4 - Experimental Evidence on Inequity Aversion and Self-Selection between Incentive Contracts*

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Abstract

When only group performance is observable, incentives depend on the distribution of payments between group members. This distribution differs between firms. In this paper, we analyze whether the coexistence of various group performance-based payment schemes on the labor market can be related to agents' heterogeneity. We test by a laboratory experiment whether agents self-select between a competitive and a revenue-sharing payment scheme. The theory predicts a sorting of agents based on their preferences and an increase of the efficiency when the payment schemes are freely chosen by agents. Data confirm the predictions. Low inequity averse agents self-select into the competitive scheme and they are more likely to choose it if their risk aversion is low. The efficiency is increasing when the payment schemes are freely chosen. The results go in favor of a flexible labor market that leads to a better matching between compensation schemes and agents' preferences.

JEL classification: C92, D03, J33, M52.

Keywords: performance pay, incentives, self-selection, inequity aversion, competition, revenue-sharing.

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1 Introduction

All organizations are divided into departments. In each department, employees often work in groups and therefore only the group performance is observable by managers. The individual productivity of employees is not accurately available that makes the manager facing an individual moral hazard problem. The only option to motivate employees is to base their salary on the group performance. The distribution of the payment based on the group performance between employees in the group can be made in different ways. In some firms the best employee of the month is chosen. This employee is the only group member who receives a share of the group benefits. In some other firms employees in the group equally share the group benefits. Different types of organizational structures coexist on the market even in the same sector for identical activities (O'Dell and McAdams, 1987, Prendergast, 1999, Pfeffer, 2007). Under standard hypotheses in economic theory, only one structure should be optimal. Why is it not the case in reality?

We think that this coexistence of different organizational structures on the market may be explained by behavioral considerations. Our hypothesis is that the heterogeneity of payment schemes is related to agents' heterogeneity in preferences. Therefore, the aim of this paper is to test, by a laboratory experiment, whether group performance-based payment schemes differing by the distribution of group benefits among employees have a sorting effect. As different distributions induce different degrees of inequality between workers, inequity aversion might play a role (Fehr and Schmidt, 1999). We analyze whether the self-selection of workers between payment schemes depends on agents' inequity aversion. As inequity is not independent from risk, we control for risk aversion. Finally, we study the consequences of giving agents the possibility of self-selection on efficiency in order to deduce policy implications regarding the flexibility of the market.

Considering the sorting effect of payment schemes is important for the understanding of organizations. The pioneered article of Lazear (2000) exposes that a piece-rate pay has a sorting effect based on agents' skill levels. This finding is confirmed by further studies.[1] Nevertheless, skill levels are not the only motivators of the sorting of agents. Employees are concerned by social interactions in the firm (Pfeffer, 2007). Therefore, understanding the self-selection of workers depending on their social preferences is necessary. Although

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[1]Booth and Frank (1999) and Parent (1999) analyzed survey data and Eriksson and Villeval (2008) made the first experimental test of the predictions of Lazear (2000).

recent theoretical models suggest a self-selection of agents in equilibrium depending on their social preferences (Cabrales and Calvo-Armengol, 2008, Kosfeld and von Siemens, 2009, Teyssier, 2007), empirical evidence on this topic is lacking in the literature.[2] We investigate this central question in the current paper.

The only studies known at the moment that also elicit agents' social preferences are experimental studies.[3] Dohmen and Falk (2006) analyze agents' self-selection between a fixed wage and a tournament or a revenue-sharing based on their preferences which are measured via a sequential trust game. They find that reciprocal agents prefer to avoid the tournament but no effect is observed regarding the choice of the revenue-sharing. The laboratory experiment conducted by Cabrales, Miniaci, Piovesan and Ponti (forthcoming) suppose a choice of principals and agents between two contracts that differ on the spread between agents' payoffs and also on the level of strategic uncertainty. Their results underline that the strategic uncertainty of a contract is a stronger determinant of choices than the current degree of inequity. In a later study, Bartling, Fehr, Maréchal and Schunk (2009) find that advantageous inequity aversion prevents people from choosing a tournament when the alternative is a piece-rate scheme.

In comparison to these studies, our experiment analyzes the self-selection of subjects between two variable payment schemes implying strategic interactions. Our study adds to the understanding of self-selection of agents by social preferences in two main dimensions. First, in our study we isolate the sorting effect of the distribution of payments among group members that is not possible to analyze in other studies. Indeed, the two payment schemes in use in our experiment are based on group performance and have the same structure. The only distinction between the two payment schemes relates to the distribution of payments among group members. Second, we analyze the consequences of giving the possibility to the agents of self-selecting into these two payment schemes. While other studies analyze

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[2]There exists a growing literature on the sorting effect of payment schemes depending on other individual preferences. For example, Niederle and Vesterlund (2007) or Datta Gupta, Poulsen and Villeval (2005) analyze the sorting effect of a competition depending on the gender of agents. Some other studies, such as Bellemare and Shearer (2006), Bonin et al. (2006), Cadsby, Song and Tapon (2006), Dohmen and Falk (2006), Eriksson, Teyssier and Villeval (2009) and Grund and Sliwka (forthcoming), have shown evidence of a sorting effect of payment schemes depending on risk preferences.

[3]Bandiera, Barankay and Rasul (2005), Lazear, Malmendier and Weber (2009) and Keser and Montmarquette (2007) suggest a sorting of agents by payment scheme based on agents' social preferences but do not evaluate agents' social preferences. Concerning the choice of a principal, the experiment conducted by Fehr, Klein and Schmidt (2007) shows that the optimal choice between different contracts of a principal in a moral hazard context (bonus contracts, explicit incentive contracts, trust contracts) is affected by fairness concerns of the principal.

the choice of payment schemes only, we investigate what the impact of the flexibility of the labor market is. We compare efficiency under a market without any move between payment schemes and a market with free moves. The result leads to political implications. In addition, as agents choose more than one time their payment scheme, our experimental design allows to study the evolution of agents' choices. Finally, our study counts a high degree of generality with both endogenous effort decisions and payment scheme choices.

In the literature on group performance, an important finding underlines that agents are more productive and earn higher payoffs when groups are homogeneous under a particular payment scheme adapted to agents' social preferences (Burlando and Guala, 2005, Carpenter and Seki, forthcoming, Gächter and Thöni, 2005, Fischbacher and Gächter, 2009). What is however missing but fundamental is the endogeneity of group formation. The present study fills this gap by analyzing the efficiency of groups when they are chosen by agents themselves.

In our experiment, two treatments are compared. A two-stage game is played by agents in the *choice treatment*. First, agents choose the payment scheme they prefer. At the second stage, being matched with another agent under this payment scheme, they decide of an effort. Two payment schemes exist to compensate agents in a group of two workers. As individual performance is not observable, each agent receives a share of the group output that makes payoffs received by agents endogenous to their performance. Under the competitive payment scheme, unequal prizes are rewarded with one agent receiving a higher share of the output than the other one. Under the revenue-sharing scheme, each agent earns fifty percent of the total output.[4] In the *benchmark treatment*, payment schemes are exogenously imposed to the agents. Comparing results of the two treatments allow to analyze the effect of the possibility of self-selection on efficiency. At the end of each period, every agent receives a feedback on his own effort and on his co-worker's effort.

Theoretical predictions are tested by a laboratory experiment. This choice has to do with the endogeneity bias that exists in business data and with the fact that inequity aversion of workers is hardly observable. The experimental method allows to study separately the agents' choice of their payment scheme and their decision of effort. Moreover, social preferences of agents can be accurately elicited by the analysis of agents' behavior in a specific context with monetary incentives.

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[4]For theoretical work, see the seminal papers of Lazear and Rosen (1981) and Moldovanu and Sela (2001) on the analysis of competition and see Holmström (1982) on the analysis of revenue-sharing scheme.

To obtain a direct test of the influence of an agent's inequity aversion on his choice and effort decisions, inequity aversion has been evaluated for all the agents. As inequality between payoffs in an experiment necessarily induces more variance and then more risk, we also elicited subjects' risk aversion. Our experiment is one of the first attempt to simultaneously measure agents' inequity aversion and risk aversion while analyzing also agents' decisions in a different context.[5] The preferences of agents were elicited in experimental sessions played one week before the game sessions in order to avoid influences between the measures of preferences and the decisions in the game. The strategy method (Selten, 1967) has been used. We elicited advantageous inequity aversion by means of a modified dictator game and disadvantageous inequity aversion by an ultimatum game (Blanco, Engelmann and Normann, 2007). Risk attitude was elicited using the Holt and Laury's procedure (2002).

Our theoretical results predict a sorting effect of the group payment schemes we considered and a self-selection of agents based on their preferences. Agents with advantageous and disadvantageous inequity aversion lower than a specific threshold should prefer to be compensated by the competitive scheme. These low inequity averse people should be less likely to choose the competitive scheme if they have a higher risk aversion. Agents preferring the competitive scheme instead of the revenue-sharing scheme are agents who are efficient in the competitive scheme by exerting a high effort level. Therefore, allowing agents to choose their payment scheme should increase the efficiency, in terms of average effort and agents' payoffs, in the competitive payment scheme.

The model is strongly predictive. Three main results are observed. First, a sorting effect of group performance-based payment schemes differing by the distribution of payments between group members is observed. Some agents mainly choose the competitive scheme, some others prefer the revenue-sharing scheme and people in the last category are hesitant and do not show a strong preference for one payment scheme. Second, inequity aversion and risk aversion drive agents' choice as theoretically predicted. Third, the efficiency of the market is increased when agents are allowed to choose their own payment scheme due to an increase of the efficiency in the competitive scheme. This increase of efficiency is essentially due to people choosing more often the competitive scheme who exert a significantly higher

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[5]The experiment of Carlsson, Daruvala and Johansson-Stenman (2005) allows an independent measure of risk aversion and inequity aversion of the same agents but their work does not try to explain agents' behavior and decisions depending on their social preferences in a different environment.

effort in the competitive scheme than in the revenue-sharing scheme. Moreover, agents maximize their payoff when choosing the payment scheme according to their preferences. It is found that agents who have a preference for one payment scheme exert a higher effort under this payment scheme than other agents.

The paper is organized as follows. We present the model in section 2. Section 3 provides experimental design and procedures. Results are analyzed in section 4 and section 5 concludes.

2 Model

2.1 Game and parameters

The game consists of two stages. In the first stage, two compensation modes are proposed to all agents. Each agent must choose the one he prefers. In the second stage, each agent is matched with another agent who has chosen the same payment structure as him in the first stage. They form a group for five repeated periods. Groups consist of two agents to keep the framework as simple as possible. The two agents of each group, i and j, decide simultaneously of a level of effort, e_i and e_j, respectively. A positive effort level is costly for the agent. The cost of effort function is convex in effort, $c(e_i) = \frac{e_i^{1.5}}{20}$.[6] Every group creates a production that is equal to the sum of effort levels in the group, $e_i + e_j$. The group production is supposed perfectly observable but the individual output cannot be observed with certainty.

