg and Kirchsteiger (1998; forthcoming) and Falk and Fischbacher (1999).

[4] Another possibility would be to define reciprocity in *payoffs* and not in actions as we do it here. See, e.g., Berg, Dickhaut, and McCabe (1995) who offer two definitions in the same spirit. Qualitatively our results do not change if we use reciprocity in payoffs.

These three sources suggest that we observe wages and effort levels that are at least as high as w^* and e^*. A "repeated game effect" can therefore be defined as the difference in observed behaviour in the H-treatment as compared to our baseline OS-treatment. Hence, the change of reciprocity in the H-treatment relative to the one observed in the OS-treatment determines the extent to which reciprocal behaviour is altered by *some* repeated game effects. We are in this paper not interested in dissecting the various possible sources and intricacies of repeated game effects discussed above. Our goal is to determine (i) the economic importance of a repeated interaction as a performance elicitation device and (ii) to see to what extent a repeated interaction alters reciprocal behaviour. In particular, do repeated game effects lead to a "crowding in" or to a "crowding out" of reciprocity? Can we detect some effects at the individual level?

4. Results

In total, 116 subjects participated in our experiments. 60 subjects participated in the OS-, and 56 subjects in the H-sessions. Our subjects were students (no economists among them) recruited from public lectures at various educational institutions in Vienna. None of them had ever participated in an experiment. The experiments lasted between 1.5 and 2 hours and subjects earned on average ATS 148 (about € 10.8) in the OS-sessions and on average ATS 161 (about € 11.7) in the H-sessions. Hourly earnings in the experiments exceeded our subjects' opportunity costs of participating in the experiments.

4.1 Aggregate-level Observations

OS-treatment. Figure 1 presents the evolution of average wages and effort levels in the OS-treatment. The most obvious result is that both average wages and effort levels clearly exceed the predicted levels, i.e., compared to the reference outcome ($w^* = 21$ and $e^* = 0.1$), we find a strong and systematic deviation. This deviation is persistent across all periods. Since firms pay higher wages than w^* and workers respond by providing effort levels higher than e^*, both trading partners heavily improve their payoffs compared to subgame perfect play. Whereas according to the latter a firm's period payoff in experimental money units is 9.9, their actual average payoff is 19.4, about twice as much. Workers earn a lot more as well. Given firms' wage policy workers experience a dramatic increase in their average period profits (35.3 experimental monetary units instead of 1 unit). Thus, efficiency is considerably increased relative to the reference outcome. This result is true on average. However, as we will show in Section 4.2 there

is a non-negligible minority of subjects whose behaviour is to choose *e** – the level predicted by standard arguments.

Fig. 1. *Wages and effort levels in the OS-treatment.*

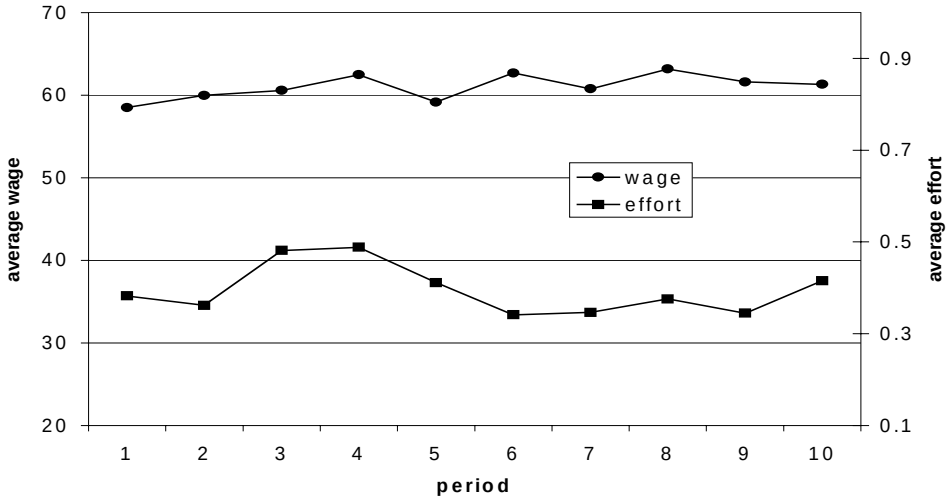


Table 2
The wage-effort relation (*Tobit estimates*)

	Dependent variable: effort	
independent variables:	OS-treatment	H-treatment
constant	-0.0018 (0.089)	0.0513 (0.058)
wage	0.0069*** (0.001)	0.0111*** (0.002)
period dummies	jointly insignificant	jointly significant
worker fixed effects	jointly significant	jointly significant
	N = 279 Log-L = -11.72 χ^2 = 820.9***	N = 252 Log-L = 70.62 χ^2 = 720.2***

Note: Numbers in parentheses are robust standard errors. *** indicates significance at the 1-percent level.

In keeping with previous observations, we find evidence in favour of our Reciprocity Hypothesis. Table 2 contains the results of a Tobit-regression with robust standard errors and with effort as dependent and wages as independent variable. In addition, we controlled for individual fixed effects and for repeated measurement (see Königstein (1997)).

The wage coefficient in the OS-treatment is positive (0.0069) and highly statistically significant ($p < 0.0001$). On average, workers provide higher effort levels, the higher the wages paid to them. This positive wage-effort relation is of course exactly the reason why firms pay wages above w^*. Thus, reciprocity is capable of supporting cooperative play, thereby ensuring *mutual* benefits. Consistent with the one-shot interaction character of the OS-treatment, none of the period dummies is significantly positive at conventional levels. In contrast, the regression reveals a considerable degree of individual heterogeneity, since the worker dummies are jointly clearly significantly different from zero. We will return to this point in the next subsection.

