How We Earn Money Matters:
Internal Reflection and Voting on Redistribution

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Abstract

This paper tests experimentally public deliberation procedures such as voting and "internal reflection" on people's preferences for redistribution depending on how money was earned. Consistent with a number of social justice theories, we set out to find people's preferences for redistribution when they earned their money either through effort, circumstances, brute luck and option luck. The baseline experiment implemented a majority voting procedure on redistribution after an earned money phase. A second treatment, called Internal Reflection treatment, studies whether people's prior deliberation on what they consider to be a fair redistribution and remuneration of earned money may affect their preferences for redistribution. The systematic comparison between the two treatments does not reveal a significant impact of internal reflection.

Keywords: Social justice, redistribution, self-interest, experiment, internal reflection, public deliberation

JEL codes: D6, C9

1   Introduction

There is now a significant amount of evidence that people have other-regarding prefer-
ences. Experimental games such as the ultimatum, dictator, prisoner dilemma, goods
games etc. helped to reveal this kind of behaviour (Camerer and Thaler 1995, Ledyard
1995, Camerer 2003, Eckel and Gintis 2009, etc). Motives other than self-interest include
preferences for redistribution. Some papers have explicitly tested people's distributive
preferences, in particular preferences for distribution of money people jointly earned
(Rutström and Williams 2000, Konow 2000, Frohlich et al 2004, Cappelen et al 2007,
2008). These authors introduced a production phase prior to a distribution phase which
was a dictator game. Participants first earned some money, then the joint earnings of
an assigned dictator and a receiver was calculated and then the dictator was asked to
distribute the money. Again, these experiments revealed that a substantial amount of
participants distributed the money "fairly" between them, even though the logic of a
purely self-interested standard economic agent would imply to keep the money.[1] To
account for this result, Konow (2000) for example argues that individuals are motivated
by the "accountability principle". This means that the difference in remuneration with
respect to the joint production is based on factors for which the individuals themselves
are responsible, but not on any exogenous variables. This idea is of course reminis-
cent of various egalitarian theories of justice which discuss factors for which individuals
themselves are held responsible (such as e.g. effort or option luck – a risky event chosen
by an individual) but which demand compensation for those factors for which they are
not (e.g. talent, particular social circumstances or brute luck – events that may happen
but are not under the control of individual) in order to achieve equality of opportu-

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[1]These results are interesting especially in the light of Cherry et al's (2002) findings who have a
"earned money phase" prior to a standard dictator game, but the dictator is asked to divide the money
he or she alone has earned. In this case, they observe a substantial drop in giving in comparison to the
dictator game with "windfall" money.

nity (Dworkin 1981, Cohen 1989, 1990, Arneson 1989, 1990, 2001 etc.). Cappelen et al (2007) discusses the trade-off between monetary payoff and one of three prominent fairness ideals in the political and theoretical debate on distributive justice, namely strict egalitarianism, liberal egalitarianism or libertarianism. Finally, Frohlich et al (2004) introduce a "just desert" aspect into the inequity aversion framework presented by Fehr and Schmidt (1999), which represents some kind of proportionality fairness ideal and means that individuals should be compensated in proportion to their personal contribution to the joint production.

These papers discussed people's preferences for redistribution with a particular fairness view in mind. The determination of the fairness ideal as such is of course a difficult matter. In political philosophy and economics, at least two different approaches have been discussed that should determine what is just in the first place. The one is the impartial observer approach, commonly associated with Adam Smith (1756[1976]), but also to some extent with John Harsanyi (1953, 1955) and John Rawls (1971), both of which place the individual in a position of ignorance of which social position he or she will occupy in society once the veil of ignorance is lifted. The second approach to determine what is just calls for public deliberation outside the veil of ignorance. Amartya Sen (1999) for example argues that the priority of opportunities (or capabilities as he calls them) that should be equalized is a matter for people to decide through public discussions. To propose a fixed and pre-established list of capabilities would amount to paternalism. John Roemer (1993) argues that society itself must determine for which factors individuals should be held responsible and on the basis of this it can be decided when compensation payments are appropriate and when they are not.

Public deliberation is of course also at the heart of deliberative democracy, which is the idea that deliberation informs and educates the public who then can make better

(at least in the sense of more reasonable and more legitimate) decisions on the basis of, for example, unanimity or majority principles. This approach does not exclude self-interested individuals, but assumes that individuals' preferences are malleable through public deliberation and it is this modification in preferences that can lead to a large basis of agreement and consensus oriented towards the public good. Our paper is situated in the context of public deliberation and proposes to study people's preferences for redistribution of money they can earn through different factors (such as e.g. effort or luck).

There is a substantial discussion about what counts as public deliberation. As reviewed by Delli Carpini et al (2004), a "face-to-face" situation for public discussions is often considered to be the ideal public deliberation. However, some argue that it is not clear that the effects of deliberation come from discussion or the information it provides (see Muhlberger and Weber 2006). That is why in modern mass democracies, deliberation is also seen as the process of assembling, explaining and disseminating information about public policies to a wider public, and not necessarily simply as discussions. Gunderson (1995) even argues that "[d]emocratic deliberation occurs anytime a citizen either actively justifies her views (even to herself) or defends them against a challenge (even from herself)" (p.199) from which Delli Carpini et al (2004) deduce that public deliberation does not even need to involve direct exchanges between citizens, but can also occur through survey processes that may trigger thought processes of an individual citizen. Hence, an "internal reflection" (also referred to as "deliberation within") on public issues can also be part of public deliberation (Goodin and Niemeyer 2003). However, given that the crucial element of public deliberation is democratic legitimation of certain decisions, they also add that "[h]ypothetical imagined discourse ("deliberation within") can never substitute for the external democratic validation that comes from

more overtly political processes" (p. 628), to which they count, next to discussion also voting, bargaining, petitioning, suing and other interpersonal acts of democratic politics.

Surprisingly little however has been done in economics (but also in other social sciences) to test the influence of public deliberation on justice and fairness considerations.[2] The only noteworthy exception in experimental economics is Cappelen et al (2008) who test (without though putting this explicitly in a context of public deliberation) the impact of what they call people's "moral reflection" on their behaviour in a dictator game with a preceding production phase. More specifically, they conduct an experiment in which they confront participants with the same distributional situations that they will face later in the experiment. They thus asked them hypothetical questions about what they consider to be a fair distribution in such situations. This design allowed Cappelen et al to see whether participants attribute more weight to fairness motives (and thus less weight to self-interest) or whether their fairness considerations change altogether by being confronted twice with the same scenario, one time hypothetically, one time for real.