The two proposed compensation schemes differ in the distribution of payoffs between the members of a group. Two prizes are allocated to the agents, a winner prize and a loser prize.[7] When the agent earns the winner prize, he is in the *High situation* and when he gets the loser prize, he is in the *Low situation*. As the group production is known with certainty, the prizes rewarded to agents are endogenous to this group production to induce incentives. The winner prize is a share τ, $\tau \in \left[\frac{1}{2}, 1\right]$, of the total production of the group. It writes $W(e_i, e_j) = \tau(e_i + e_j) + F$, with F, a fixed payment given to every agent. The loser receives $L(e_i, e_j) = (1 - \tau)(e_i + e_j) + F$. Under both payment schemes, $F = 14$.

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[6]The parameters of the cost of effort function have been chosen to obtain comparable payoffs in different cases.

[7]In the experiment, the words "winner" and "loser" have not been used in order to avoid any influence on agents' behavior by framing. We chose the classical rule of non contextualization in experiments.

F avoids any negative payoff to the subjects, even to the loser of the competition.[8] The competitiveness of the payment structure is increasing in τ for a given effort because the spread between the two prizes is raised. One payment scheme is called the competitive payment scheme with $\tau = 0.75$ (noted C). The other one is a revenue-sharing payment scheme with $\tau = 0.5$ (noted RS). The group production, in this last case, is equally divided between group members that makes this structure equivalent to a public goods game.

After having chosen their payment scheme, subjects exert an effort. They are allowed to choose between two levels of effort. In order to stay close to the model with continuous effort levels, each of these two effort levels is the Nash equilibrium under the *homo economicus* assumption in one payment scheme. When $\tau = 0.5$, the Nash equilibrium is $e_s^{RS*} = 44.44$. We call it e_L effort. The Nash equilibrium is higher under the competitive scheme, $e_s^{C*} = 100$, called e_H effort. The Pareto optimum is $e_P^* = 100$ for both payment schemes. A choice of the agents in the experiment between two effort levels instead of a continuum of efforts guaranties a limited complexity of the game. Moreover, the range of effort levels does not change the predictions or conclusions regarding the focus of the paper. Predictions on the self-selection of agents and predictions on effort provisions are kept identical. Indeed, agents can choose between two decisions where one is the optimal decision and the other one is the free-riding decision.

As individual output is not perfectly observable, the agent getting the winner prize in the competitive payment scheme is not the agent with the highest effort level with certainty. Therefore, the agent with the highest effort should have a higher probability to win than the other agent in the group but his probability to win is lower than a hundred per cent. We capture this uncertainty by the contest success function introduced by Tullock (1980).[9] It is supposed that each agent's probability of winning depends on the ratio between his

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[8]Loss aversion may in fact play a role on agents' behavior when they respond to incentive payment schemes (Kahneman and Tversky, 1984, Kahneman, Knetsch and Thaler, 1991).

[9]The contest success function introduced by Tullock (1980) is more commonly used in rent-seeking contests than in tournaments between employees. Nevertheless, this hypothesis reflects the same mechanism as in standard tournament theory as mentioned by Ryvkin (2007). For example, in Lazear and Rosen (1981), the probability of an agent to win is equal to the probability that his effort plus a random term is higher than the effort of his competitor plus a random term. In Lazear and Rosen (1981), as in Tullock (1980), the agent with the highest effort level has a higher probability to win than his competitor but this probability is different from one. As our analysis focuses on group production, the Tullock hypothesis (1980) is more adequate to our framework.

own production and the group joint production:

$$\Pr\left(p_i(e_i, e_j) = W(e_i, e_j)\right) = \frac{e_i}{e_i + e_j} \tag{1}$$

The probability of winning the prize $W(e_i, e_j)$ is increasing in the agent's effort.

Applying equation (1) to our parameters gives the following probabilities for the competitive payment scheme. If agent i plays e_H when he faces agent j who plays e_L, his probability to be in the high situation is 70% whereas it is about 30% when he plays e_L and agent j plays e_H. When both subjects in the group play the same effort, their probability to be in the high situation is 50%. The expected payoffs in the competitive scheme are the following:

		agent j	
		e_L	e_H
agent i	e_L	8.5,8.5	11.2,9.8
	e_H	9.8,11.2	13,13

Table 1: Expected payoffs in the competitive scheme

In the revenue-sharing scheme, each agent receives the same share, $\tau = 0.5$, of the group production whatever his individual effort level. The payoffs are the following:

		agent j	
		e_L	e_H
agent i	e_L	8.5,8.5	14,7
	e_H	7,14	13,13

Table 2: Expected payoffs in the revenue-sharing scheme

In the competitive scheme, agents are confronted to ex-post payoffs instead of expected payoffs.[10] In the revenue-sharing scheme, we saw that expected and ex-post payoffs are

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[10]We assume that agents compare their payoffs once the cost of effort deduced. On the business place, we think that agents working in the same group are able to roughly evaluate the cost of effort of the other agent in the group. It seems more realistic that agents compare their net payoffs instead of their payoff before the deduction of costs of effort. Moreover, when they apply their model to explain experimental evidence in public goods games, Fehr and Schmidt (1999) compare net payoffs of agents. The payoff considered is the revenue of the public good minus the individual contribution to the public good. Experimental results observed in public goods games support the comparison between net payoffs. Then, it appears in the continuation of the Fehr and Schmidt's model to compare net payoffs of agents (see also Akerlof and Yellen, 1990, for some evidence on the fair wage-effort hypothesis).

identical. If only one situation exists in the revenue-sharing scheme, we might observe biased data and framing effects because the revenue-sharing scheme appears to be more simple than the competitive scheme. Therefore, we created high and low situations in the revenue-sharing scheme as well to keep the two payment schemes comparable. We have been careful that payoffs are always, i.e. whatever the situation, higher when both agents exert the high effort level than when both agents exert the low effort level.

Figure 1 presents the game agents i and j play, assuming that agent j has chosen the same payment scheme as agent i at the first stage. All the payoffs have been divided by five to obtain more tractable numbers.
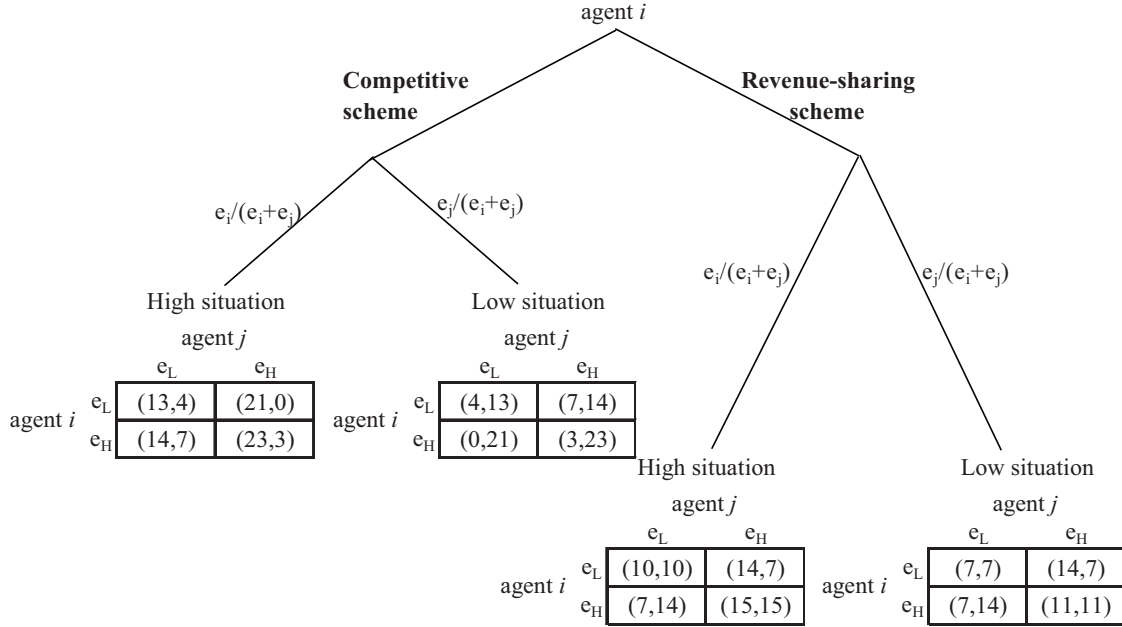

Fig. 1: Game and payoff matrices

The difference between the two payment schemes is related to *ex post* inequality between payoffs. It clearly appears that payoffs are more unequal in the competitive payment scheme than in the revenue-sharing scheme. To focus on the effect of inequality between *ex post* net payoffs, some other characteristics are constant between the two payment schemes. First, the parameters lead to equivalent expected payoffs under both payment schemes when the subjects play the same effort. Second, the social welfare, given by the sum of expected utilities of subject i and subject j, for every possible combination of effort

levels, is identical under both the competitive scheme and the revenue-sharing scheme. Recall that exerting the high effort level is the social optimum in both payment schemes leading to the highest expected monetary payoff.

2.2 Theoretical predictions

The object of this study is to test whether a sorting effect of the two payment schemes previously described does exist and, if it exists, we want to determine what are the sources and what are the consequences in terms of efficiency of a self-selection of agents. To derive such predictions, we suppose that agents are heterogeneous in their concern for inequality (Fehr and Schmidt, 1999) and for risk. We suppose constant relative risk aversion (Holt and Laury, 2002). Although we are interested in the effect of inequity aversion on decisions, as there is always a risk to lose when participating in a competition and as previous studies have shown the importance of risk aversion on the participation in a competition (Cadsby, Song and Tapon, 2007, Dohmen and Falk, 2006, Eriksson, Teyssier and Villeval, 2009), we also consider risk aversion of agents. The utility function is the following for player i when the group is composed of two agents:

$$U_i(x_i, x_j) = v(x_i) - \alpha_i \max\{x_j - x_i, 0\} - \beta_i \max\{x_i - x_j, 0\} \qquad i \neq j \qquad (2)$$

with

$$v(x_i) = \frac{x_i^{1-r_i}}{1 - r_i} \qquad (3)$$

Variables x_i and x_j represent the monetary payoffs of agents i and j. An inequity averse agent i can be averse to advantageous inequality, noted β_i, and to disadvantageous inequality, noted α_i, with $\alpha_i \geq 0$ and $0 \leq \beta_i < 1$. Agent i is selfish if $\alpha_i = \beta_i = 0$. The parameter r_i indicates the level of risk aversion of agent i. Risk aversion corresponds to $r_i > 0$, risk neutrality to $r_i = 0$ and then risk preference to $r_i < 0$.