H-treatment. As in the OS-treatment both wages and effort levels exceed the subgame perfect levels in the H-treatment. Figure 2 sets the stage for our investigation of repeated game effects. We take the OS-treatment as the benchmark. In this figure, we relate the average wage and effort level of the H-treatment (w_t^H and e_t^H) to the corresponding average wage and effort levels in our baseline, the OS-treatment (w_t^{OS} and e_t^{OS}). That is, we have calculated e_t^H/e_t^{OS} as an indicator for the relative difference in effort levels and w_t^H/w_t^{OS}, as an indicator for the relative difference in wages, respectively (t =1,...,10).

Fig. 2. *Repeated game effects*

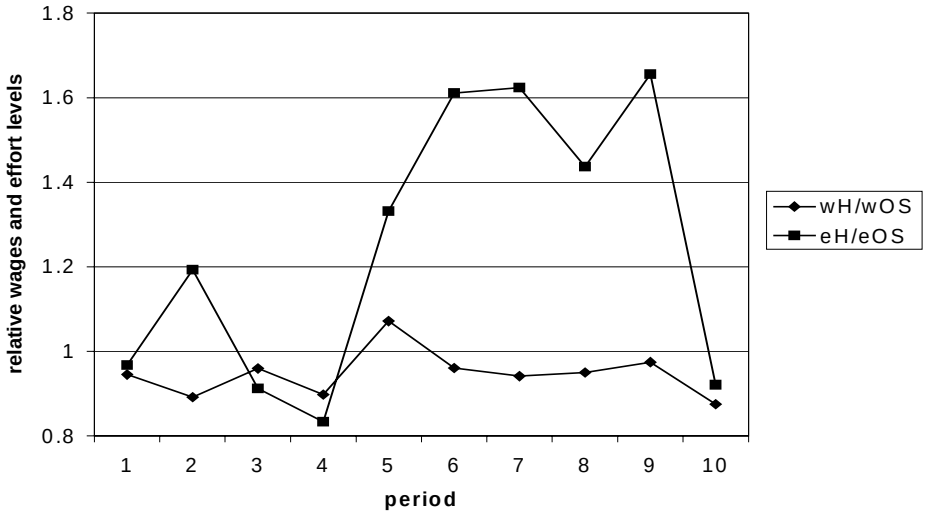


Figure 2 illustrates three important points: First, wages in all periods are practically indistinguishable between the two treatments. Second, the common history of a firm-worker pair in the H-treatment actually matters. Workers' behaviour is more cooperative in the H-treatment, i.e., for a given wage, they supply higher effort levels in the repeated game (except in periods 1, 3 and 4). As a consequence, relative to the OS-treatment, efficiency is enhanced through

repeated play.[5] Third, there is a sharp drop in the last period. This sudden decline, however, does not result in effort levels of e^*. Instead, effort levels fall close to the level in the OS-treatment, which was on average about $e = 0.41$ (see Figure 1). Average effort levels in period 10 of the H-treatment are (a) lower than in period 9 (contrary to wages; one-tailed Wilcoxon signed rank tests, $p = 0.002$ and $p = 0.245$, respectively) and (b) a bit lower than in the OS-treatment, but not significantly so (Mann-Whitney-U-test, $p = 0.590$, two-tailed).

The regression results reported in Table 2 suggest that the repeated interaction leads to a "crowding in" of reciprocity. The wage-effort relationship is indeed significantly steeper in the H-treatment than in the OS-treatment. The corresponding regression coefficient is 0.0111, which clearly and significantly exceeds the coefficient of the OS-treatment. As in the OS-treatment, the worker dummies are jointly significantly different from zero, indicating substantial individual heterogeneity. We will come to this point in the following section.

4.2 Analysis of Individual Behaviour

Can we trace back the findings at the aggregate level to individual decisions? For that purpose we analyse and classify all individual decisions of the subjects in the role of workers because only they could reciprocate to their firm's wage offer (at least in the OS-treatment). First notice that, because there are no repeated game incentives in the OS-treatment, we can identify the number of genuine reciprocators and selfish types, respectively. If in the H-treatment the repeated game has not "crowded out" the reciprocal motivation of the genuine reciprocators, we should observe roughly the same number of genuine reciprocators than in the OS-treatment. Selfish subjects, however, may have an incentive to change their behaviour at least in the early periods of the repeated game. Since it was common knowledge that the repeated game will end after period 10, these selfish subjects, however, are predicted to choose e^* by the last period, whereas a reciprocal subject may choose $e > e^*$.

OS-treatment. Our evaluation of reciprocal behaviour on an individual level rests on our Reciprocity Hypothesis. To estimate reciprocal behaviour, we calculated the Spearman rank correlation between the received wage and a worker's corresponding effort choices for each individual worker (see Table A1 in Appendix 1).

[5] Efficiency-enhancing effects of repeated interaction are also reported by e.g., Andreoni and Miller (1993), Cooper et al. (1996), Keser and van Winden (forthcoming) and van der Heijden et al. (forthcoming).