Our paper is situated in this context of determining and legitimising people's preferences for redistribution via public deliberation procedures. Our aim was to create a form of micro society in which people (about 100 participants per treatment) engage in prior deliberations and actual decisions about redistribution, not of any jointly earned money, but of their own money they earned such as they would normally do in course of their particular activity within society.

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[2]Research in other social sciences have started to study empirically the benefits of deliberation e.g. on civic engagement and other political consequences, but not necessarily its impact on justice considerations. See e.g. Delli Carpini (2004) and Thompson (2008) for reviews. It should be noted however that in environmental and resource economics standard surveys have been compared to focus groups' or citizen juries' evaluation of environmental goods and policies (see e.g. Alvarez-Farizo and Hanley 2006; Dietz et al 2009)

More explicitly, we organize two treatments. The baseline experiment consists in analysing the support of redistribution depending on how money has been earned. We thus started with an earned money phase that highlights the source of income from 4 different *factors*: circumstances, effort, option luck and brute luck. Afterwards a distribution phase followed in which participants engaged in a public deliberation exercise, namely, they could vote whether or not they wanted to redistribute money for any of those 4 factors. In a second treatment, which we call more specifically "internal reflection treatment", participants were asked to fill in a questionnaire prior to the baseline experiment whilst sitting at their assigned seat in the voting room. This questionnaire contained vignettes telling stories about two sellers whose earnings are influenced through effort, social circumstances, option and brute luck. Bar Hillel and Yaari (1984) were probably the first to study the concept of social justice via answers to hypothetical questions (for an overview of this kind of questionnaire see Gaertner 2007). Participants were later in the experiment confronted with all those factors for real. For each of those earning situations described in the vignettes, participants had to indicate how fair they found the proposed payment for any of those sellers. This meant that participants had to engage in an internal deliberation and reflection on issues of fair payments and redistribution prior to the earning and voting phase. Thus in contrast to Cappelen et al, our deliberation phase makes people think more broadly about their fairness views; participants will only be confronted with the same "earning factors", but not with the same scenario as in the experiment. Consequently, they may be less "anchored" in their responses. Also, in contrast with the other papers that introduced an earned money phase prior to a dictator game, we test people's preferences for redistribution on a much larger scale than in a generally speaking two person setting (dictator and receiver).

The paper is structured as followed. Section 2 describes the experimental design.

Section 3 provides unconditional results as well as an econometric analysis. Section 4 concludes.

2 Experimental Design

2.1 Preliminaries

Our experiment was presented as a study entitled "To succeed in *Marseilles*". It was conducted in the Regional Council Provence-Alpes-Côte d'Azur in the city of Marseilles in the context of a then ongoing "Fête de la science", which is held in France each year. More specifically, the experiment was held in the council chamber of the Regional Council. This is the place where normally regional social and political issues are debated and decided among the elected regional deputies. It is thus a particularly ideal place to stimulate public deliberation and to invite people to vote on particular issues. The council chamber is built in an *amphitheater* style for about 140 people. Each seat is equipped with an individual screen on which all public information is displayed. Each seat is also equipped with an electronic voting device that has three voting buttons ("yes", "no", "abstention"). All submitted votes are anonymous and end results can be displayed immediately on the screens.

Participants were recruited through advertisements in local newspapers and regional TV news. Flyers were handed out in the street and faxes sent to 6,000 companies to invite people to participate at this study. The purpose of the study was not explained any further, but the information was given that participants could earn up to 40 euros for one hour and a half. Interested participants were asked to register prior to the event using the Public Economics Institute webpage or a dedicated phone line. When

participants arrived at the Regional Council for the study, they were given a seat number. Once seated, they were told that all information they would give will be dealt with anonymously. They were not allowed to communicate with each other and any questions they had were answered privately. They were told that each participate would be given a 4 euros show-up fee.

2.2 Stages of the baseline treatment

The experiment consisted of two stages, an earned money stage and a voting stage on redistribution. The participants however were not told about the whole procedure at once, but were given instructions as the experiment went along.

In the **earned money stage**, participants were able to earn money with respect to four independent *factors*, namely effort, circumstances, brute luck, and option luck in addition to their show-up fee. However, these factors were not mentioned directly to participants. Rather, they were termed ("test of copying characters", "being born or not in Marseille", "draw of the colour of the ping-pong ball", "bet on the number of the seat") respectively, as we will describe in more detail below. In our analysis here however, we call those factors by their theoretical term. The difference between success and failure was 10 euros for each of the factors. This allowed to clearly attribute differences in voting behaviour to *how* participants earned their money (i.e. factor effect) and not to *how much* they earned (i.e. income effect).

Effort. Because the task should be painful in oder to be compensated, we asked participants to perform a five minutes visuo-spatial task. This was a modified longer version of the Zazzo test used in the Wechsler Intelligence Scale for Children (WISC-III, 3rd edition). A series of 9 symbols was displayed and to each symbol corresponded an

integer-number. Participants were then presented with a full page of integer-numbers associated with blank cells. Participants had to copy correctly as many as possible corresponding symbols in the blank cells within these five minutes (if they skipped a symbol they were told not to receive any gains at all). Symbols were made of straight lines and blank cells are presented with a dotted grid so that the task would not require any drawing skills. This kind of visuo-spatial task is used to measure psycho-motors skills in children. For adults however, who have already well-established psycho-motor skills, this test comes down to measure the amount of attention they (can) put into the completion of the task. We *equalize* this measure of attention (for which no particular skills are required) with the amount of effort that is put into the completion of the task (attention-effort).[3] Absolute effort is measured in terms of the quantity of correct symbols drawn. Participants were rewarded in terms of relative effort: participants with a score above the median score received 10 euros (good situation), all others received 0 euros (bad situation). For this factor, participants were not informed about their earnings immediately but only when they were given their payment sheets before the voting stage.