The predictions are derived by backward induction. We solve first the second stage of the game to deduce equilibrium efforts. Then, we solve the first stage to analyze the optimal self-selection of the subjects depending on inequity and risk preferences. Finally, predictions in terms of efficiency are inferred.

In the competitive scheme, the best response effort levels are as follows:

$$
e_i^{C*} = \begin{cases} e_H & \text{if } \alpha_i \leq \alpha^*(\beta_i) \text{ or } \alpha^*(\beta_i) < \alpha_i < \widehat{\alpha}(\beta_i) \text{ and } e_j = e_L \\ e_L & \text{if } \alpha_i \geq \alpha^*(\beta_i) \text{ or } \alpha^*(\beta_i) < \alpha_i < \widehat{\alpha}(\beta_i) \text{ and } e_j = e_H \end{cases} \tag{4}
$$

Under the assumption of risk neutrality, we have $\alpha^*(\beta_i) = \frac{1.8-3.7\beta_i}{5.1}$ and $\widehat{\alpha}(\beta_i) = \frac{1.3-0.4\beta_i}{1.8}$. The value of $\alpha^*(\beta_i)$ and $\widehat{\alpha}(\beta_i)$ is decreasing with agents' risk aversion.[11] We observe that agents who are selfish and risk neutral have a dominant strategy that is to exert the high effort, e_H. The likelihood of exerting the high effort is decreasing in inequity and risk aversion. Effort equilibria in the competitive scheme are as follows:

$$
\left(e_i^{C*}, e_j^{C*}\right) = \begin{cases} (e_H, e_H) & \text{if all agents have } \alpha_i \leq \alpha^*(\beta_i) \\ (e_L, e_L) & \text{if all agents have } \alpha_i \geq \widehat{\alpha}(\beta_i) \\ (e_L, e_H) & \text{if all agents have } \alpha^*(\beta_i) < \alpha_i < \widehat{\alpha}(\beta_i) \\ (e_H, e_H), (e_L, e_L) \text{ and } (e_L, e_H) & \text{otherwise} \end{cases} \tag{5}
$$

When agents in the competitive scheme differ in their preferences, several equilibria exist. For example, as agents with $\alpha_i \leq \alpha^*(\beta_i)$ always exert e_H and agents with $\alpha_i \geq \widehat{\alpha}(\beta_i)$ always exert e_L, depending on the matching of agents, three equilibria exist: (e_H, e_H), (e_L, e_L) and (e_L, e_H).

In the revenue-sharing scheme, the best response effort levels are as follows:

$$
e_i^{RS*} = \begin{cases} e_H & \text{if } \beta_i \geq \beta_i^* \text{ and } e_j = e_H \\ e_L & \text{if } \beta_i < \beta_i^* \text{ or } \beta_i \geq \beta_i^* \text{ and } e_j = e_L \end{cases} \tag{6}
$$

Under the assumption of risk neutrality, we have $\beta_i^* = 0.15$. The value of β_i^* is decreasing in agents' risk aversion.[12] We observe that agents who are selfish, whatever their degree of risk aversion, have a dominant strategy that is to play the low effort, e_L. Effort equilibria are as follows:

$$
\left(e_i^{RS*}, e_j^{RS*}\right) = \begin{cases} (e_H, e_H) \text{ and } (e_L, e_L) & \text{if all agents have } \beta_i \geq \beta^* \\ (e_L, e_L) & \text{otherwise} \end{cases} \tag{7}
$$

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[11]Exact values of $\alpha^*(\beta_i)$ and $\widehat{\alpha}(\beta_i)$ depending on different degrees of risk aversion are provided in appendix A.

[12]Exact values of β_i^* depending on different degrees of risk aversion are provided in appendix B.

Therefore, the theory suggests that agents are differently incentivized by each payment scheme depending on their preferences. On the one hand, selfish agents and inequity averse agents with low inequity aversion are motivated by the competitive payment scheme. Risk aversion decreases the likelihood of agents to choose the high effort. On the other hand, inequity averse agents with sufficiently high advantageous inequity aversion are potentially more motivated by the revenue-sharing payment scheme. Because agents with different preferences behave differently in various payment schemes, we wonder whether agents choose one specific payment scheme when the market is perfectly flexible. Will agents self-select depending on their preferences?

We first discuss the self-selection of agents depending on their inequity aversion, assuming risk neutrality. Comparing agents' payoffs in both payment schemes, we determine which payment scheme, denoted by $Z \in \{C, RS\}$, is optimally chosen depending on inequity aversion. In the revenue-sharing scheme, although both agents playing the high effort level can be an equilibrium, it is more likely to observe the low effort equilibrium in case of a heterogeneity of agents' preferences. Hence, we assume that agents' payoffs in the revenue-sharing scheme is 8.5. The optimal choice is as follows:

$$
Z^* = \begin{cases} C & \text{if } \alpha_i \leq \alpha^* (\beta_i) \text{ when } \beta_i \leq \bar{\beta} \text{ or } \alpha_i \leq \bar{\alpha} (\beta_i) \text{ when } \beta_i > \bar{\beta} \\ RS & \text{otherwise} \end{cases} \tag{8}
$$

with $\bar{\alpha} (\beta_i) = \frac{4.5 - 10\beta_i}{10}$ and $\bar{\beta} = \frac{4.95}{14}$.[13] The competitive scheme is the optimal choice for agents with low inequity aversion. The following figure represents the optimal choice of payment scheme depending on inequity aversion under risk neutrality.

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[13]For agents with $\alpha^* (\beta_i) < \alpha_i < \widehat{\alpha} (\beta_i)$, it is difficult to predict their choice of payment scheme because these agents' reaction function is to play a different effort level from the other group member. If we assume that all agents in the competition play e_H, these agents play e_L. It is deduced that agents with $\frac{2.7 - 6.3\beta_i}{4.9} \leq \alpha_i < \widehat{\alpha} (\beta_i)$ prefer the revenue-sharing scheme. Agents with $\alpha^* (\beta_i) < \alpha_i < \frac{2.7 - 6.3\beta_i}{4.9}$ prefer the competition when all agents in the competition play e_H. Nevertheless, if a positive share of agents in the competition have $\alpha^* (\beta_i) < \alpha_i < \frac{2.7 - 6.3\beta_i}{4.9}$, it is not always optimal for other agents with these preferences to choose the competition anymore. These agents receive a higher payoff by playing e_L instead of e_H when matched with someone playing e_H. Nevertheless, if they are matched with another agent playing e_L as well, they will receive a very low payoff, $8.5 - 4.5\beta_i - 4.5\alpha_i$. Therefore, the choice of payment scheme of agents with $\alpha^* (\beta_i) < \alpha_i < \frac{2.7 - 6.3\beta_i}{4.9}$ depends on their belief on the share of agents with the same preferences as them choosing the competition. As this share is unknown and unpredictable, it is optimal for these agents to choose the revenue-sharing scheme.
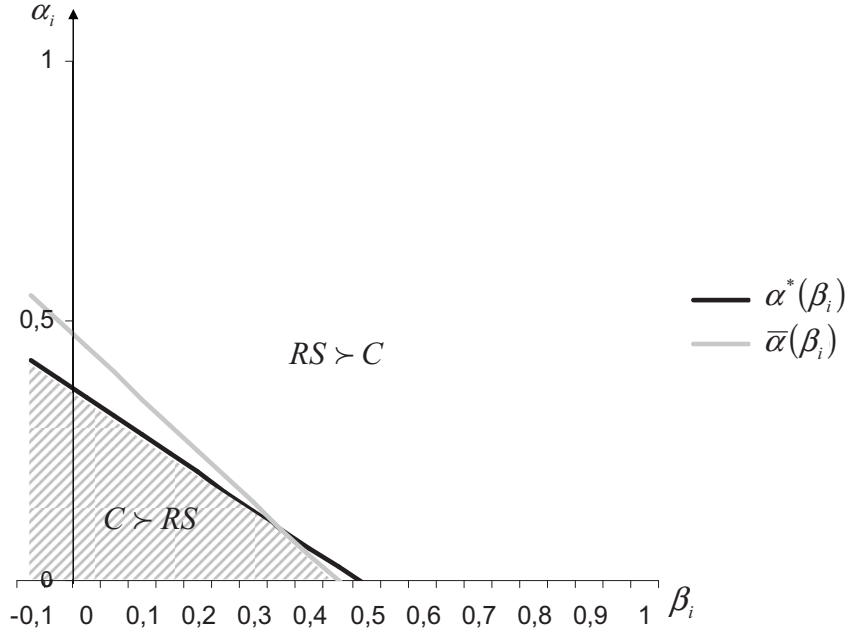
Fig. 2: Optimal payment scheme depending on inequity aversion

Agents with inequity aversion degrees included in the white area prefer the revenue-sharing scheme while agents with inequity aversion degrees in the grey area prefer the competitive scheme.

As the likelihood of exerting the high effort in the competition is decreasing in risk aversion, the payoff in the competition is reducing in risk aversion as well. Hence, agents with low inequity aversion verifying $\alpha_i \leq \alpha^*(\beta_i)$ when $\beta_i \leq \bar{\beta}$ or $\alpha_i \leq \bar{\alpha}(\beta_i)$ when $\beta_i > \bar{\beta}$ are less likely to choose the competition as risk aversion increases. Agents with other degrees of inequity aversion should prefer the revenue-sharing scheme whatever their degree of risk aversion.

Therefore, allowing a flexible labor market with agents freely choosing the organization in which to work, differing in the payment scheme in use, should lead to efficiency gains. Indeed, when the market is not flexible, some agents paid by the competitive scheme exert the high effort level but some others exert the low effort level. When the market is flexible, agents who are paid by the competitive scheme are people who have chosen it and they all exert the high effort level. No efficiency gains are predicted in the revenue-sharing scheme because of coordination problems and the heterogeneity of agents' preferences in this payment scheme. Efficiency is analyzed in terms of both average effort and average agents' payoffs.

Three hypotheses are tested.

Hypothesis 1. *Agents do self-select into group performance-based payment schemes differing by payoffs distribution between group members.*

Hypothesis 2. *Agents with low inequity aversion prefer to be compensated by the competitive scheme instead of the revenue-sharing scheme. Their likelihood of choosing the competitive scheme is decreasing in their risk aversion.*

Hypothesis 3. *The efficiency of the game, in terms of average effort and average agents' payoffs, increases when self-selection is allowed due to efficiency gains in the competitive scheme.*

3   Design and Procedures

In order to analyze the sources and the effects of self-selection on the efficiency of group incentives, we conducted two different treatments. Inequity and risk preferences have been elicited for all the participants. The instructions are provided in appendices C and D.