Reciprocity Criterion 1 ("Reciprocity (OS)"). *A person is classified as a* reciprocal type *if the Spearman rank correlation between wage and effort of that person is positive and statistically significant at the 1-percent level.*

Alternatively, a worker is classified as a *selfish type* if she acts according to the subgame perfect prediction (most of the time). This leads to the following criterion:

Selfishness Criterion 1 ("Egoism (OS)"). *A person is classified as a* selfish type *if she plays more than half of the time (i.e., at least 6 times) e* irrespective of the wage she receives.*

Notice that our Selfishness Criterion 1 includes the exact definition of a selfish type (i.e., ten times *e**), but also comprises subjects whose *predominant* behaviour has been to choose *e** (see also Cooper et al. (1996), who employ a similar, yet less strict definition). In order to estimate the frequency of workers who are of the selfish type we simply have to count the number of *e**-choices. Table A1 in Appendix 1 provides all details.

The share of types according to our criteria "Reciprocity (OS)", and "Egoism (OS)" is summarised in Table 3. According to Reciprocity Criterion 1, 53.4 percent behave reciprocally. Fewer workers act like *homo economicus*. According to our Selfishness Criterion 1 ("Egoism (OS)") 20 percent of the workers behave egoistically most of the time. One subject chose *e** ten times.

H-treatment. Recall that in the OS-treatment we only observe *genuine* reciprocity, since there is no strategic reason to imitate reciprocity. Things look different in the H-treatment. Here, a positive Spearman rank coefficient is no unambiguous indication for a *genuine* reciprocal type, for there exist *strategic* reasons to act reciprocally. Indeed, the share of workers with a significantly positive (at the 1-percent level) Spearman rank correlation coefficient increased from 53.4 percent in the OS-treatment to 67.8 percent in the H-treatment (compare Tables A1 and A2 in Appendix 1). Hence, it seems that some reciprocity has been imitated. In order to distinguish *genuinely* reciprocal types in the H-treatment from the "imitators" of reciprocity, we will therefore refine the reciprocity criterion of the OS-treatment. It takes into account the behaviour in the one-shot situation of the *last period*. Hence, in order to be counted as a reciprocal type a worker must choose an effort level strictly larger than *e** in the last period. With this requirement we can exclude subjects who play reciprocally only for strategic reasons for they will inevitably choose *e** in the last period. Similarly, if the material incentives that are present in the repeated game would have led to a "crowding out" of reciprocity, we should observe as well *e** in the last period. Table A2 in Appendix 1 provides all details.

Reciprocity Criterion 2 ("Reciprocity (H)"). *A person is classified as* reciprocal *if her Spearman rank correlation between wage and effort is positive and statistically significant at the 1-percent level* ***and*** *if she chooses an effort level strictly larger than e* in period 10.*

Notice that Reciprocity Criterion 2 is actually the same as Reciprocity Criterion 1 but adapted to the H-treatment.[6] It excludes those workers who show a reciprocal pattern but "defect" in the last period, for there may exist strategic reasons to imitate reciprocity. This leads straightforwardly to our second selfishness criterion.

Selfishness Criterion 2 ("Imitation"). *A person is classified as an* imitator *if her Spearman rank correlation between wage and effort is positive and statistically significant at the 1-percent level* ***and*** *if she chooses an effort level of e* in period 10.*

"Imitation" comprises those subjects who are likely to have imitated reciprocity despite their egoistic motivation, or because their reciprocal motivation has been crowded out. Of course, there remains the possibility that some subjects acted egoistically without adopting the sophisticated strategy of imitating reciprocity. They choose e^* at least in period 10 but are not expected to have a significant Spearman rank correlation coefficient. These subjects are described by the following criterion:

Selfishness Criterion 3 ("Egoism (H)"). *A person is classified as an* egoist *if her Spearman rank correlation between wage and effort is statistically insignificant at the 1-percent level* ***and*** *if she chooses an effort level of e* in period 10.*

All information to determine types according to criteria "Reciprocity (H)", "Imitation" and "Egoism (H)" is documented in Table A2 in Appendix 1. The resulting share of types is shown in Table 3.

According to "Reciprocity (H)", we get a share of 48 percent. This number resembles the number of reciprocal types in the OS-treatment (53.4 percent). Thus, across treatments, we get a robust share of reciprocal types of about 50 percent. According to criterion "Imitation" the share of selfish workers in the H-treatment is about 20 percent. 21.4 percent of the workers are less sophisticated egoists according to our Selfishness Criterion 3.

These results are remarkable for three reasons: First, reciprocity is a dominant behavioural pattern in our experiment. Second, the share is very similar across two different treatments. Thus, reciprocity seems to be robust across institutions. This finding suggests that repeated game incentives have not significantly altered reciprocal inclinations. Third, in reputation models

[6] Notice that Reciprocity Criterion 2 provides a *lower* bound for the number of reciprocators, since it excludes the possibility that a reciprocal worker responds to a low wage with $e = e^*$.

usually only a "small" number of, e.g., "tit-for-tat" – or cooperatively motivated players – is needed to provide the possibility to develop a favourable reputation for a vast majority of rational egoists. Our results show that actual numbers are quite the reverse in the sense that reciprocal people make up the majority and the egoists are a minority. The presence of a large number of reciprocators makes it easy for the egoists to imitate reciprocity. Hence, the repeated game incentives have left intact the reciprocal motivations of the genuine reciprocator and actually disciplined the selfish subjects. These facts together may explain the observed "crowding in" of reciprocity.