Circumstances. For circumstances, we chose to use participants' place of birth. This is a typical variable used in empirical studies of equal opportunities, in particular those analysing education and health outcomes (see for instance Kawachi and Berkman, 2003). Participants are told that "place of birth is a factor that can determine success". Before the earned money stage began, participants had to fill in a short questionnaire in which

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[3]We have chosen this kind of test in order to disentangle as much as possible *effort* from *talent* or *skills* as well as from *social background* or *circumstances*. For example, in Cherry et al (2002), participants had to perform a quiz in the earned money phase, but this cannot count as pure effort due to the influence of of the level of education on performance. In Ruström and Williams (2000), participants had to perform the Hanoi Tower puzzle (shifting several disks of different sizes onto some pegs to form pyramids), but some talent to visualise how best to proceed to solve this puzzle may affect performance. These distinctions are important for redistributive justice: some philosophers and economists think that it is just to redistribute or compensate for factors that we are not responsible of, such as talent or social background, but not for those for which we are responsible, such as effort.

they had to indicate their place of birth. They did not know that their place of birth would matter for their earnings in the subsequent experiment, hence answers to this question were not strategic. To implement the circumstances factor, participants who were born in Marseille received 10 euros (good situation) and those not born in Marseille received 0 euros (bad situation).[4]

Brute luck. Brute luck relates to random events which are beyond individual's control. We implemented brute luck using a random draw. Before subjects took their seats in the room, we located on half of the seats in the room an envelope containing a slip of orange paper and on the remaining seats an envelope containing a slip of white paper. Participants were told not to open their envelop until further notice. At this point of the experiment, we showed two coloured ping-pong balls, one orange and one yellow to the participants and placed them into a non-transparent bag. A randomly chosen participant was invited to draw a ball and to show its colour. Participants were then asked to open their envelops. Participants who had a slip of paper with the same colour as the ball received 10 euros (good situation) and those who did not received 0 euros (bad situation).

Option luck. Option luck are risky events that individuals can choose, but need not to. Participants were offered the option to participate at a lottery for which they had to pay 4 euros. This meant that even those who did not succeed in earning any money up to that point had their show-up fee to participate at the lottery. The lottery consisted of drawing a number between 0 and 9. Participants were told that they would receive

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[4]Other variables would have been possible to account for circumstances, such as, for example, the level of education of the father, or, even more randomly, the first letter of the family name of the participants. We have not done so because, for the former example, we could not foresee how many people would be in good or bad circumstances, whilst we had the experience from previous experiments conducted in the Regional Council that around 30% of participants would be likely to be born in Marseille. We did decide against the latter example because we thought it too arbitary, that it could be confounded with brute luck.

10 euros if the number drawn was odd (even) and their seat number was equally odd (even) and 0 euros otherwise. This meant that those who won earned an additional *6* euros (good situation), whilst those who did not lost *4* euros (bad situation). This again makes a difference of 10 euros between winners and losers. Those who did not participate at the lottery had their earnings unchanged and watched the lottery in the meantime.

After the earned money stage followed the **voting and redistribution stage.** Participants were first invited to respond to a set of four hypothetical questions about redistribution. They were asked whether they thought it was *fair* to redistribute part of the gains from those who turned out to be in a good situation to those who ended up in a bad situation for each of the factors. Participants were then given their payment sheet that informed them privately about whether or not they succeeded in the effort task and reminded them about their earnings for each of the three other factors. Their total earnings were computed and stated on the payment sheet. In addition, half of the subjects, chosen randomly, received an extra sheet with information about other participants's earnings (referred to as *Information Provision* in the following). The information sheet only contained the empirical distribution of earnings using a histogram which indicated for each possible total gain the frequency of participants who earned that amount of money. The idea here was to see whether individuals who had the information about the distribution of outcome had the tendency to equalise outcome rather than opportunity and thus to disregard the *factors* according to which the outcome was achieved.

To find out about preferences for redistribution of participants, we used a simple majority rule voting mechanism for each of the factors. Voting is the standard device usually used by democracies to solve conflicts involving pure redistribution games (i.e. zero sum games). Attention was however paid to fulfill the requirements for strategy proofness.

Participants voted via their electronic voting devices either for (partial) redistribution or for no redistribution (abstention was allowed). Partial redistribution involved redistributing 2.5 euros (that is 25% of the total gains obtained for any of the factors) from all participants in the good situation to participants in the bad situation for any particular factor under consideration. This procedure is expected to be strategy-proof when there are only two alternatives. Votes were proposed factor by factor, with full anonymity, without telling *ex ante* that all factors will be considered. Results were not given before the end of the four votes, and abstention did not count in deciding whether the majority was for or against the proposal. Hence, this procedure was designed so that participants did not anticipate subsequent votes and thus could not manipulate their vote. Participants voted on partial or no redistribution successively with regard to circumstances, followed by effort, brute luck and option luck.[5] Note that for each factor but for circumstances, if participants voted for redistribution, the budget would be balanced (in expectation for option luck). At the very end of the experiment, we distributed the gains and subsidized redistribution when needed to respect our pledge.

2.3   Internal reflection treatment

This treatment only differs from the baseline treatment by the introduction of a hypothetical questionnaire in the spirit of Cappelen et al. (2008) at the very beginning of the procedure. In this treatment, we wanted to make explicit that participants were invited to deliberate within or to internally reflect about what they consider to be fair distributions before the start of the baseline experiment. The hypothetical questionnaire

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[5]Note that when a majority voted for partial redistribution for a factor, we conducted a second vote after the 4 first votes, in which participants could vote either for full redistribution (5 euros) or partial redistribution (2.5 euros). Because participants did not know that a second vote could occur depending on the outcomes of the first vote, truthful revelation of preferences is also preserved at each stage of the vote. This paper only considers the vote for partial redistribution or no redistribution.

introduced was about equality of opportunity (EOP) and contained vignettes telling the story of two sellers who earn a base salary and a sales indexed bonus. Sales depend on four factors (effort, circumstances, brute luck and option luck) which were described in practical terms as follows (see also technical appendix for the complete instructions). Effort is qualified as the salesman's *hard work* (how many customers he visits per day). The salesman's circumstances are called *social background* and is determined by his parents' network of acquaintances and the direct and indirect contacts this network offers him. If the network is good, it leads to a job with "TheBest", a company selling a very high quality product. If the network is not good or doesn't exist, the salesman gets a job with "TheMean", a company selling a lower quality product. The bonuses at "TheBest" are higher than those at "TheMean". The seller's brute luck was qualified as *luck* and depends on the sales territory (a geographical area) each salesman is randomly assigned to. A salesman with a "GoodSector" has a headstart over a salesman with a "BadSector". Finally, option luck is described as the *risks the salesman takes*. The salesman has to choose between selling an old product that has been on the market for a long time and is familiar to customers, or a more recent product with unknown customer reaction. At the time he chooses his or her product the salesman does not yet know whether the product is going to sell well. Hence he or she is thus taking a risk by choosing to sell the new product.