3.1   Experimental design

3.1.1   Two treatments

In the *Benchmark treatment*, subjects are informed on being paid either under the revenue-sharing scheme (*mode X*) or under the competitive scheme (*mode Y*). They are randomly allocated to one of the two compensation modes for the whole experiment. Subjects do not know the proportion of people being paid under each payment scheme but they know the existence of both. We have chosen to mix subjects being paid under both payment schemes in order to have the same environment as in the other treatment described below. Subjects are matched in pairs. The pairs are fixed for five periods, called a *sequence*. Nine sequences of five periods are played to allow the subjects to learn the game. Subjects are rematched at the end of every sequence. Each subject knows his own payoff and also his co-worker's payoff under each payment scheme at the end of every period. Each subject makes his effort decision by choosing between e_L and e_H.

In the *Choice treatment*, the only difference with the benchmark treatment is that, at the beginning of every sequence, each subject chooses under which payment scheme he

wants to be compensated. Once the subject has chosen his payment scheme, he is matched with someone who has done the same choice as him.[14] Subjects are free to move from one payment scheme to the other without any cost at the beginning of each new sequence.

The rematching of subjects after five periods has been chosen for three reasons. The partner matching protocol for five periods allows first agents to learn implications of one payment scheme for a sufficiently high number of periods. Second, agents are in this manner able to evaluate the type of the agent they are matched with. Finally, the rematching after five periods leads to the observation of several choices of payment schemes by agents.

3.1.2 Elicitation of preferences

To measure preferences of agents, we used the strategy method (Selten, 1967) because it allows to study the reaction of agents in all situations.

Advantageous inequity aversion (β) Subjects are asked to participate in a modified dictator game (Blanco, Engelmann and Normann, 2007). The game involves two roles: the *dictator* and the *receiver*. All subjects take their decisions under both roles before knowing the actual role they have been allocated for payment. At the end of the session, the computerized program randomly allocates a role to each subject and payoffs are determined accordingly. Half of the subjects are a dictator and the other half a receiver. Subjects are matched in pairs with a dictator and a receiver in each.

The rules of the game are the following. Dictators make a choice between two options regarding the distribution of a pie between himself and the receiver. 21 decisions are presented to the subjects. Receivers cannot decide on anything once facing a specific decision. The first option, option a, corresponds to the equal share for the dictator and the receiver. The distribution is (x_i, x_i) with $x_i = \{0, ..., 20\}$. The second option, option b, is to keep 18 points for himself and to give 2 points to the receiver, distribution $(18, 2)$. The 21 decisions are such that under decision 11, the choice is made between distribution $(10, 10)$ and distribution $(18, 2)$; under decision 21, the choice is made between distribution $(20, 20)$ and distribution $(18, 2)$.

Before playing as the dictator, subjects take first their decision as the receiver. They

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[14]All the sessions are composed of an even number of subjects. In case of an odd number of subjects choosing a payment scheme, one of them having chosen the revenue-sharing is randomly picked and is affected to the competitive scheme. This particular subject is informed of this change before deciding on his effort level.

are asked to decide to play the game or to opt out for a fixed payment (5 points[15]). This first step allows to give a strategic dimension to the dictator game. Indeed, the evaluation of β is then more easily associable with behavior in games with strategic interactions. Moreover, Lazear, Malmendier and Weber (2009) have shown that dictators' generosity is amplified when they have to meet the receiver. Dictators make significant lower gifts when they can avoid meeting the receiver. To avoid over-generosity of dictators and then over-estimation of advantageous inequity aversion, we limit chances of the dictators to meet the receiver. All subjects know the rules of the game at the time they intake their decision in the receiver's role.

The advantageous inequity aversion of subjects, β_i, is estimated through the choices of subjects when they intake their decisions in the dictator's role. It is calculated by the decision number at which the agent switches from option b to option a, i.e. from the distribution $(18, 2)$ to the equal distribution. The value of β is determined by $U_i(x_i - 0.5, x_i - 0.5) = U_i(18, 2)$, with x_i being the decision number of the first decision in which the agent chooses the option a. The value of β_i is then defined below:

$$\beta_i = \frac{18.5 - x_i}{16} \tag{9}$$

Selfish agents are expected to switch from option b to option a at decisions 18 or 19. All agents switching before have a positive β_i. β_i is negative for agents changing their choice after.

Disadvantageous inequity aversion (α)   Disadvantageous inequity aversion is measured, as in Blanco, Engelmann and Normann (2007), through an ultimatum game (Güth, Schmittberger and Schwarze, 1982). The game involves two roles : the *sender* and the *responder*. All subjects take their decisions under both roles before knowing the actual role they have. At the end of the session, the computerized program randomly allocates a role to each subject and payoffs are determined accordingly. Half of the subjects are allocated to the sender's role and half to the responder's role. All subjects are matched in pairs with a sender and a responder in each pair.

In the role of the sender, the subject receives an endowment of 20 points. He must

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[15]Under the assumption that the dictators are selfish, the average payoff of the receiver is around 5 points.

decide on the distribution of this amount, restricted to integers, between himself and the responder. If the responder accepts the distribution, this distribution is implemented but if he rejects it, both the sender and the responder earn nothing. Then, the responder must choose between two options for 21 decisions. Option a is to accept the distribution and option b is to reject it. Each decision corresponds to a particular distribution. Under decision 1, the choice is made between accepting the distribution $(20, 0)$ and rejecting it; under decision 11, the choice is made between accepting distribution $(10, 10)$ and rejecting it.

The estimation of disadvantageous inequity aversion, α_i, is realized through decisions of the responder. It is calculated by the decision number at which the agent switches from option b to option a; i.e. from reject to accept. The value of α_i is determined by $U_i(s_i - 0.5, 20.5 - s_i) = U_i(0, 0) = 0$, with s_i being the decision number of the first decision under which the subject accepts the distribution of the sender.

$$\alpha_i = \frac{s_i - 0.5}{21 - 2s_i} \tag{10}$$

In the responder's role, selfish agents should always accept the distribution proposed as soon as the share they receive is strictly positive. The later the agent switches from rejecting to accepting the distribution, the higher his value of α_i.

Risk aversion (r)   We used the lottery procedure of Holt and Laury (2002) to elicit risk preferences of subjects.

The subjects filled out a questionnaire with 10 decisions. Each decision consists of a choice between two paired lotteries, option a and option b. Payoffs for option a are either €2 or €1.60, whereas the riskier option b pays either €3.85 or €0.10. In the first decision, the probability of the high payoff for both options is 1/10. In the second decision, the probability increases to 2/10. Similarly, the chances of receiving the high payoff for each decision increase as the decision number increases. When the probability of the higher payoff is large enough, subjects should cross over from option a to option b. Risk neutrality corresponds to a switch at the fifth decision, while risk loving subjects are expected to move earlier and risk averse subjects at the sixth decision and after.

3.2 Experimental procedures

The experiments have been conducted at the GATE laboratory, Lyon, France, in January 2008. The experiment was computerized using the Regate software (Zeiliger, 2000). We recruited 118 under-graduate students (ORSEE, Greiner, 2004) from three business or engineering schools, trying to guarantee a fair gender distribution in each session (52.54 per cent of male participants in total). Three sessions with 18 subjects, two with 22 subjects and one with 20 subjects were organized; three for the benchmark treatment and three for the choice treatment. The game was composed of 9 sequences of 5 periods. 45 observations are collected for every subject that conducts to a total of 5310 observations.

Every participant was summoned at two different days with one week of difference. When registering for the session of the first week, subjects committed themselves to participate in the second-week session. They were informed, in the invitation by E-mail, that they would receive their monetary gain only at the end of the second-week session. During the first week, the preferences were elicited. During the second week, the game was played. The subjects participating in a particular first session were not necessarily allocated to the same second session. They registered for the second session at the end of the first one. We separated the sessions eliciting preferences from the game sessions to avoid any potential influence from one part on the other one and to limit confusion.

Upon arrival, each subject received a participant identifier in order to match the data between the two sessions anonymously. For every session, all participants were randomly assigned to a computer. Instructions were distributed and read aloud. Questions were answered in private. The participants had to answer series of questions to verify their understanding of the instructions. The experiment started once all the participants answered correctly. No communication was allowed.

In sessions of the first week, subjects completed first the risk-aversion questionnaire. Subjects noted on a sheet of paper the option they chose for each of the 10 lottery decisions. After all participants had made their decisions, the sheets of papers were collected. Only one decision was used for the computation of subjects' payoffs. At the end of the sessions of the second week, at the moment of receiving his payment, each subject had to throw a ten-sided die twice : once to select the decision to be considered and a second time to determine his payoff for the option chosen. The other decisions asked in the first week were computerized. The subjects answered first the modified dictator game and then the

ultimatum game.

In sessions of the second week, in the Benchmark treatment, 10 subjects were allocated the revenue-sharing scheme and the others were compensated under the competitive scheme.[16] In the Choice treatment, at the beginning of every sequence, each subject had to tick either the "mode X" box (revenue-sharing scheme) or the "mode Y" box (competitive scheme) to choose his payment scheme for the current sequence. In both treatments, they selected their effort level by choosing between the "choice A" (low effort) and the "choice B" (high effort). The computerized program determined the situation (high or low) in which each agent was, depending on the computed probabilities. At the end of every period, each subject received a feedback on his potential payoff and on the potential payoff of his co-worker. In every new sequence of five periods, subjects who chose the same payment scheme were randomly reshuffled in pairs.

All the transactions, except the lottery, were conducted in points, with conversion into Euros at a rate of 4 points = €1 for the preferences elicitation session and at a rate of 3 points = €1 for the game session. In the first week sessions, the Holt and Laury's lottery was paid and one of the two games was randomly selected for the payments. In the second week sessions, two periods in different sequences, identical for all subjects, were randomly picked to determine the payments. Not all periods were paid because, in this case, subjects would have received their average payoff that eliminates inequality between agents. In total, the payment consisted of the sum of payoffs during each session plus the lottery payment and a €6 show-up fee (€3 for each session). The totality of the payments and the actual roles of subjects were announced only at the end of the second week for each participant. On average, subjects earned €19.59.

4 Results

This section aims at testing the three hypotheses previously described. We study first whether subjects differ in their choice of payment scheme between the competitive and the revenue-sharing schemes. Second, we determine which preferences influence such a choice. Third, we analyze the consequences of the self-selection of subjects on efficiency in terms

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[16]As the number of participants under each session can be 18, 20 or 22, and an even number of subjects is required under each payment scheme, we forced 10 participants to be compensated under the revenue-sharing scheme. Then, the number of participants compensated under the competitive scheme can be 8, 10 or 12.

of average effort and average payoffs.