Table 3
Share of reciprocal and selfish types

Share of *reciprocal* types in percent according to...		Share of *selfish* types in percent according to...		
'Reciprocity (OS)'	**'Reciprocity (H)'** [7]	**'Egoism (OS)'**	**'Egoism (H)'**	**'Imitation'**
53.4	48.0	20.0	21.4	20.0

Robustness. How robust are our results as summarised in Table 3 with respect to the measurement of reciprocity? To check this we use a measure of reciprocity that accounts for the fact of a permanent relationship in the H-treatment. This "robustness-criterion" measures how effort choices respond to a *change* in wages. Specifically, we determine the sign of $\Delta w = w_t - w_{t-1}$ and of $\Delta e = e_t - e_{t-1}$ ($t = 1, \ldots, 10$). If the two signs of Δw and Δe are the same, we count the corresponding effort choice as reciprocal. Therefore, it can be viewed as a "measure-for-measure"-criterion of reciprocity.[8] Of course, we can calculate this type of reciprocal action individually for *each* worker in the H-treatment. This is done in Table A2 (see Appendix 1). The column "*No. of r*" summarises all effort choices of a particular worker that fall within this pattern. Please note that, according to this measurement, the maximum possible number of reciprocal actions is 9. We can now define the following

Reciprocity Criterion 3 ("Measure-for-Measure"). *A person is classified as a* reciprocal *type if she plays more than half of the time reciprocally* (*i.e. No. of* $r \geq 5$) ***and*** *if she chooses an effort level strictly larger than e* in period 10.*

[7] In the H-treatment subjects 16, 21 and 22 are excluded. These workers cannot be classified according to our criteria since they either got no offer or an offer of 20 in the last period.

[8] Selten, Mitzkewitz and Uhlich (1997) introduce "measure-for-measure" as a generalization of 'tit for tat'-strategies. The term "measure-for-measure" captures therefore very well the spirit of our Reciprocity Criterion 3.

Similarly, we can define an appropriate criterion for imitators:

Selfishness Criterion 4 ("Imitate Measure-for-Measure"). *A person is classified as an* imitator *if she plays more than half of the time reciprocally* (*i.e. No. of* $r \geq 5$) ***and*** *if she chooses an effort level of e* in period 10.*

Our "Measure-for-Measure"-criterion of reciprocity generates 56 percent reciprocal subjects, which is very similar to the results of the other two reciprocity criteria. Moreover, the concordance of who is singled out to be reciprocal or not according to "Reciprocity (H)" and "Measure-for-Measure" is 100 percent (see Table A2). Our determination of reciprocal workers therefore turns out to be very robust. The number of imitators according to "Imitate Measure-for-Measure" is 40 percent.

5. The Impact of Experience

As described in Section 2, we conducted four trials with "experienced" subjects, two trials after an OS- and two after a H-treatment. This was done to check whether our findings are robust with respect to learning chances. Figures 3 and 4 show the evolution of average wages and efforts in both treatments. The first ten periods are the "inexperienced trials", and the second ten are the "experienced trials".

Figure 3 reveals that behaviour is very robust with respect to experience. In particular, there is no tendency – neither in the wage setting nor in the effort choices – that subjects start to play the outcome w^* and e^*. Notice that mean effort is even higher in the trials with experienced subjects compared to the inexperienced ones. We also checked whether the regression coefficients on effort changed with experience. As it turns out, the propensity to reciprocate in the trials with experienced subjects tends to increase. In fact, the reciprocal relationship is strengthened (the estimated coefficient on wages is 0.0092 and is highly significant ($p < 0.0001$). If subjects do learn anything at all in the OS-treatment, it is to become more cooperative and reciprocal.[9]

Similar things can be said concerning the H-treatment. Figure 4 reveals that average wages are similar (mean wages are 57.6 and 59.0, respectively) whereas effort levels are even higher compared to the first ten periods (0.47 and 0.52, respectively).

[9] This finding contrasts with the results of Clark and Sefton (1999). In a sequence of ten one-shot *sequential* prisoner's dilemma games (which is akin to our gift exchange game) they also find reciprocal cooperation decisions, which, however, decline over time. One reason may be that fine-tuned gift exchanges are possible in our game, whereas in the sequential prisoners dilemma only "Cooperate" and "Defect" are possible.

Fig. 3. *Average wages and effort with inexperienced and experienced subjects (OS-treatment).*