These vignettes were read aloud by the experimenter for all participants simultaneously. If participants had a question, he or she could raise the hand and one of the team members came over to answer individually. Participants were then asked whether they thought that the bonus the seller received on the basis of any of those factors was very "unfair", "quite unfair", "quite fair" or "very fair". Apart from the introduction of the questionnaire at the beginning, the treatment was the same as the baseline treatment.

3   Empirical results

The experiment was conducted in November 2008 in Marseilles (0.83 million inhabitants), the second largest city in France and the largest city of the Bouches-du-Rhône (BDR) district (1.9 million inhabitants). We held two sessions on two successive days: the internal reflection treatment on the first day and the baseline on the second day (sessions ordering was chosen randomly). Due to the recruitment process, the number of participants slightly differs in the two sessions (107 respondents in the baseline treatment and 95 respondents in the internal reflection treatment).

Participants were not representative of the general French population - the promise of remuneration seems to have attracted relatively young, unmarried women with a high level of education, although the median income is close to the median income in the BDR population –1,295 euros. Comparative statistics indicate that although the samples in the two treatments are very much alike in some aspects, they also differ for certain characteristics (see two-sample mean-comparison t-tests in the last column of Appendix 1). This implies that unconditional statistics will not be sufficient to study the effect of internal reflection on answers and votes. In the next section, we first provide unconditional results on participants' responses, and then go on to conduct an econometric analysis that controls for composition effects between experimental treatments.

3.1   Unconditional results

3.1.1   Answers to the equality of opportunity questionnaire

We first examine the answers to the equality of opportunity questionnaire specific to the internal reflection treatment (n=95). It was asked before the earned money stage

and the voting and distribution stage that were the same in both treatments. Table 1 presents some descriptive statistics. It shows that participants' fairness views vary with factors. A majority of respondents considered that it is fair to earn bonuses based on a seller's effort and option luck: 92.7% for effort and 90.5% for option luck. Results are the opposite for seller's circumstances and to a lesser extent for a seller's brute luck, for which participants' judgements are more mixed: 85.2% of participants judged it unfair to earn a bonus thanks to circumstances (i.e. the network of the seller's parents and acquaintances, and the direct and indirect contacts this network offers him or her) and a smaller majority, 64.3% thought that a seller's brute luck is an unfair way to earn bonuses. Looking at how participants combined their views about fairness among the different factors led to two most salient patterns. Forty-six respondents (48.4%) said that earning bonuses based on seller's circumstances and seller's brute luck is unfair while it is fair to earn bonuses based on effort and option luck. The second most salient pattern is that 24 participants thought that only circumstances are unfair (24.2%). Other combinations account each for less than 5% except 8 participants who said that none of the four factors lead to unfair bonuses (8.4%).

3.1.2 Voting behaviour by treatment and situation

We now turn to the core experiment where participants had personal stakes through their earned money. Table 2 presents descriptive statistics of voting behaviour by treatment and situation.[6] Results are four-fold. First, voting behaviour clearly differs between factors. For both treatments, a majority voted for redistribution for circumstances (highest support) and brute luck while a majority voted against redistribution for effort and option luck. Second, less people voted for redistribution in the internal reflection

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[6]As mentioned in section 2, participants also gave answers to hypothetical questions before voting. Here however, we focus only on people's votes.

treatment than in the baseline for circumstances, effort and option luck. This is however only statistically significant for circumstances ($p = .052$) but not for effort ($p = .176$) and option luck ($p = .294$).

Third, there is a clear *self-interest* bias in our data. Participants were less likely to support redistribution when they were in the good situation than when they were in the bad situation. Differences are statistically significant for all factors and both treatments (two-sample mean-comparison t-tests $p = .060$, $p = 0.028$, $p < .001$ and $p = 0.008$ for circumstances, effort, brute luck and option luck respectively in the baseline and $p < .001$, $p = .022$, $p < .001$ and $p = .055$ in the internal reflection treatment). The self-interest bias appears to be higher in the internal reflection treatment for circumstances: a smaller proportion of participants voted in favour of redistribution in the good situation ($p = 0.022$) and almost the same proportion of participants voted in favour of the redistribution in the bad situation in the internal reflection as well as in the baseline treatment. Hence if there is a smaller proportion of people who support compensation in the good situation, but the same in the bad situation, this necessarily means that they vote more in line with their self-interest. This result also seems to hold for effort although the difference in voting behaviour is not significant in the good situation ($p = .191$) and we also observe a decrease of votes in favour of redistribution in the bad situation, but not significantly so ($p = .267$). For brute luck, a higher proportion of participants in the good situation voted in favour of the redistribution in the internal reflection treatment, but the difference is not significant ($p = .222$). Voting behavior is almost identical for option luck in the two treatments.

Fourth, the voting behaviour in both treatments leads to 7 salient combinations of votes (among 16 possible combinations), accounting for 84% of votes in the baseline and

81.8% in the internal reflection treatment. These combinations of votes are presented in Figure 1: bullets and numbers in *black* account for baseline results while crosses and numbers in *red* for the internal reflection treatment. The most salient behaviour is that of participants who voted for redistribution for circumstances but voted against redistribution for the other three factors in the baseline (18.7%). In the internal reflection treatment, the most salient behaviour is that of participants voting against redistribution for all factors (18.9%). This proportion is significantly higher in the internal reflection treatment than in the baseline (11.2%, $p = .0615$). Two combinations are adopted by a lower proportion of participants in the internal reflection treatment in comparison with the baseline: redistribution for all factors but effort ($p = .111$) and redistribution for circumstances and effort ($p = .037$).

3.1.3 Consistency between answers to EOP questionnaire and voting behaviour

For the internal reflection treatment, it is interesting to compare combinations of votes with the combination of fairness views obtained in the equality of opportunity questionnaire. If we accept that those factors which are considered unfair should be eligible for redistribution, observed voting behaviour diverges largely from the fairness views expressed in the hypothetical questionnaire. In particular, the most salient fairness judgement deduced from the questionnaire, namely that circumstances and brute luck are unfair for 48.4% of the participants, is not supported by our voting data since only 16.8% of participants supported redistribution for *both* circumstances and brute luck with their votes.

Looking not at combinations but at each factor individually, there is a greater consistency between the fairness views expressed in the questionnaire and the voting be-

haviour, except in two cases (see Table 3). Among the participants who expressed the view that earning bonuses based on social background (resp. luck) is unfair, 67.9% (resp 67.2%) also voted for redistribution. Among the participants who expressed the view that earning money by working hard (resp. taking risks) is fair, 67% (resp 74.4%) voted against redistribution. However, only 46.2% of those who expressed the view that earning bonuses based on social background is fair voted against redistribution and only 44.4% of those who thought that earning money through risk-taking is unfair voted for redistribution.