4.1 Sorting

The competitive payment scheme is chosen on average in 38.5% of the decisions. A low proportion of subjects choose the competition in their first decision (25.9%). Subjects are heterogeneous in their choice behavior over the nine sequences of the game. We classify subjects into three categories called "competitor categories": subjects who choose the competition in less than three sequences, "rare competitors" (45% of subjects), subjects who choose the competition in at least six sequences, "frequent competitors" (24% of subjects), and an intermediate category, "occasional competitors" (31% of subjects). Figure 3 describes the evolution of the frequency of the choice of the competition over time.
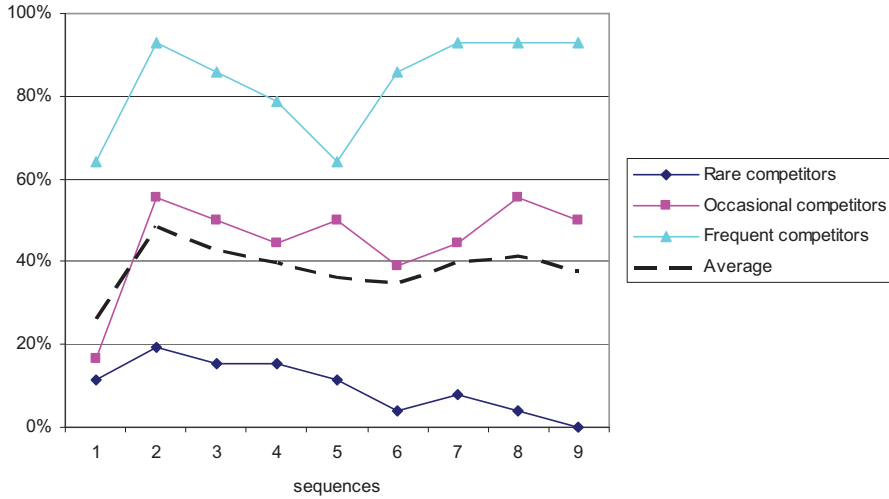

Fig. 3: Evolution of the frequency of the choice of the competition over time by competitor category of subjects

We observe that a self-selection of subjects between the competitive scheme and the revenue-sharing scheme does exist. Therefore, our results show that group performance-based payment schemes differing by the distribution of payoffs between group members have a sorting effect. We also note that more subjects choose the revenue-sharing scheme for their first choice, i.e. at the first sequence.

How is this sorting effect related to preferences of subjects? According to our theoretical predictions, inequity and risk aversion should drive the self-selection of subjects.

Figure 4 and Table 3 present the distribution of subjects by preferences in the choice treatment. Figure 4 presents the distribution of subjects by advantageous and disadvantageous inequity aversion and table 3 presents the distribution of subjects by risk aversion.[17]
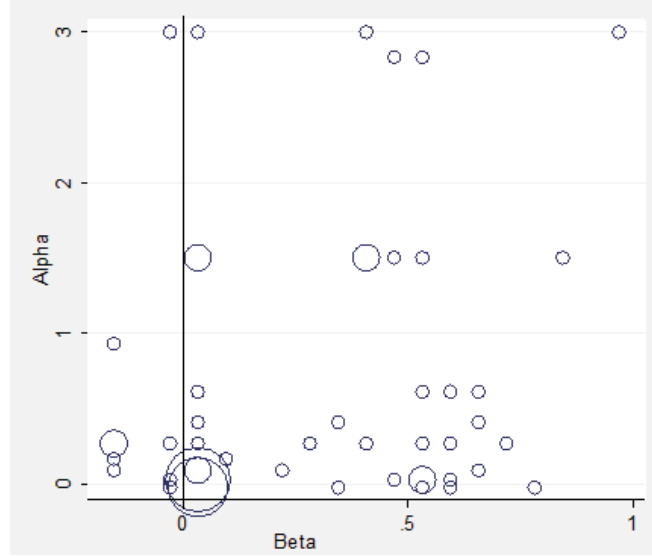
Note: The size of markers is scaled according to the number of subjects. Markers represent, from the smallest to the largest, one subject, two subjects, five subjects and six subjects.

Fig. 4: Distribution of α_i and β_i in the choice treatment

We observe that subjects are heterogeneous in their inequity aversion degrees. According to the method that measures inequity aversion of subjects in the experiment, selfish subjects are defined as subjects with $\alpha_i < 0.03$ and $\beta_i < 0.04$. Therefore, 20% of the subjects in the choice treatment are selfish.[18] We also note that some agents do not verify the hypothesis of Fehr and Schmidt (1999), $\alpha_i \geq \beta_i$: 38% of subjects present $\beta_i > \alpha_i$ in our experiment. This result is consistent with Blanco et al. (2007) and Dannenberg et al. (2007). Finally, advantageous inequity aversion is not significantly correlated to disadvantageous inequity aversion (Spearman's test, $z = 0.027$, $p = 0.776$). A Kolmogorov-Smirnov exact test does not reject the hypothesis of equality of distribution functions of inequity aversion degrees between the benchmark and the choice treatments (α, $z = 0.088$, $p = 0.977$ and β,

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[17]Separated figures for advantageous and disadvantageous inequity aversion can be found in appendix E.

[18]We observe higher proportions of inequity averse agents with low inequity considerations compared to the results in Fehr and Schmidt (1999) and Blanco, Engelmann and Normann (2007). The subjects from our pool may be less affected by the situation of other subjects because of their education path. Indeed, the subjects are mainly from "grandes écoles" (business and engineering schools). Nevertheless, we may suppose that the only impact of this specificity of our pool would be a reduction of the effect of social preferences in our results.

$z = 0.183$, $p = 0.278$) that allows a non-biased comparison of efficiency between the two treatments.

Number of safe choices	Range of risk aversion degrees	Holt and Laury's classification	Number of subjects	Frequency
0-1	$r_i < -0.95$	Highly risk lover	0	0.00
2	$-0.95 < r_i < -0.49$	Very risk lover	1	0.02
3	$-0.49 < r_i < -0.15$	Risk lover	3	0.05
3	$-0.15 < r_i < 0.15$	Risk neutral	8	0.14
5	$0.15 < r_i < 0.41$	Slightly risk averse	18	0.31
6	$0.41 < r_i < 0.68$	Risk averse	14	0.24
7	$0.68 < r_i < 0.97$	Very risk averse	11	0.19
8	$0.97 < r_i < 1.37$	Highly risk averse	2	0.03
9-10	$r_i > 1.37$	Stay in bed	1	0.02

Table 3: Distribution of risk aversion in the choice treatment

As commonly observed, most subjects of our sample are risk averse. As well as for inequity aversion degrees, a Kolmogorov-Smirnov exact test does not reject the hypothesis of equality of distribution functions between the benchmark and the choice treatments ($z = 0.093$, $p = 0.960$).[19] The correlation between agents' degrees of inequity aversion and their level of risk aversion is not significant (Spearman's test for β, $z = 0.050$, $p = 0.593$ and for α, $z = 0.047$, $p = 0.616$).

Theory predicts that agents who have $\beta_i \leq \overline{\beta}$ prefer the competitive scheme than the revenue-sharing scheme if they have $\alpha_i \leq \alpha^*(\beta_i)$ and agents who have $\beta_i > \overline{\beta}$ choose the competitive scheme if $\alpha_i \leq \overline{\alpha}(\beta_i)$, with $\overline{\beta} = \frac{4.95}{14}$, $\alpha^*(\beta_i) = \frac{1.8-3.7\beta_i}{5.1}$ and $\overline{\alpha}(\beta_i) = \frac{4.5-10\beta_i}{10}$. We name this type of subjects "low inequity averse" subjects. In the choice treatment, 24 subjects are low inequity averse, which represents a share of 41.4% of the subjects.

A multivariate analysis allows to understand the determinants of the choice of the competitive scheme. We use probit regressions and as decisions of subjects are repeated, we adjust standard errors for intragroup correlation. As we have seen that more subjects choose the revenue-sharing scheme at the first sequence of the game, we run separated regressions explaining the first choice of subjects, i.e. at the first sequence, from their following choices. As predicted by theory, we analyze whether subjects with low inequity aversion are more likely to choose the competitive scheme and whether among this type of subjects risk averse subjects are less likely to choose the competitive scheme. In model (1),

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[19]We observe higher proportions of risk averse and very risk averse subjects but a lower proportion of risk neutral subjects than in Holt and Laury's pool of subjects.

independent variables are risk aversion, low inequity version, risk aversion for low inequity averse subjects and we control for gender and a time trend with the variable sequence. The risk aversion variable (coded from 1 to 10) corresponds to the number of the decision where the subject crosses over from the safer to the riskier option in the lottery test. As this number increases, the subject is more risk averse. The variable low inequity aversion is binary with 1 indicating that the subject is low inequity averse as previously defined. In model (2), we add variables that allow to analyze the effect of the distance of subjects' inequity aversion from the threshold ($\alpha_i = \alpha^*(\beta_i)$ if $\beta_i \leq \overline{\beta}$ and $\alpha_i = \overline{\alpha}(\beta_i)$ if $\beta_i > \overline{\beta}$) depending on whether subjects are low inequity averse or not. Marginal effects are reported in Table 4.

Dependent variable: Choice of the competitive scheme				
	Model (1)		Model (2)	
	Sequence 1	Sequences 2-9	Sequence 1	Sequences 2-9
Low inequity aversion	-.355	.761**	-.558	.771**
	(.371)	(.194)	(.398)	(.214)
Risk aversion	-.200***	-.003	-.198***	-.004
	(.070)	(.036)	(.070)	(.035)
Low inequity aversion × Risk aversion	.067	-.176***	.071	-.175***
	(.088)	(.062)	(.089)	(.062)
Low inequity aversion × Distance			.970	-.036
			(1.069)	(.622)
(1- Low inequity aversion) × Distance			-.028	-.011
			(.062)	(.050)
Male	.044	.035	.046	.036
	(.118)	(.082)	(.115)	(.082)
Sequence		-.012		-.012
		(.009)		(.009)
Observations	58	464	58	464
Wald χ^2	16.05	26.02	19.03	26.57
Prob > χ^2	.0029	.0001	.0041	.0004
Pseudo R^2	.2177	.0867	.2276	.0870

Note: Robust standard errors in parentheses. Significance levels: *** 1%; ** 5%; * 10%.