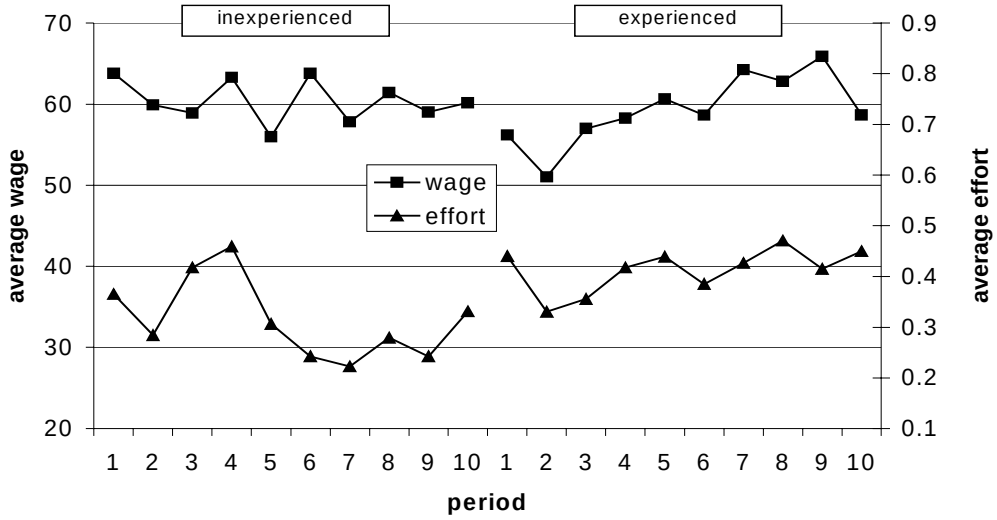
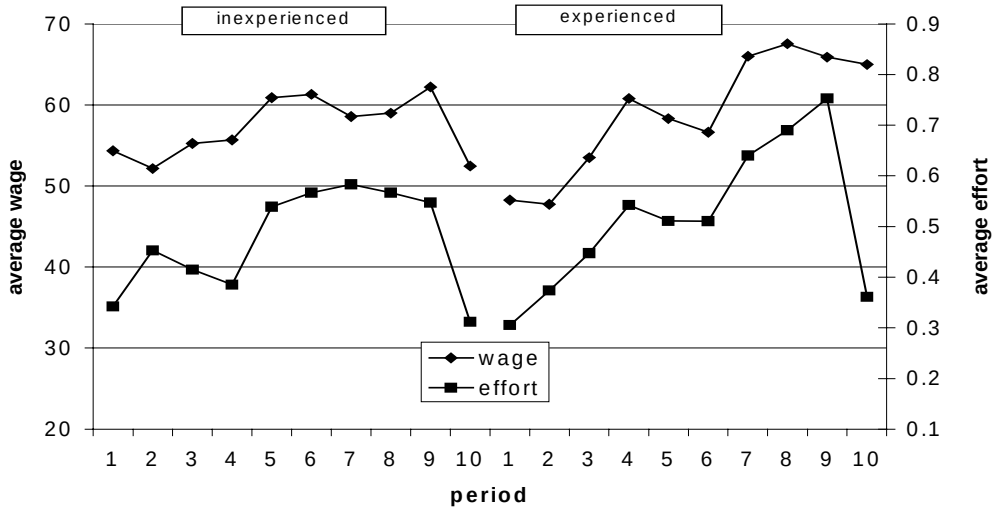


Fig. 4. *Average wages and effort with inexperienced and experienced subjects (H-treatment).*



Reciprocity seems to be strengthened with experience. The coefficient on wages is 0.0138 ($p < 0.0001$). Again we observe a rising pattern of effort levels and a sudden decline in period 10. Thus, with experience, backward induction does not start in earlier periods (compare Selten and Stoecker (1986)).

At the *individual level*, we compared for each subject her individual Spearman rank coefficient in the "inexperienced" and the subsequent "experienced trials". A two-sided Wilcoxon signed ranks test cannot reject the null hypothesis that these individual Spearman rank coefficients are the same in the "inexperienced" and the "experienced trials" in both the OS- and the H-treatment (though 15 (12) out of 20 (20) subjects in the OS- (H)-treatment have higher Spearman rank coefficients in the second trial).

Finally, we tested whether in the "experienced trials" the share of reciprocal types differs from that in the "inexperienced trials". McNemar change tests do not allow rejecting the null hypothesis that the number of subjects classified according to our Reciprocity- and Selfishness-criteria is the same in the regular and the experience trials. *This holds for all our criteria in both the H- and the OS-treatment.* In our view, this is strong evidence in favour of the argument that reciprocity and its imitation are both consistent and behaviourally relevant.

Figure 4 reveals yet another interesting fact. According to a standard reputation model efforts and wages should show a *non-increasing* pattern since cooperative behaviour is losing its value as the game goes on. In our H-sessions, however, we observe an *increase* in wages and efforts. This holds in particular with experienced subjects. This is in stark contrast to observations from repeated as well as one-shot public goods games, or prisoner's dilemma games with simultaneous contribution decisions, where cooperation declines over time.[10]

We believe that the dynamic pattern in the H-treatment can best be understood as being the result of reciprocal cooperation (applied by both the reciprocators and the imitators) combined with a heuristic of "piecemeal trust". Since fine-tuned gift exchanges are possible in our game, this heuristic allows an increasing level of bilateral gift exchanges in the sense that a cooperative experience in the previous period justifies a gradually increased trust move this period.[11] In the final period the imitators drop their disguise and revert to e^*, whereas the reciprocators continue to reciprocate.

The observation of *imitation* is compatible with Kreps et al. (1982). However, as Selten (1978), Selten and Stoecker (1986), Selten, Mitzkewitz and Uhlich (1997) and Keser (1997) convincingly argue, it is likely that many people in the early phases of a cooperation game do not perform the necessary backward induction and try to play cooperatively until the final period where backward induction is easy to apply. We believe however, that such boundedly rational behaviour is not the full story. The fact that in the OS-treatment we observe a considerable number of people who reciprocate suggests that these people are willing to cooperate anyhow. Both imitation and cooperative play (with piecemeal trust) are considerably eased by the presence of these genuine reciprocators.

6. Concluding Remarks

Recent evidence highlights the importance of social norms in labour relations (see, e.g., Agell (1999)). However, an equally important observation on labour relations is their long-term

[10] See, e.g., Keser and van Winden (forthcoming) for public goods games and Andreoni and Miller (1993) and Cooper et al. (1996) simultaneous prisoner's dilemma games.