3.2 Conditional results

We have seen in the previous section that participants differ significantly in some of their characteristics between the two treatments. Unconditional statistics do not account for such differences and this calls for an econometric analysis which controls for heterogeneity. We proceed in two steps. We first explore the relation between fairness views expressed in the EOP questionnaire and voting behaviour in the internal reflection treatment. Second, we study the effect of internal reflection on voting behavior by using a multivariate probit that accounts for potential correlation across votes – the baseline treatment being the referent.

3.2.1 Answers to EOP questionnaire and voting behaviour

This section explores further the relationship between fairness views expressed in the EOP questionnaire and the probability of voting in favour of redistribution, for each of the four factors studied independently. We do so for the internal reflection treatment only (n=95). Each of the four models has two equations: one for the view expressed

in the EOP questionnaire (the dependent variable is equal to one if the participant considers the factor as "very unfair" or "unfair", and zero otherwise), and the other for the voting behaviour (the dependent variable is equal to one if the participant vote in favour of redistribution, and zero otherwise).

The first equation includes only controls as explanatory variables (age, gender, level of education, wage, marital status, religion status, see descriptive statistics in Appendix 1). In the second equation, three additional variables are introduced: the fairness view expressed in the EOP questionnaire, a dummy equal to one if the participant is in the good situation for the factor considered, and a dummy equal to one if the participant received the extra sheet with information about the distribution of earnings over all the participants (*Information Provision*). To account for potential endogeneity, we estimate a recursive simultaneous equation model with (Full Information) Maximum Likelihood, that provides consistent and efficient estimations (see Greene, 2003). The disturbance terms in each equation are correlated to one another through the disturbance correlation parameter rho (ϱ).

Table 4 presents the econometric estimations for the four factors. A brief overview of the results related to socio-economic variables shows the following results. No significant variables are found to explain fairness views expressed in the EOP questionnaire for circumstances and option luck. This indicates that the preferences of the participants regarding these factors cannot be captured by standard socio-economic variables. It is however not the case for effort and brute luck. For the former, *Age, Wage,* and *Gender* are significant, whereas in the latter, *Not Being Single* and the two dummies standing for Religion (*Christian* and *Muslim*) contribute to explain fairness views. In the four votes for redistribution equations, the control variables that explain redistribution are *Wage* (for Brute Luck and Option Luck) and *Religion* (for all factors except Circumstances).

Let us now turn to the findings common to the four factors. First, the non explained components of fairness views expressed in the EOP questionnaire and voting behaviour *are* not significantly correlated. *P*-values are far from rejecting the null of no correlation (all *p*-values are larger than 0.67). This indicates that the non deterministic part in the EOP equation is not significantly correlated with the non deterministic part in the vote equation. Second, we found consistently for each factor that the fairness view expressed in the EOP questionnaire on a given factor does not explain the vote for redistribution for this factor. The four *p*-values are larger than 0.44 and we cannot reject the null. Third, we found that the most significant variable for explaining redistribution was always whether or not the participant was in the good situation. Indeed, being in the good situation decreases significantly the probability of voting for redistribution for each factor, which indicates that participants were driven by self-interest for each factor. This confirms the unconditionnal findings.

Finally, the *Information Provision* is significant for explaining votes, with a negative coefficient for Circumstances and a positive coefficient for Effort and Brute Luck. Hence knowing the distribution of earnings during the earned money stage influences the votes for redistribution. This means that for Effort, participants with Information Provision were favouring redistribution which is compatible with achieving equality of outcome but not with equality of opportunity, i.e. the opportunity to exert the same effort. In case of brute luck, the two ethical norms do not contradict and information on other participants' earnings provides an additional push toward redistribution.There is however no obvious explanation of why there is a negative effect with respect to Circumstances.

Up to now, the conditional results did not account for two elements: the isolation of the effect of Internal Reflection, and the fact that the vote for each factor were

correlated because linked through participants' heterogeneity (i.e. we face a sequence of 4 successive votes for each participant, and not votes by independent individuals). We deal with these issues in the next section when considering the two treatments simultaneously.

3.2.2 Determinants of voting behaviour

Effects of Internal Reflection: treatment variables only

We study in this section the determinants of voting behavior by estimating a quadri-variate Probit using the whole sample (n=202): one equation for each factor –a "Yes" answer to the vote meaning Redistribution. Correlation between the four disturbance terms of the equations are accounted for through the 6 off-diagonal terms of the variance-covariance matrix of the model. Rejecting the nullity hypothesis of a given correlation term means that the non explained components of the two factors involved influence the Redistribution in the same way.

We account for the effect of internal reflection by introducing three dummy variables. A first dummy variable "Internal reflection" equals one if the participant was in the Internal reflection treatment and zero otherwise. This variable accounts for the overall effect of internal reflection, without distinguishing if the participant was in the good or bad situation. In order to account for the latter, we introduced a second dummy variable, "Good sit. × Internal Reflection", that controls for the interaction effect of internal reflection with the situation in which the participant was when voting. This variable equals one if the participant was in the internal reflection treatment and in the good situation (we still control for the overall effect of being in the good situation by the dummy variable "Good situation"). A third dummy variable, "Unfair in EOP × Internal

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Reflection ", controls for the interaction effect of internal reflection with the fairness view expressed by the participant in the EOP questionnaire. This variable equals one if the participant was in the internal reflection treatment and considered the factor under consideration as "very unfair" or "unfair").

Testing the coefficients of these three variables for each factor allows us to assess the effect of Internal Reflection on voting behaviour. We start by estimating a quadrivariate model with these three variables and a constant only. Table 5 presents the econometric estimations for the four factors. We found the 6 disturbance correlation parameters to be significant (all t-test p-values of nullity $<.05$) except the one between the factors Circumstances and Effort. Because all disturbance terms are positive when significant, they play in the same direction when explaining the vote for Redistribution. This means for instance that if a participant voted "yes" for redistribution for Circumstances, he or she is more likely to vote "yes" for another factor too.