Table 4: Determinants of the choice of the competitive scheme

The results confirm our theoretical predictions for sequences 2 to 9, i.e. for choices following the first choice. As predicted, low inequity averse subjects are more likely to choose the competitive scheme rather than the revenue-sharing scheme. More precisely, the probability that a subject who has low inequity aversion degrees, as theoretically defined, chooses the competitive scheme is higher by 76% than the probability of a subject with higher inequity aversion degrees. Moreover, the higher one low inequity averse subject's

risk aversion, the lowest his probability to choose the competitive scheme. Risk aversion has a significant effect only for low inequity averse subjects. We do not find any significant effect of the distance of inequity aversion degrees from the threshold on the choice of payment scheme. This result corroborates again our theoretical predictions. Indeed, this last result confirms the effect of a threshold in inequity aversion degrees and adds that only this threshold has an effect.

When analyzing the choice of the payment scheme at the first sequence of the game, we observe different effects. The results show that only risk aversion drives the first choice of the payment scheme of subjects. The more risk averse the subject, the lower his probability to choose the competitive scheme. This is true for all subjects and not only for low inequity averse subjects as in sequences 2 to 9. This result gives a reason to the observation of more choices of the revenue-sharing scheme in the first sequence. When they have no experience, subjects prefer to limit risks only by choosing the revenue-sharing scheme and they do not take into account social externalities.

We also run probit regressions to explain the category of subjects defined in the previous section.[20] The results confirm our conclusions. We find that low inequity averse subjects are 93% more likely than others to be a frequent competitor and this likelihood is decreased in their risk aversion. As theoretically predicted, these results show evidence of a sorting effect of the payment schemes proposed. The self-selection of agents is moreover related to their inequity and risk preferences.

4.2   Efficiency

As a sorting effect of payment schemes has been found in the data, we study in this section the consequences of the self-selection of agents on efficiency. Efficiency is measured by the average effort level and the average payoff of agents under both the competitive and the revenue-sharing schemes.

4.2.1   Average effort

The effort variable is binary. We coded the high effort, e_H, by 1 and the low effort, e_L, by 0. Table 5 displays summary statistics about the mean of effort by payment scheme and treatment.

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[20]The marginal effects of these regressions are reported in Appendix F.

	Sequence 1	Sequences 2-9	All sequences
Competitive scheme			
Benchmark Tr.	0.66	0.70	0.70
Choice Tr.	0.80	0.77	0.77
Revenue-sharing scheme			
Benchmark Tr.	0.67	0.67	0.67
Choice Tr.	0.64	0.65	0.65

Table 5: Summary statistics on average effort

The average effort in the revenue-sharing payment scheme equals 0.65 in the choice treatment. It is not different from the average effort exerted in the benchmark treatment (Mann-Whitney U-test, $z = 1.523$, $p = 0.128$). The average effort in the competitive scheme equals 0.77 in the choice treatment and it is significantly higher than the average effort in the benchmark treatment (Mann-Whitney U-test, $z = 3.935$, $p < 0.001$). This result is in accordance with the theory. When subjects do not freely choose their payment scheme, some exert the low effort in the competitive scheme while subjects who choose the competitive scheme themselves are motivated by this payment scheme and exert more often the high effort.

To understand why the effort level is higher in the competitive scheme than in the revenue-sharing scheme, we analyze how subjects behave depending on their competitor category. Figure 5 displays the average efforts in both payment schemes depending on the number of times the agents chose the competition in the choice treatment. The two lines represent the average effort in the benchmark treatment.
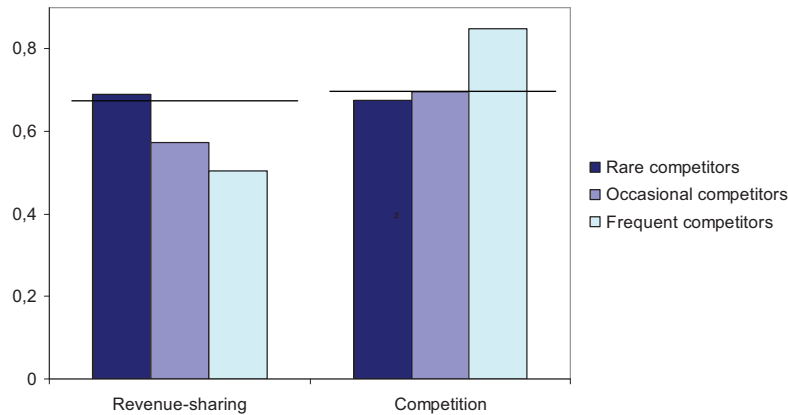

Fig. 5: Average effort by category of subjects

This figure shows that frequent competitors exert a significantly higher effort level than subjects affected to the competitive scheme in the benchmark treatment (Mann-Whitney U-test, $z = 6.666$, $p < 0.0001$). Subjects who choose the competitive scheme less than six times exert the same effort level than subjects in the benchmark treatment (Mann-Whitney U-test, $z = 0.232$, $p = 0.8168$). Therefore, we deduce that the average effort level in the competitive scheme is higher in the choice treatment than in the benchmark treatment because subjects who have a strong preference for this payment scheme exert a high effort level. We also observe that subjects who prefer the competitive scheme are largely more motivated by it rather than by the revenue-sharing scheme (Wilcoxon rank-test, $z = 17.666$, $p < 0.001$). Moreover, frequent competitors exert a higher effort than others in the competitive scheme. These findings support theory very well because they show that subjects who have a preference for the competitive scheme are more efficient in it than in the revenue-sharing scheme and are more efficient than others in this payment scheme. Subjects who choose the competitive scheme less than three times exert a higher effort than others in the revenue-sharing scheme but they exert the same effort in this payment scheme and in the competition.

The self-selection of agents is then efficient as predicted theoretically. Indeed, when allowed to freely choose their payment scheme, subjects who prefer the competitive scheme exert a high effort in this payment scheme. Moreover, an agent who chooses a payment scheme more frequently than other agents exerts, on average, a higher effort than others in this payment scheme.[21]

The opportunity given to the agents to freely choose their payment scheme leads to an efficient self-selection of agents in the competitive scheme. The consequence of this efficient self-selection is an increase of the average effort in the competition. Subjects who often choose the competition feel in accordance with this type of incentives and are largely more motivated by it than by the revenue-sharing scheme. In the revenue-sharing scheme, the efficiency is not increased. Heterogeneity of preferences of agents having chosen this payment scheme prevents agents from reaching the Pareto optimum.

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[21]It cannot be explained by a learning effect. The evolution of effort levels in a specific payment scheme does not vary depending on the number of times the agent has chosen this payment scheme.

4.2.2 Average payoffs

Do agents benefit also from the opportunity of choosing their payment scheme? Is it costly for agents to follow their preferences or is it a good manner to maximize their payoffs? Table 6 represents the average payoffs of agents in the benchmark and the choice treatments under both payment schemes depending on the number of times they chose the competition.

	Benchmark Tr.	Choice Tr.		
Category of subjects	Average	Average	Competition	Revenue-sharing
Rare competitors	11.5	11.8	11.7	11.8
Occasional competitors	-	11.0	11.1	10.9
Frequent competitors	11.5	12.1	12.5	10.2

Table 6: Average payoffs by category of subjects

The main result is that subjects maximize their payoffs by following their preferences. The average payoff of subjects under both payment schemes in the benchmark treatment equals 11.5 points. Subjects who prefer one of the two payment schemes in the choice treatment benefit from the possibility to choose their payment scheme (frequent and rare competitors). They receive a higher average payoff under the preferred payment scheme than subjects in the benchmark treatment (t-test, respectively, $p = 0.062$ and $p = 0.109$) whereas agents who hesitate between the two payment schemes receive a lower payoff (t-test, $p = 0.023$).

Frequent competitors receive an average payoff significantly higher under the competitive scheme than under the revenue-sharing scheme (t-test, $p = 0.004$). It is also higher than the average payoff of other agents under the competition (t-test, $p = 0.023$). Rare competitors do not receive a significantly higher average payoff under the revenue-sharing scheme compared to the competition (t-test, $p = 0.220$). Their average payoff is nevertheless significantly higher than others' under the revenue-sharing (t-test, $p < 0.001$).

These results are in the continuation of the previous findings; agents efficiently self-select. Agents who often choose one payment scheme are more motivated by it than hesitant agents. They are then more able to reach the Pareto optimum and then to make higher payoffs by following their preferences.

5 Conclusion

The experiment presented in this paper was aimed to give an answer to the question whether heterogeneity of payment schemes on the market may be related to the heterogeneity of agents' preferences. To conduct such a study, we tested the sorting effect of two group performance based payment schemes, differing only by the distribution of payments between group members. We analyzed the determinants and the consequences of the self-selection of agents. The theory predicts the existence of a sorting of agents according to their inequity and risk preferences. This sorting should lead to an increase of the efficiency of the competitive scheme when self-selection of agents is allowed. Evidence of these hypotheses is found in the data. The model is strongly predictive. The two group performance based payment schemes induce a sorting of agents. This sorting is influenced by agents preferences. Low inequity averse agents prefer the competitive scheme and this preference is increased for agents with low risk aversion. Finally, the efficiency of the competitive scheme is increased when agents are allowed to freely choose their payment scheme. This last result is due to the fact that people choosing more often the competitive scheme exert a significantly higher effort in the competitive scheme than in the revenue-sharing scheme. Therefore, assuming the external validity of agents' behavior in the experiment, the results show that the heterogeneity of payment schemes on the market may reflect the heterogeneity of agents' social and risk preferences because of agents' self-selection between those payment schemes.

Moreover, the results have some business recommendations. Consider a personnel manager who is interested in searching for an incentive mechanism leading to an increase of the average productivity of employees and then of the company. Our experimental results suggest that two types of labor market must be differentiated. On a market with high costs of mobility for agents, the personnel manager should evaluate employees' individual preferences, such as social and risk preferences, to calibrate which performance-based payment scheme is the most appropriate to provide incentives to workers. Depending on agents' preferences, the efficiency of a variable payment scheme may not be such as expected. On a flexible market, the situation is different. Agents may self-select between firms using different payment schemes, provided that diverse organizations exist on the market. In this case, an evaluation of agents' preferences may be useless because their choice of payment scheme already indicates their individual characteristics. As an opti-

mal matching between employer and employees may be induced, the institution of various performance-based payments schemes may be valuable for the efficiency of the market.

Regarding implications in terms economic policy, the results of this experiment are in favor of a flexible labor market with low costs for job change between firms or between departments inside the firm. When agents freely choose the organization where to work, i.e. the payment structure, the efficiency of some payment schemes is increased. The flexibility of the market induces a better matching between employers and employees and hence efficiency gains. Our results go in favor of Rosen's idea that the optimal matching between economic agents leads to the market efficiency (1986). Therefore, even for identical abilities, the labor market should be flexible to induce an optimal matching regarding the social and risk preferences of the agents.