[11] We hypothesise that this heuristic applies in particular in sequential move games since it requires some coordination, which is hard to achieve in simultaneous move games.

character, i.e., employer and employee play a repeated game. Understanding how social norms and repeated game incentives interact is of an importance that extends beyond the labour relation (see, e.g., the extensive discussion in Bowles (1998)).

In our data we find that both reciprocity and "reputation" (or, more general, *repeated game effects*) contribute to increased effort levels relative to the inefficient reference outcome. Average effort levels are considerably higher in the H-treatment than in the OS-treatment. In both treatments we observe reciprocity, i.e., a positive wage-effort relationship. However, it is steeper in the H- than in the OS-treatment. Hence, it appears that the social norm of reciprocity and repeated game incentives are *complementary* forces. Together reciprocity and repeated game incentives have a considerable efficiency-enhancing effect on performance despite contractual incompleteness.[12] This observation is robust with respect to experience.

In our view, these results contribute to the debate on performance incentives in the presence of incomplete contracts. Our results show that a repeated interaction is in itself a suitable contract enforcement device, because there actually are behaviourally relevant repeated game incentives that prevent workers from inefficiently low performance. We believe that a reason for the success of a repeated interaction is its compatibility with a genuine reciprocal inclination that is exhibited by many people. As our individual data analysis shows this is due to the fact that the repeated game incentives leave many subjects' genuine reciprocal motivations intact and, moreover, discipline the "egoists" (because they have an incentive to "imitate reciprocity"). As Fehr and Gächter (2000) show, such "reciprocity-compatibility" is a feature that is by no means guaranteed by other incentive schemes. In the experiments of Fehr and Gächter (2000) the incentive device of an announced wage reduction in case of detected shirking, led – in contrast to our observed "crowding in" of reciprocity – to an almost complete "crowding out" of reciprocity. This contrast may help explaining why many firms dispense with high-powered incentive schemes and fare better with repeated game incentives and reciprocity alone.

Our results have also relevance for the way the labour relation, or, more generally, repeated games with incomplete contracts are viewed. For example, MacLeod and Malcomson (1998, p. 390) argue that in an infinitely repeated labour relation with incomplete contracts "the existence of a self-enforcing agreement that sustains equilibrium depends on a convention such as fairness (…) that prevents wages being bid down". Our findings on the role of reciprocity in our repeated game support this. The behavioural features observed in our experiment should make it easy to sustain a particular fairness norm.

[12] It should be noted though that efficient trading between two parties might be detrimental for third parties. In the labour market fair wage-effort relations may result in involuntary unemployment (see, e.g., Akerlof (1982)). In organizations, reciprocity might lead to collusive behaviour among agents and to bureaucratisation (Martimort (1997)).

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Appendix 1: Summary data on individual worker behaviour

Table A1
Summary of worker behaviour in the OS-treatment

Worker No.	*No. of e = 0.1*	*corr(w,e)*	*Worker No.*	*No. of e = 0.1*	*corr(w,e)*
1	0	0.587*	16	3	0.827**
2	2	0.945**	17	7	0.724*
3	1	0.258	18	3	0.790**
4	2	0.639*	19	2	0.867**
5	6	0.099	20	1	0.513
6	1	0.947**	21	0	0.837**
7	1	0.055	22	0	0.915**
8	7	-0.350	23	5	0.666*
9	0	0.031	24	0	0.965**
10	0	-0.284	25	0	0.904**
11	1	0.929**	26	3	0.910**
12	7	0.822**	27	0	0.990**
13	10	0	28	0	0.990**
14	8	0.710*	29	0	0.866**
15	4	0.962**	30	0	0.905**

• *No. of e = 0.1*: includes all effort choices of 0.1 and the number of rejection decisions if the corresponding wage offer was 20 (rejection of wages > 20 cannot be explained with self interest).

• *corr(w,e)*: indicates the Spearman rank correlation coefficients between wage and effort, * indicates significance at the 5-%-level, and ** at the 1-%-level. If the worker rejected a wage offer this was included in the calculation of the correlation coefficient in the form effort = 0.

Table A2

Summary of worker behaviour in the H-treatment

Worker No.	*No. of e = 0.1*	*e in t = 10*	*corr(w,e)*	*No. of r*	*Worker No.*	*No. of e = 0.1*	*e in t = 10*	*corr(w,e)*	*No. of r*
1	0	0.7	0.940**	7	15	0	0.2	0.653*	5
2	3	0.1	0.950**	9	16	3	no offer	0.688	5
3	1	0.1	0.340	6	17	1	0.1	0.696*	5
4	6	0.1	0.714**	5	18	3	0.1	0.319	6
5	0	0.7	0.742**	6	19	1	0.1	0.555*	6
6	4	0.1	0.950**	6	20	0	0.7	0.913**	8
7	1	0.4	0.932**	7	21	5	rej (20)	0.981**	9
8	1	0.8	0.865**	6	22	2	rej (20)	0.858**	6
9	1	0.4	0.382	8	23	0	0.5	0.963**	6
10	0	0.5	0.930**	6	24	0	0.7	0.827**	6
11	0	1.0	0.884**	6	25	0	0.8	0.967**	9
12	2	0.1	0.559*	8	26	1	0.7	0.852**	5
13	6	0.1	0.821**	4	27	3	0.1	0.996**	7
14	1	0.1	0.442	7	28	0	0.9	0.886**	7

• *No. of e = 0.1*: includes all effort choices of 0.1 and the number of rejection decisions if the corresponding wage offer was 20 (rejection of wages > 20 cannot be explained with self interest).