The overall effect of Internal Reflection is never significant in explaining the voting behaviour for the four factors. Hence, answering the EOP questionnaire before voting seems to have no influence on the outcome of the vote. On the contrary, the interaction effects "Good sit. $\times$ Internal Reflection" are all significant, with a negative coefficient. This means that participants in both, good situation and Internal Reflection treatment are less likely to vote for redistribution than participants who ended up in a bad situation or those who are in the Baseline treatement, which suggests that self-interest is an important determinant of voting behaviour. Finally, the interaction term "EOP answers x Internal Reflection" is only significant in the Brute Luck equation, with a positive sign. The last step is to check the robustness of theses results once control variables are added in the model.

Effects of Internal Reflection with controls

To control for sample composition effects between the two treatments, the set of explanatory variables is now expanded by including the control variables used for the bivariate models, as well as Information Provision and Interaction terms involving good situation. Indeed, this is made possible by the increase in the sample size which allows for more possible complex effects of situations: "good situation x wage", "good situation x age" and "good situation x education". Note that because Internal Reflection is the main concern of this paper, we chose to keep it in every equation even if was not significant. At the end, we looked for a parsimonious model by removing all other variables when their p-values were too high.[7]

Table 6 presents the econometric estimations for the four factors. Results are four-fold. First, a brief analysis of the control variables indicates that only *Wage* (for all votes except Brute Luck), *Age* for Circumstances, and *Religion* for Option Luck are significant. Interestingly, no significant control variable is found to be significant for Brute Luck. Second, the 6 disturbance correlation parameters are significant (all t-test p-values of nullity $<.05$) except the correlation term between Circumstances and Effort. This means that except for these two factors, all disturbance terms play in the same direction when explaining the vote for Redistribution. Again, this says that a participant who voted "yes" for one factor is more likely to vote yes for another factor (with the exception of Circumstances and Effort).

Third, Internal Reflection has no effect on voting behaviour in the four equations. This is true for the overall effect as well as for the interaction effects with good situation and EOP answers. The only exception is the interaction term "EOP answers x Internal

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[7]To control for possible endogeneity between fairness views expressed in EOP and votes, the residuals of the vote equation in the bivariate Probit (see section 3.2.1) have been introduced among the control variables of the corresponding factor as "Residual of bivariate x Internal Reflection". The estimated coefficients have never been significant and are not shown herein. Estimations are available upon request to the authors.

Reflection " for Brute Luck, with a positive effect. This confirms the results of the quadrivariate with Internal Reflection dummies and is the only evidence that the Internal Reflection treatment has an impact in increasing the probability for redistribution.

Fourth, the good situation main effects are always significant among the four factors, and negative: this confirms previous conditional and unconditional results. Self-interest is an important determinant of voting behaviour: participants in the good situation are *ceteris paribus* less likely to vote for redistribution than participants who ended up in a bad situation. Note however that in the Circumstances equation, the interaction terms "Good circumstances x wage" and "Good Circumstances x bachelor degree" are positive and mitigate this negative effect. Finally, the *Information Provision* is significant for explaining votes, with a negative coefficient for Circumstances and a positive coefficient for Effort.

A way to evaluate how the quadrivariate model performs is to compute predictions of votes for redistribution. We consider the seven salient combinations of vote presented in Figure 1, and provide both observed and predicted frequencies in Table 7. The computation of the predictions in a quadrivariate Probit is not trivial, and we used the procedure proposed by Cappellari and Jenkins (2003). Because this procedure provides by default only predictions for "Yes" answers to all votes and "No" answers to all votes (i.e., redistribution for all factors or no redistribution for all in our case), we had to recode the model in order to get the predicted probabilities for each of the 14 other combinations (details upon request). Table 7 indicates that the quadrivarite model performs relatively well in predicting observed probabilities for the seven major combinations of vote.

4   Concluding remarks

Using the science-fair computer voting room of the regional council, we recreated a form of micro society in which people (about 100 participants per treatment) engaged in internal reflections and actual decisions about redistribution of their own money they earned in a previous phase. Four factors have been considered, social circonstances, brute and option luck and effort, factors extensively discussed in the equality of opportunity literature. As is well known, majority voting between two alternatives, here partial redistribution or status quo, that is no redistribution, induces people to reveal their true preferences since it is strategy-proof. Thus, the voting procedure allows us to elicit true preferences between dichotomous choices for relatively large sample of subjects in experimental economics. In both treatments of our experiment, in themselves a public deliberation exercise, participants make binding decisions by voting for or against redistribution which all need to accept whether or not they agree with the majority decision.

In our Internal Reflection treatment, participants are first "deliberating within" on a fair distribution of money between two sellers depending on the factors through which they earned their money before they are earning any money themselves and do the voting exercise. Hence, the decision that individuals face throughout the whole internal reflection treatment is to find a fair distribution of earned money within society that guarantees the equality of opportunity for each citizen/participant. Given this particular set-up, one would therefore expect people to become less self-interested in the Internal Reflection treatment, following the view of public deliberation theorists that deliberation changes people's preferences for the better of the common good.

However, one of the interesting features of this experiment is to see that a self-interest

bias is consistently observed in the unconditional as well as conditional results in both treatments. This means that participants in the good situation generally vote less in favour of redistribution than those in the bad situation. Interestingly, this result is mitigitated by education and income. Surprisingly, this pattern is not clearly affected by the prior deliberation that goes with the exposition to the seller story. The only exception is with respect to brute luck for which voting for redistribution is enhanced after having found this factor unfair in the questionnaire phase. This result does not tie in with Cappelen et al (2008) who find that introducing a hypothetical questionnaire prior to a Dictator Game with an initial production phase – which they call "moral reflection" – increases the weight people attach to their fairness view and thus make them less self-interested. Yet despite the more self-interested behaviour when participants have a stake in the redistribution, we clearly observe that participants are sensitive to the different factors through which people can earn their money. Indeed, some of the voting behaviour reflect the intuitions of social justice philosophers who claim that the legitimacy of redistribution will depend on whether or not people can be held responsible for the way they earn their money. This therefore suggests that people are not guided by self-interest only, but also have well-established preferences for redistribution.