The results obtained emphasize the importance of taking into account the sorting effect of institutions on the market. In this study, we focused on the labor market studying the optimal matching between employer and employee through the payment scheme in use. Nonetheless, it has implications in all domains in economics provided that a heterogeneity of mechanisms or institutions exists.

Appendices

Appendix A - Thresholds of α in the competitive scheme depending on risk aversion

r_i	-0.49	-0.15	0	0.15	0.41	0.68
$\alpha^* (\beta_i)$	$\frac{10.27-3.7\beta_i}{5.1}$	$\frac{3.19-3.7\beta_i}{5.1}$	$\frac{1.8-3.7\beta_i}{5.1}$	$\frac{0.95-3.7\beta_i}{5.1}$	$\frac{0.21-3.7\beta_i}{5.1}$	$\frac{-0.08-3.7\beta_i}{5.1}$
$\widehat{\alpha} (\beta_i)$	$\frac{6-0.4\beta_i}{1.8}$	$\frac{2.21-0.4\beta_i}{1.8}$	$\frac{1.3-0.4\beta_i}{1.8}$	$\frac{0.64-0.4\beta_i}{1.8}$	$\frac{-0.14-0.4\beta_i}{1.8}$	$\frac{-0.89-0.4\beta_i}{1.8}$

Appendix B - Thresholds of β in the revenue-sharing scheme depending on risk aversion

r_i	-0.49	-0.15	0	0.15	0.41	0.68
β^*	0.47	0.21	0.15	0.10	0.05	0.03

Appendix C - Instructions of the first week session

You are about to participate in an experiment on decision-making organized for the GATE research institute. During this session, you can earn money. The amount of your earnings depends on your decisions and on the decisions of the participants you will have interacted with.

As it was mentioned in the invitation E-mail, the experiment will take place on two days : today and a day of next week. It is indispensable that you come back next wee to participate to the experiment in its totality. **All the profits you have made will be paid at the end of the session next week.**

The participant number you received will be used as your identifier for the next week session. **You must come with your participant number in order to receive your earnings**.

IMPORTANT : only people who will have participated in both sessions will receive their earnings. The earnings amount is the sum of the payoffs you made in both sessions.

Today, the experiment is composed of three independent sections. In every section, you will take one or several decisions. You will take your decisions without knowing the other participants' decisions in the previous sections. Note that the other participants do not know your decisions either.

The first section is realized on paper form. The result of the first section requires an individual random draw that will take place at the end of the session next week to determine your earnings.

Your final profit also depends on two other sections. The section considered for your earnings computation will be randomly determined by the computer software. Every section has the same probability of being selected. At the end of the final session next week, the result of this draw will be individually announced, as well as your payoff in this section. Your total earnings for this session will be individually announced and paid in cash in a separate room in order to preserve confidentiality at the end of the experiment next week. You will additionally receive a show-up fee of 3 Euros

During the totality of the session, you cannot communicate.

Thanks for your participation.

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Section 1

The attached sheet of paper shows ten decisions. Each decision is a paired choice between "Option a" and "Option b". You will make ten choices and record these in the column on the right, but only one of them will be used in the end to determine your additional earnings. Let us explain how these choices will affect your earnings.

Here is a ten-sided die that will be used to determine this payoff. The faces are numbered from 1 to 10 (the "0" face of the die will serve as 10). When you will receive your earnings at the end of the experiment next week, as you will come to the other office, you will throw this die twice : once to select one of the ten decisions to be used and a second time to determine what your payoff is for the option you chose, a or b, for the particular decision selected.

Even though we ask you to make ten decisions, only one of these will end up affecting your earnings. However, you will not know in advance which decision will be used. Obviously, each decision has an equal chance of being used in the end.

- Look at decision 1

    Option a pays €2 if the throw of the dice is 1, and it pays €1.6 if the throw is 2-10.

    Option b yields €3.85 if the throw of the dice is 1 and it pays €0.1 if the throw is 2-10.

- Look at decision 2

  Option a pays €2 if the throw of the dice is 1 or 2, and it pays €1.6 if the throw is 3-10.

  Option b yields €3.85 if the throw of the dice is 1 or 2 and it pays €0.1 if the throw is 3-10.

- The other decisions are similar, except that as you move down the table, the chances of a higher payoff for each option increase. In fact, for decision 10 in the bottom row, the dice will not be needed since each option pays the highest payoff for sure, so your choice here is between €2 and €3.85.

To summarize,

- You will make ten choices. For each decision row, you will have to choose between Option A and Option B. You may choose A for some decision rows and B for other rows. You may change your decisions and make them in any order.

- Next week, when you come to the other room to receive your earnings from the experiment, you will throw the ten-sided die to select which of the ten decisions will be used.

- Then, you will throw the die again to determine your money earnings for the Option you chose for that Decision.

The earnings for this choice will be added to your other earnings, and you will be paid all earnings in cash at the end of the experiment next week.

If you have any question, please raise your hand. Your questions will be answered in private. Please do not talk with anyone.

PARTICIPANT NUMBER : _____

NAME OF YOUR COMPUTER : _____

DATE : _____

Please indicate for each of the following 10 decisions if you choose Option a or Option b.

	Your decision
Decision 1 Option a: 1/10 of 2 € and 9/10 of 1.6 € Option b: 1/10 of 3.85 € and 9/10 of 0.1 €	Option a O Option b O
Decision 2 Option a: 2/10 of 2 € and 8/10 of 1.6 € Option b: 2/10 of 3.85 € and 8/10 of 0.1 €	Option a O Option b O
Decision 3 Option a: 3/10 of 2 € and 7/10 of 1.6 € Option b: 3/10 of 3.85 € and 7/10 of 0.1 €	Option a O Option b O
Decision 4 Option a: 4/10 of 2 € and 6/10 of 1.6 € Option b: 4/10 of 3.85 € and 6/10 of 0.1 €	Option a O Option b O
Decision 5 Option a: 5/10 of 2 € and 5/10 of 1.6 € Option b: 5/10 of 3.85 € and 5/10 of 0.1 €	Option a O Option b O
Decision 6 Option a: 6/10 of 2 € and 4/10 of 1.6 € Option b: 6/10 of 3.85 € and 4/10 of 0.1 €	Option a O Option b O
Decision 7 Option a: 7/10 of 2 € and 3/10 of 1.6 € Option b: 7/10 of 3.85 € and 3/10 of 0.1 €	Option a O Option b O
Decision 8 Option a: 8/10 of 2 € and 2/10 of 1.6 € Option b: 8/10 of 3.85 € and 2/10 of 0.1 €	Option a O Option b O
Decision 9 Option a: 9/10 of 2 € and 1/10 of 1.6 € Option b: 9/10 of 3.85 € and 1/10 of 0.1 €	Option a O Option b O
Decision 10 Option a: 10/10 of 2 € and 0/10 of 1.6 € Option b: 10/10 of 3.85 € and 0/10 of 0.1 €	Option a O Option b O

Sections 2 and 3 are conducted informatically. your earnings will be calculated in points,

4 points = 1 Euro

We remind you that one of the sections 2 and 3 will be randomly selected by the computer software to determine your earnings. Each section has the same probability to be selected.

_____

This section is independent of the previous section.

In this section, the situation is the following :

- The person B will choose between two options : either to participate to the game which the rules are described below, or to receive 5 points and not to participate to the game.

- In the game, the person A must choose between two earnings distributions between herself and the person B in 21 different decision problems. The person B can only accept the personn A's decisions.

- You take your decisions under the role of the person A and under the role of the person B. The roles of the persons A and B will be randomly determined by the computer software once you will have taken your decisions.

The decision problems of the game will be presented in a table.

Example : the decision 7 is presented as follows :

Decision 7		
Option a: Your payoff is 7 pts and the payoff of the person B is 7 pts	Option a	O
Option b: Your payoff is 18 pts and the payoff of the person B is 2 pts	Option b	O

You take your decisions in the role of the person A :

If you choose the Option a, yourself and the person B will receive 7 points each. If you choose the Option b, you decide to keep 18 points for yourself and the payoff of the person B will be 2 points.

The other decisions are similar, except that as you move down the table, the payoff of each person under the Option a is increased.

For example, the decision 10 is presented as follows :

Decision 10		
Option a: Your payoff is 10 pts and the payoff of the person B is 10 pts	Option a	O
Option b: Your payoff is 18 pts and the payoff of the person B is 2 pts	Option b	O

You will choose an option (a or b) in each of the twenty-one lines you will see on the screen.

If this section is selected to determine your earnings, the computer software will affect you randomly with another participant in the room once your choices are done and will give you a role. The matching and the roles attribution will remain anonymous.

The computer software will randomly select one of the decisions.

You will take your decisions in the role of the person A and also in the role of the person B.

Your earnings are determined as follows :

- If you receive the role B :

    – If you have chosen not to participate to the game, you will earn 5 points.

– If you have chosen to participate to the game, you will earn the amount that the person A with whom you are paired has chosen for the person B in the decision selected by the computer software.

- If you receive the role A, you will earn the amount you have chosen for yourself in the decision selected by the computer software.

Example of earnings calculation :

The decision 7 is the decision selected by the computer software.

If the person B decides to participate to the game

- If the person A has chosen the option a

  Earnings of the person A are : 7

  Earnings of the person B are : 7

- If the person A has chosen the option b

  Earnings of the person A are : 18

  Earnings of the person B are : 2

If the person B decides not to participate to the game

- If the person A has chosen the option a

  Earnings of the person A are : 7

  Earnings of the person B are : 5

- If the person A has chosen the option b

  Earnings of the person A are : 18

  Earnings of the person B are : 5

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Section 3

This section is independent of the previous section.

In this section, the situation is the following :

- The person A will choose a distribution (only one) over the twenty-one payoffs distributions available between herself and the person B.

- The person B knows that it has been asked to the person A to take this decision. B can either accept or reject the distribution chosen by A. If the person B accepts the distribution proposed by the person A, this payoffs distribution is implemented. If the person B rejects the offer, the two persons, A and B, receive nothing.

- The person B chooses between accepting and rejecting the distribution proposed by the person A for each of the twenty-one available distributions. The person B must choose an option (to accept the distribution or to reject the distribution) in each of the twenty-one lines on the screen.

If this section is selected to determine your earnings, the computer software will affect you randomly with another participant in the room once your choices are done and will give you a role. The matching and the roles attribution will remain anonymous.

You will take your decisions in the role of the person A and also in the role of the person B.