• *e in t = 10*: indicates the effort choice in the final period. If the wage offer was rejected in the final period we indicate it by "rej" and give the corresponding wage offer in parentheses. If no wage offer was made we indicate it by "no offer". These three individuals cannot classified according to our criteria. They are therefore excluded.

• *corr(w,e)*: indicates the Spearman rank correlation coefficients between wage and effort, * indicates significance at the 5-%-level, and ** at the 1-%-level. If the worker rejected a wage offer this was included in the calculation of the correlation coefficient in the form effort = 0.

• *No of r*: indicates the number of reciprocal actions of a worker, i.e., the two signs Δw and Δe are the same with $\Delta w = w_t - w_{t-1}$ and $\Delta e = e_t - e_{t-1}$ *(t = 1, ..., 10).*

Appendix 2: Instructions

In the following we document the English translation of our German OS-instructions. Since the instructions of the H-treatment are just a slightly modified version of the OS-instructions, they are not presented here.

You are a worker

General Information for Workers

You are taking part in a study of the labour market, financed by the National Science Foundation. If you read these instructions carefully you may earn a considerable amount of money. During the experiment your income will be calculated in Guilders. At the end of the experiment Guilders will be converted into Austrian Schilling at a rate of

1 Guilder = 50 Groschen.

At the end of the experiment your income will be paid to you in cash. The labour market has 10 periods consisting of two stages each:

Stage 1: Each of the 20 participants will be randomly assigned to one of two groups: 10 will be "workers" and 10 "firms". Whether you are a worker or a firm is noted at the top right-hand corner of this page. In the first stage firms will make a wage offer to the workers. Workers can either work for this wage or not accept the offer. If a worker accepts the wage offer the second stage follows.

Stage 2: At the second stage, those workers who accepted a wage offer must determine how much they work. The exact procedure is described below.

Attached to these instructions you will find decision-sheets on which you must record all wages that you have been offered and the amount of work that you have chosen. After this you will calculate the income you have earned. This concludes a period of the labour market. Overall, there will be ten periods. **Your total income for the participation in this market will be the sum of your earnings in each of the ten periods**.

Please note:
There is a total of 10 firms and in each period you will be assigned to another firm.
Thus, your firm will always be another person!

Information Concerning the Labour Market

1. At the beginning of each period a firm *may* offer a wage to you. This wage offer will be transmitted to you by the experimenters. Please do not tell anybody about the wage offer that you receive. No other worker and no other firm will get to know your wage offer. Please record the wage offer you have received on the decision sheet for that period.

2. You may either accept the wage offer and work. Or you may not accept the wage offer.

3. If you accept a wage offer you must decide how much you want to work. We will then transmit your choice to the firm you are assigned to. Please do not tell anybody about the amount of work you choose. No other worker and no other firm will get to know about your choice. If a worker accepts a contract he has to bear travel costs of 20 Guilders.

4. If you do not accept the wage offer you will be unemployed in this period and earn nothing.

How do you calculate your income in each period?

1. If you have <u>not</u> concluded a labour contract, you will receive nothing in this period.

2. If you have <u>accepted</u> a wage offer you will receive this wage. From this wage you must then subtract the travel costs of

20 Guilders and the costs of your amount of work.

3. You determine your quantity of work by choosing a number betweeen 0.1 and 1.0 from the schedule below. The lowest amount of work you can choose is 0.1. 0.2 is a slightly higher amount, and so on up to 1.0, the highest amount.

4. The higher the work quantity you choose the better it is for "your" firm. The higher the number you choose, that is, the higher the quantity of work, the higher is "your" firm's income.

5. The higher the work quantity you choose the higher your work-related costs will be. You can find out how your costs are related to the quantity of work by looking at the schedule below.

6. If you have concluded a contract your income in Guilders will be determined by the following formula:

Income (4) = wage (1) – costs of quantity of work (2) – travel costs (3)

Travel Costs = 20 Guilders
Schedule of feasible amounts of work and corresponding work related costs to workers

Work quantity	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1.0**
Costs	0	1	2	4	6	8	10	12	15	18

How do you calculate the income of a firm in each period?

1. Each firm receives 120 coupons from the experimenters which the firm may use to pay for wages. If the firm makes a wage bid of 120 Guilders, the firm will have no income coupons left. If a firm offers a wage of 20 Guilders, the firm will have 100 income coupons left. In general, the firm will have

120 coupons – wage

income coupons left.

2. How are the remaining income coupons converted into Guilders? The number of coupons retained by the firm whose wage offer you accepted is multiplied by the quantity of work you choose. This result is the income of your firm in Guilders. Thus:

Firm's income in Guilders = coupons retained × quantity of work

3. If you do not accept a wage offer of a firm, this firm will earn nothing during that period.

Please note: **The income of all workers and firms will be computed according to the same rules. Every firm has 120 coupons and the work related cost-schedule as well as the travel costs are the same for every worker. Every worker is able to compute the income of "his" firm and every firm is able to compute the income of the firm's worker.**

Let's have an exercise!

1. Let's assume that a firm, who has 120 coupons, offers you a wage of 110 Guilders.

A. You do not accept! What will your income and the income of "your" firm be?

My income = ... Guilders
Firm's income = ... Guilders

B. You accept the wage offer and choose a quantity of work of 0.5! What will your income and the income of "your" firm be?