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6   Figures and Tables

	Fairness judgment			
	Very unfair	Unfair	Fair	Very fair
Effort	2 (2.1%)	5 (5.3%)	43 (45.3%)	45 (47.4%)
Circumstances	48 (50.5%)	33 (34.7%)	11 (11.6%)	2 (2.1%)
Brute luck	20 (21.1%)	41 (43.2%)	25 (26.3%)	9 (9.5%)
Option luck	2 (2.1%)	7 (7.4%)	38 (40.0%)	48 (50.5%)

Table 1: Equality of opportunity questionnaire (n=95)

	Circumstances	Effort	Brute luck	Option luck
Whole Sample				
Baseline	81 (75.7%)	44 (41.1%)	61 (57.0%)	33 (30.8%)
Moral Reflection	62 (65.3%)	33 (34.7%)	55 (57.9%)	26 (27.3%)
Good situation				
Baseline	24 (66.7%)	19 (32.8%)	18 (34.6%)	7 (17.1%)
Moral Reflection	16 (43.2%)	12 (25.0%)	21 (42.0%)	7 (18.4%)
Bad situation				
Baseline	57 (80.3%)	25 (51.0%)	43 (78.2%)	21 (50.0%)
Moral Reflection	46 (79.3%)	21 (44.7%)	34 (75.4%)	17 (50.0%)
Non bettors				
Baseline	-	-	-	5 (20.7%)
Moral Reflection	-	-	-	2 (8.7%)

Table 2: Votes in favour of Redistribution by treatment and situation (n=202)

Figure 1: Combinations of votes ($n = 202$)
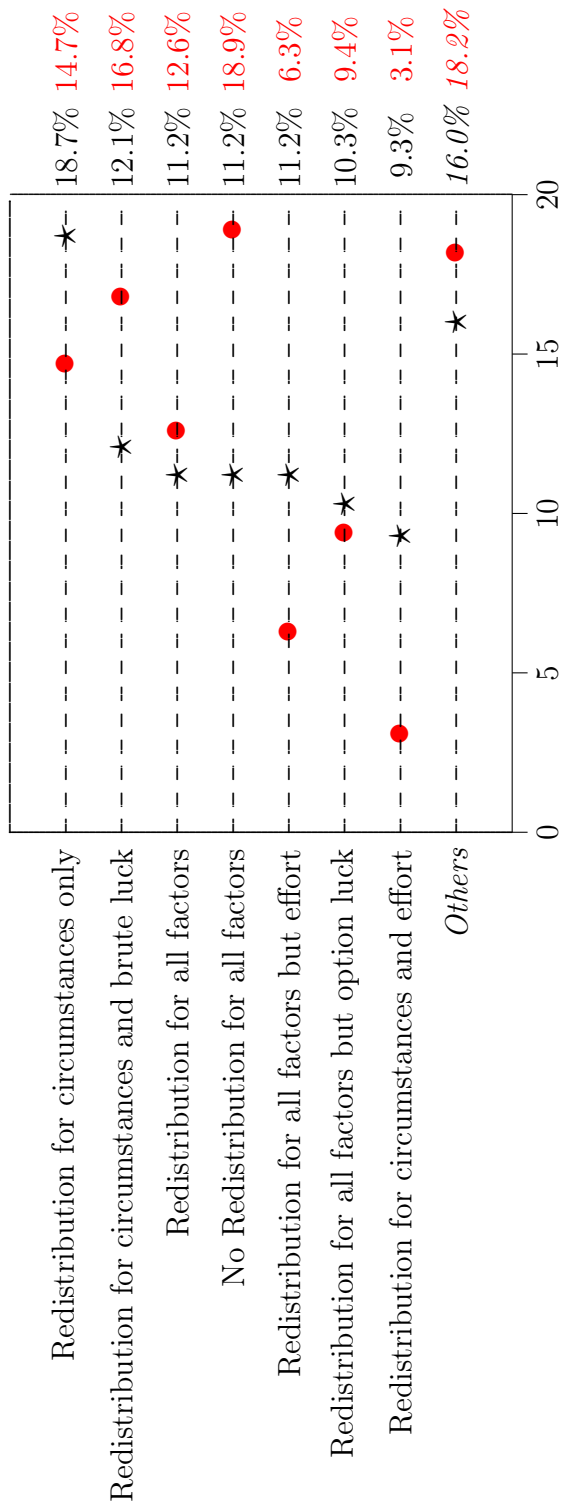
Note. Stars (⋆) and numbers in black refer to the baseline session while bullets (•) and numbers in red refer to the public deliberation session.

	Circumstances		Effort		Brute luck		Option Luck	
	Fairness view	Votes	Fairness view	Votes	Fairness view	Votes	Fairness view	Votes
Fair	13	Yes: 6 / No: 7	88	Yes: 29 / No: 59	34	Yes: 20 / No: 14	86	Yes: 22 / No: 64
Unfair	81	Yes: 55 / No: 26	7	Yes: 4 / No: 3	61	Yes: 41 / No: 20	9	Yes: 5 / No: 4
Consistency	62 (65.3%)		63 (66.3%)		55 (57.9%)		69 (72.6 %)	

Table 3: Fairness views expressed in the questionnaire and votes for redistribution ($n = 95$)

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Circumstances	Coef.	p-value
Unfair in EOP		
Constant term	0.411	0.722
Age/100	2.754	0.574
(Age/100)³	-7.196	0.406
Female	0.314	0.409
Vote for redistribution		
Constant term	0.298	0.919
Good circumstances	-1.152	0.001
Unfair in EOP	0.946	0.735
Age/100	-0.506	0.771
(Wage/1000)²	0.672	0.213
(Wage/1000)³	-0.346	0.123
Christian	0.706	0.060
Muslim	0.418	0.375
Information provision	-0.649	0.065
Correlation	-0.180	0.910

Effort	Coef.	p-value
Unfair in EOP		
Constant term	-2.161	0.027
(Age/100)²	29.11	0.079
(Age/100)³	-40.537	0.091
Wage/1000	-0.782	0.073
Female	-0.954	0.069
Christian	0.880	0.143
Muslim	0.314	0.664
Vote for redistribution		
Constant term	-1.036	0.005
Good relative effort	-0.823	0.012
Unfair in EOP	0.824	0.461
(Age/100)³	2.767	0.134
Christian	0.558	0.125
Muslim	0.738	0.089
Information provision	0.749	0.019
Correlation	-0.097	0.866

Brute luck	Coef.	p-value
Unfair in EOP		
Constant term	0.886	0.006
Wage/1000	-0.298	0.135
Not single	1.185	0.005
Christian	-0.633	0.062
Muslim	-0.876	0.033
Vote for redistribution		
Constant term	-1.287	0.376
Good BL	-1.002	0.002
Unfair in EOP	0.492	0.621
Age/100	8.128	0.261
(Age/100)²	-9.032	0.302
(Wage/1000)²	-0.126	0.092
Christian	0.787	0.065
Muslim	0.550	0.296
Correlation	0.259	0.676