- If you receive the role A, you will earn the amount that you have chosen for yourself if the person B with whom you are matched accepts you offer. If the person B rejects the offer, yourself and the person B will earn nothing.

- If you receive the role B, you will earn the amount that the person A with whom you are matched has chosen for B if you have accepted the offer. If you have rejected this offer, the person A and yourself earn nothing.

Appendix D - Instructions of the second week session (choice treatment)

You are about to participate in the second part of the experiment on decision-making organized for the GATE research institute. During this session, you can earn money. The amount of your earnings depends on your decisions and on the decisions of the participants you will have interacted with. During the session, your earnings will be calculated in points:

$$\text{With 3 points} = 1 \text{ Euro}$$

This session is composed of 9 sequences of 5 periods each. Each sequence is independent.

At the end of the session, two sequences are randomly selected by the computer software. One period is picked in each of the two sequences selected. The earnings that you will have realized in these two periods will be added and converted in Euros.

Moreover, you will receive the earnings realized during the session last week. You will also receive the total show-up fee that equals €6. The section of the last week session (among the sections 2 and 3) randomly selected for your earnings will be revealed, as well as your earnings in this section. The individual random draw of the last week session will be done at the end of the session today in a separated room for every participant. This random draw will give you an extra earning. After this draw, your earnings in total will be paid to you in cash.

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Every sequence is composed of 5 periods.

- **At the beginning of the sequence**, you choose between two compensation modes, the "mode X" or the "mode Y", by clicking one of the two available buttons on the screen. These compensation modes are described in more details below.

  You are randomly matched, for the whole sequence, with another person in the room **who has chosen the same compensation mode as you**. This other person is called your "co-participant". The identity of your co-participant will never be revealed to you and your identity will never be revealed to your co-participants.

- **At each period of the sequence**, you select one of the two available choices on the screen, "Choice A" or "Choice B", by clicking the box corresponding to your choice. You confirm your choice by clicking the button "OK".

The calculation of your earnings is described below. Your earnings at every period depend on the compensation mode that you have chosen and on your decision at every period.

Choice of the compensation mode and calculation of your earnings

Two compensation modes exist, the mode X and the mode Y.

At the beginning of every sequence, you choose to be paid under the compensation mode X or under the compensation mode Y.

Note : You will be paid under this compensation mode during the 5 periods of the sequence. Once the 5 periods of the sequence are over, a new sequence begins.

Reminder : At the beginning of every sequence, you are randomly matched with another person in the room who has chosen the same compensation mode as you. You keep matched with this person for the 5 periods of the sequence. Another matching is done at the following sequence.

At every period, your co-participant decides as you and simultaneously between the choice A and the choice B.

Then, the computer software will determine, for every period, the potential earnings of everybody in function of the compensation mode and of the choices made.

In each compensation mode, mode X or mode Y, you may be in two different situations, in the situation M or in the situation L. Your chances to be in the situation M or in the situation L depend on your choice, A or B, that you have done and on the choice, A or B, that your co-participant has done.

- If you choose A and your co-participant B, you have 30% of chances to be in the situation M and 70% of chances to be in the situation L.

- If you choose B and your co-participant A, you have 70% of chances to be in the situation M and 30% of chances to be in the situation L.

- If both you and your co-participant choose A, or both choose B, you have 50% of chances to be in the situation M and 50% of chances to be in the situation L.

Your potential earnings are registered in the following tables according to the compensation mode you have chosen and the situation in which you are depending on your choice, A or B, and on the choice, A or B, of your co-participant.

A paper sheet is joint to these instructions. The earnings tables under the mode X and under the mode Y are reported on it.

DESCRIPTION OF THE COMPENSATION MODE X

If you choose the compensation mode X, your potential earnings are written in the following tables in function of your choice, A or B, and of the choice of your co-participant, A or B.

Earnings tables under the compensation mode X

Mode X				

Situation M

Choice of your co-participant / Your choice		**A**	**B**
A	Your payoff	10	14
	Payoff of your co-participant	10	7
B	Your payoff	7	15
	Payoff of your co-participant	14	15

Situation L

Choice of your co-participant / Your choice		**A**	**B**
A	Your payoff	7	14
	Payoff of your co-participant	7	7
B	Your payoff	7	11
	Payoff of your co-participant	14	11

Examples of earnings under the compensation mode X:

Example 1 : Pierre chooses A while Helen chooses B.

Pierre has 30% of chances to be in the situation M.

If Pierre is in the situation M :
Pierre's earnings are : 14
Helen's earnings are : 7

If Pierre is in the situation L :
Pierre's earnings are : 14
Helen's earnings are : 7

Example 2 : Pierre chooses B and Helen chooses B also.

Helen has 50% of chances to be in the situation M.

If Helen is in the situation M :
Pierre's earnings are : 15
Helen's earnings are : 15

If Helen is in the situation L :
Pierre's earnings are : 11
Helen's earnings are : 11

DESCRIPTION DU MODE DE PAIEMENT Y

If you choose the compensation mode Y, your potential earnings are written in the following tables in function of your choice, A or B, and of the choice of your co-participant, A or B.

Earnings tables under the compensation mode Y

			Mode Y	

Situation M

Choice of your co-participant / Your choice			A	B
A		Your payoff	13	21
A		Payoff of your co-participant	4	0
B		Your payoff	14	23
B		Payoff of your co-participant	7	3

Situation L

Choice of your co-participant / Your choice			A	B
A		Your payoff	4	7
A		Payoff of your co-participant	13	14
B		Your payoff	0	3
B		Payoff of your co-participant	21	23

Examples of earnings under the compensation mode Y:

Example 1 : Pierre chooses A while Helen chooses B.

Pierre has 30% of chances to be in the situation M.

If Pierre is in the situation M :
Pierre's earnings are : 21
Helen's earnings are : 0

If Pierre is in the situation L :
Pierre's earnings are : 7
Helen's earnings are : 14

Example 2 : Pierre chooses B and Helen chooses B also.

Helen has 50% of chances to be in the situation M.

If Helen is in the situation M :
Pierre's earnings are : 3
Helen's earnings are : 23

If Helen is in the situation L :
Pierre's earnings are : 23
Helen's earnings are : 3

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Under both compensation modes, X and Y, at the end of every period, the compensation mode that served for your payment is reminded. The probability you had to be in the situation M

and whether you have really been in the situation M or in the situation L are announced to you. Your choice between A and B is also reminded. Finally, your potential earnings and the potential earnings of your co-participant are announced to you. At the end of every period, you must click the button "OK" to start the following period.

Note that if an uneven number of participants have chosen the mode X or the mode Y, one of the participants having chosen the mode X is randomly selected and will play for the 5 periods of the sequence under the mode Y. He will be matched with a co-participant having chosen the mode Y. He will be informed of this before making his choice, the choice A or the choice B.

After 5 periods, the sequence is finished. A new sequence starts automatically. You choose your compensation mode and you will be matched with another person in the room having chosen the same compensation mode as you.

Important : in both compensation modes, X and Y, **your co-participant is randomly determined at every sequence among the participants who have done the same choice of compensation mode as you.** There are small chances for your co-participant to be the same for two consecutive periods.

To summarize the whole experiment,

- You will participate in 9 sequences composed of 5 periods.

- **At the beginning of every sequence**, you choose between the two available compensation modes, the mode X or the mode Y. You are randomly matched, for the whole sequence, with another person in the room **who has chosen the same compensation mode as you**.

- **For every period of every sequence**, you select one of the two available choices, the choice A or the choice B. Your potential earnings for the period are then computed.

- **Once the sequence is finished**, another sequence of 5 periods starts automatically. The participants choose a new compensation mode and a new matching is done.

Every sequence is independent of the previous sequences and of the following sequences also.

At the end of the session, two sequences will be randomly selected by the computer software. One period is picked in each of the two sequences selected. The earnings that you have done in these two periods will be added to determine your final earnings. The two periods randomly selected are the same for all the participants of this session.

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If you have any question, please raise your hand. Your questions will be answered in private. Please do not talk with anyone.

Thanks for your participation.

Appendix E - Distribution of inequity preferences

Figures 6 and 7 depict the distribution of advantageous and disadvantageous inequity aversion respectively (4 subjects have $\alpha = 9.5$ that we represent on the figure as $\alpha = 3$).
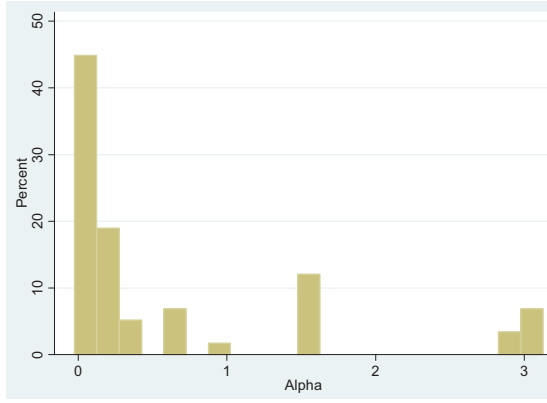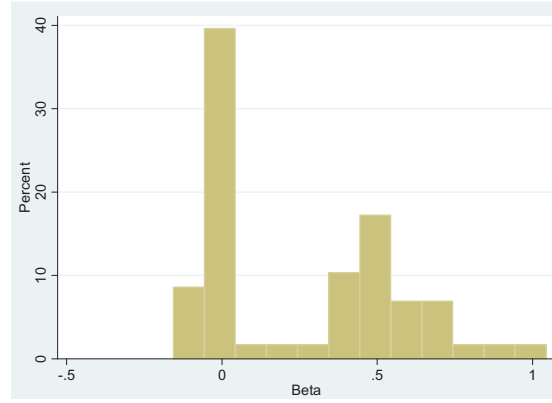
Fig. 6: Distribution of α

Fig. 7: Distribution of β

Appendix F - Determinants of the competitor category of subjects: frequent competitors, occasional competitors and rare competitors

	1 = Frequent competitor	1 = Occasional competitor	1 = Rare competitor
Low inequity aversion	.931***	-.318	-.759
	(.120)	(.391)	(.287)
Risk aversion	.009	-.012	.001
	(.052)	(.070)	(.072)
Low inequity aversion $\times$ Risk aversion	-.212***	.015	.220**
	(.080)	(.082)	(.108)
Male	-.014	.214*	-.209
	(.110)	(.126)	(.139)
Observations	58	58	58
Wald χ^2	12.09	5.61	14.77
Prob > χ^2	.0167	.2300	.0052
Pseudo R^2	.1497	.0996	.1768

Note: Probit regressions with robust standard errors in parentheses.
Significance levels: *** 1%; ** 5%; * 10%.

Table 7: Determinants of the competitor category of subjects

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