My income = ... Guilders
Firm's income = ... Guilders

2. Let's assume that a firm, who has 120 coupons, offers you a wage of 28 Guilders:

A. You do not accept! What will your income and the income of "your" firm be?

My income = ... Guilders
Firm's income

= ..... Guilders

B. You accept the wage offer and choose a quantity of work of 0.6!
What will your income and the income of ”your” firm be?

My income = ... Guilders

Firm’s income = ... Guilders

Decision Sheet

Worker number:
Period number:

Wage (1)	
Amount of work chosen	
Costs of amount of work chosen (2)	
Travel costs (3)	20 Guilders
Your income in Guilders (4) = (1) - (2) - (3)	..... Guilders

Firm’s income in Guilders: = (120 Coupons - Wage) × amount of work chosen.

Travel Costs = 20 Guilders
Schedule of feasible amounts of work and corresponding work related costs to workers

Work quantity	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1.0**
Costs	0	1	2	4	6	8	10	12	15	18

Workers will choose one of the feasible amounts of work from the first row. The higher the number the higher the amount of work. The second row of the schedule shows the cost of each amount of work for the worker. The higher the amount of work the higher the costs to the worker.

You are a firm

General Information for Firms

This general information was the same as for workers and is therefore omitted here.

Please note:
There is a total of 10 workers and in each period you will be assigned to another worker.
Thus, your worker will always be another person!

Information Concerning the Labour Market

1. At the beginning of each period you *may* offer a wage to a worker. This wage offer will be transmitted to the worker by the experimenters. **Wages must lie between 20 and 120**. Please do not tell anybody about the wage offer that you make. No other worker and no other firm will get to know your wage offer. Please record the wage offer you have made on the decision sheet for that period.

2. The worker may either accept the wage offer and work. Or he may not accept the wage offer.

3. If the worker accepts a wage offer he must decide how much he wants to work. We will then transmit his choice to you. No other worker and no other firm will get to know about the amount of work chosen.
If a worker accepts a contract he has to bear travel costs of 20 Guilders.

4. If a worker does not accept the wage offer no labour contract is concluded and you will earn nothing in that period. The worker is unemployed in that period and will earn nothing as well.

How do you calculate the income of a worker in each period?

1. If a worker does not accept a wage offer, he will receive nothing in this period.

2. If a worker has accepted a wage offer he will receive this wage. From this wage he must then subtract the **travel costs** and the **costs of the amount of work chosen**.

3. The worker determines his quantity of work by choosing a number between 0.1 and 1.0 from the schedule below. The lowest amount of work is 0.1. 0.2 is a slightly higher amount, and so on up to 1.0, the highest amount.

4. The higher the work quantity the worker chooses the better it is for you. The higher the number he chooses that is, the higher the quantity of work, the higher is your income.

5. The higher the work quantity the worker chooses the higher his work-related costs will be. You can find out how the costs are related to quantity of work by looking at the schedule below.

6. If a worker has accepted a wage offer his income in Guilders will be determined by the following formula:

Income = wage – costs of quantity of work – travel costs

Travel Costs = 20 Guilders
Schedule of feasible amounts of work and corresponding work related costs to workers

Work quantity	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1.0**
Costs	0	1	2	4	6	8	10	12	15	18

How do you calculate your income in each period?

1. You receive 120 coupons from the experimenter which you may use to pay for wages. If you make a wage offer of 120 Guilders to a worker, then you will have no income coupons left. If your offer is 20 Guilders then you will have 100 income coupons left. In general, you will have

120 coupons - wage

income coupons left.

2. How are the remaining income coupons converted into Guilders? The number of coupons retained is multiplied by the quantity of work "your" worker chooses. The result is your income in Guilders. Thus:

Income in Guilders (4) = [amount of coupons (1) – wage (2)] × amount of work (3)

3. If no worker accepts your wage offer you will earn nothing during that period.

Please note: **The income of all workers and firms will be computed according to the same rules. Every firm has 120 coupons and the work related cost-schedule as well as the travel costs are the same for every workers. Every worker is able to compute the income of "his" firm and every firm is able to compute the income of the firm's worker.**

Let's have an Exercise!

1. Let's assume that you make a wage offer of 110 Guilders to a worker.

A. The worker does not accept!
What will your income and the income of "your" worker be?

My income = ... Guilders
Worker's income
= ..... Guilders

B. The worker accepts the wage offer and chooses a quantity of work of 0.5!
What will your income and the income of "your" worker be?

My income = ... Guilders
Worker's income
= ..... Guilders

2. Let's assume that you make a wage offer of 28 Guilders to a worker:

A. The worker does not accept!
What will your income and the income of "your" worker be?

My income = ... Guilders
Worker's income
= ..... Guilders

B. The worker accepts the wage offer and chooses a quantity of work of 0.6! What will your income and the income of "your" worker be?

My income = ... Guilders
Worker's income
= ..... Guilders

Decision Sheet

Firm number:
Period number:

Amount of coupons (1)	120
Wage (2)	
Amount of work chosen by worker (3)	
Your income in Guilders (4) = [(1) - (2)] x (3)	..... Guilders

Income of the Worker in Guilders:
= Wage – costs of amount of work chosen – travel costs of 20 Guilders

Travel Costs = 20 Guilders
Schedule of feasible amounts of work and corresponding work related costs to workers

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Costs	0	1	2	4	6	8	10	12	15	18

Workers will choose one of the feasible amounts of work from the first row. The higher the number the higher the amount of work. The second row of the schedule shows the cost of each amount of work for the worker. The higher the amount of work the higher the costs to the worker.