Option luck	Coef.	p-value
Unfair in EOP		
Constant term	-0.270	0.726
Age/100	-2.011	0.246
UnivEdu	-0.642	0.161
Vote for redistribution		
Constant term	-1.353	0.249
OL winner	-0.840	0.027
Nonbettor	-1.957	0.003
Unfair in EOP	-0.352	0.894
Age/100	1.743	0.277
Wage/1000	-0.514	0.065
Female	0.761	0.146
UnivEdu	-0.442	0.285
Christian	0.658	0.131
Muslim	0.453	0.372
Information provision	1.256	0.013
Correlation	0.377	0.793

Table 4: Bivariate probit estimations

Circumstances

	Coefficient	p-value
Constant term	0.682	0.000
Internal reflection	-0.266	0.508
Good cir.×Internal ref.	-0.994	0.001
Unfair in EOP×Internal ref.	0.498	0.214

Brute luck

	Coefficient	p-value
Constant term	0.171	0.161
Internal reflection	-0.189	0.446
Good BL×internal ref.	-0.283	0.258
Unfair in EOP×internal ref.	0.584	0.018

Effort

	Coefficient	p-value
Constant term	-0.215	0.079
Internal reflection	0.072	0.743
Good eff.×internal ref.	-0.632	0.018
Unfair in EOP×internal ref.	0.760	0.122

Option luck

	Coefficient	p-value
Constant term	-0.505	0.000
Internal reflection	-0.135	0.482
OL winner×internal ref.	0.020	0.948
Unfair in EOP×internal ref.	0.496	0.245

Correlation between each factor

	Coefficient	p-value		Coefficient	p-value
Circumstances and effort	0.105	0.404	Circumstances and BL	0.292	0.021
Circumstances and OL	0.247	0.073	Effort and BL	0.518	0.000
Effort and OL	0.337	0.006	BL and OL	0.797	0.000

Table 5: Quadrivariate probit with treatment dummies only

Circumstances

	Coefficient	p-value
Constant term	-0.064	0.950
Good circumstances	-1.047	0.014
Internal reflection	-0.385	0.422
Good cir.×internal ref.	-0.668	0.133
Unfair in EOP×internal ref.	0.560	0.210
Age/100	9.439	0.092
(Age/100)^2	-11.863	0.075
Wage/1000	-0.518	0.010
Information provision	-0.371	0.087
Good cir.×(wage/1000)	0.601	0.018
Good cir.×UnivEdu	0.752	0.056

Effort

	Coefficient	p-value
Constant term	-0.853	0.013
Good relative effort	-0.526	0.038
Internal reflection	0.004	0.989
Good eff.×internal ref.	-0.350	0.370
Unfair in EOP×internal ref.	0.729	0.169
Wage/1000	0.735	0.057
(Wage/1000)^2	-0.259	0.053
Christian	0.403	0.078
Muslim	0.638	0.021
Information provision	0.391	0.043

Brute luck

	Coefficient	p-value
Constant term	0.468	0.043
Good brute luck	-0.901	0.000
Internal reflection	-0.250	0.397
Good BL×internal ref.	-0.216	0.439
Unfair in EOP×internal ref.	0.712	0.013
(Wage/1000)^3	-0.011	0.415
Not single	0.107	0.607
Christian	0.146	0.494
Muslim	0.428	0.110

Option luck

	Coefficient	p-value
Constant term	0.667	0.041
OL winner vs OL loser	-0.933	0.000
Nonbetter vs OL loser	-0.985	0.000
Internal reflection	-0.204	0.352
OL winner×internal ref.	0.177	0.616
Unfair in EOP×internal ref.	0.578	0.330
Wage/1000	-1.910	0.043
(Wage/1000)^2	1.607	0.064
(Wage/1000)^3	-0.417	0.064

Correlation between each factor

	Coefficient	p-value
Circumstances and effort	0.086	0.553
Circumstances and OL	0.361	0.045
Effort and OL	0.281	0.049
Circumstances and BL	0.345	0.032
Effort and BL	0.503	0.000
BL and OL	0.716	0.000

Table 6: Quadrivariate probit with treatment dummies and control variables

	Whole sample	Without missing value in model	Joint probabilities predicted by model
	$n = 202$	$n = 188$	$n = 188$
Redistribution for circumstances only	16.83%	15.96%	16.91%
No redistribution for all factors	14.85%	14.89%	13.50%
Redistribution for circumstance and BL	14.36%	14.89%	10.07%
Redistribution for all factors	11.88%	12.23%	11.49%
Redistribution for all factors but OL	9.90%	9.04%	9.90%
Redistribution for all factors but effort	8.91%	9.04%	11.57%
Redistribution for circumstances and effort	6.44%	6.38%	5.31%
Others	16.83%	17.55%	21.43%

Table 7: Voting behavior predictions based on quadrivariate probit estimations

Variable	Description	Total sample	Baseline	Internal Reflection	Equality test
		Mean (sd)	Mean (sd)	Mean (sd)	Equality test
Age	Age of the participants	35.15	35.28	35.01	.888
	(years)	(14.09)	(12.80)	(15.49)	
Wage	Monthly individual income	1112.40	1242.26	962.11	.019
	(euros)	(827.55)	(827.95)	(805.78)	
Female	Participant is female (=1)	.721	.764	.673	.155
Not single	Participant is not single (=1)	.376	.495	242	<.001
UnivEdu	University level Education (=1)	.596	.279	.344	.325
Student	Participant is a students (=1)	.309	.279	.344	.325
Christian	Participant is a Christian (=1)	.465	.477	.453	.734
Muslim	Participant is a Muslim (=1)	.208	.215	.200	.795
InfProvision	Receiving information of	.525	.495	.551	.423
	other participants' earning (=1)				
Good cir.	Participant born in Marseille (=1)	.361	.336	.389	.486
Good eff.	Score in Zazzo above median (=1)	.525	.542	.505	.603
Good BL	Participant winning in the draw	.505	.486	.526	.569
	of ping-pong ball (=1)				
OL winner	Participant winning in the bet	.391	.383	.400	.808
	on the number of seat (=1)				
Non bettor	Participant doesn't play the bet	.232	.224	.242	.766
	on the number of seat (=1)				
Unfair cir.	Cir need to be compensated in EOP (=1)	.871	.879	.862	.725
Unfair eff.	Eff. need to be compensated in EOP (=1)	.054	.037	.074	.259
Unfair BL	BL need to be compensated in EOP (=1)	.657	.670	.642	.681
Unfair OL	OL need to be compensated in EOP (=1)	.064	.037	.094	.098

Table 8: Descriptive statistics and two-sample mean-comparison t-tests between treatments