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**Working Paper**

# An Experimental Test of the Validity of Survey-Measured Political Ideology

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# An Experimental Test of the Validity of Survey-Measured Political Ideology

## Abstract

We examine the predictive validity of survey-measured left-right political ideology by testing whether this measure is able to explain observed choices regarding equality versus efficiency. We study this in a real-effort distribution experiment, in which decision-makers allocate money equally or efficiently. We distinguish between decision-makers that receive 'manna-from-heaven' and decision-makers that have earned the money to be distributed in a real effort task. We find that, conditional on entitlement concerns, self-reported right-wing ideology significantly predicts preferences for efficiency. Reported left-wing ideology does not have predictive value in explaining preferences for equality.

JEL-Codes: C910, D310.

Keywords: political ideology, survey measurement, predictive validity, distribution experiment, real effort.

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# 1. Introduction

Many empirical studies in economics rely on a survey-based measure of left-right political ideology. This measure is often used to capture preferences regarding the trade-off between equality and efficiency, which are at the core of the left-right ideological divide (Jost, 2009). However, there are many factors that can influence responses in surveys such as self-serving biases, strategic motives, inattention and social desirability. More importantly, surveys are not incentivized and therefore not necessarily behaviourally consistent (Camerer & Hogharth (1999); Dohmen, et al. (2011)). Consequently, we cannot know with certainty whether the survey-question measures what it is supposed to measure. This leaves researchers in the dark about the observed measurement. Have they measured political ideology or something else?[1]

In this paper, we examine the validity of the (standard) survey-measure of political ideology. We conduct an incentivized real-effort distribution experiment, which is designed to capture preferences regarding equality versus efficiency. Within this context, we investigate whether self-reported ideology has predictive value in explaining these preferences. Secondly, we examine potential differences in behaviour due to entitlement concerns.

Although few real-effort experimental studies go into detail about what could explain differences in outcomes due to entitlement concerns (exceptions are Barr, et al. (2015), and Cappelen, et al. (2013))[2], a number of studies show that beliefs about (the role of) effort and luck on an individual and societal level affect views regarding (in)equality, efficient outcomes and redistribution (e.g. Alesina & Angeletos (2005); Alesina & Giuliano (2011); Benabou & Tirole (2006); Fong (2001); Lefgren, et al. (2016); Piketty (1995); Varian (1980)). At the same time, it is either explicitly stated or implicitly assumed that left- and right-wing individuals think differently about the role of luck or effort in determining success or income (e.g. Alesina & Angeletos (2005); Benabou & Tirole (2006); Jost, et al. (2009); Piketty (1995)). As such, we expect to observe differences in behaviour between left-wing and right-wing individuals when earnings are determined by luck compared to when entitlement concerns play a role.

Our experiment relates to the work of Engelmann & Strobel (2004), who study the relative importance of difference aversion, maximin preferences and preferences for efficiency. We build upon this study by adding a real-effort stage to the experiment. That is, we conduct a two-stage real effort distribution experiment.[3] In the first stage there is a between subject treatment, in which income is either

[1] In a different paper, we address an additional shortcoming of left-right political ideology by focussing on the dimensionality of political beliefs. We challenge the one-dimensionality that is implied by using left-right ideology and show that political beliefs are best captured by four distinct dimensions. Moreover, we find that a multi-dimensional measure captures more variance in political preferences than a left-right measure (Laméris, et al. (2018)).

[2] Barr, et al. (2015) find that economic status matters, whereas Cappelen, et al. (2013) analyse needs considerations.

[3] In both distribution experiments and dictator games there is only one person that determines outcomes. However, whereas the choice set of a dictator is in most cases quite large (i.e. he can choose to give away any amount of his endowment), the choice set in distribution experiments is limited to a few options that are set in advance. This is to create a trade-off in choice options, and as such, force participants to reveal

earned during a task or given as 'manna-from-heaven'. In the second stage, earned or given income is distributed by the decision-maker over him/her and two anonymous receivers. The decision-maker has to choose between two distributions: an equal distribution or an unequal, but efficient distribution. Depending on his/her performance in the first stage, the earnings that can be distributed in the second stage are either high or low. We consider two scenarios in this second stage: one in which the distributive choice of the decision-maker is, by design, unaffected by selfishness considerations, and one in which these considerations do play a role. By incorporating these scenarios, we are able to test the robustness of our results to monetary incentives.

Our paper contributes to the experimental literature on redistributive preferences (e.g. Engelmann & Strobel (2004); Esarey, et al. (2012)) and real effort experiments (e.g. Barr, et al. (2015); Cappelen, et al. (2013); Cherry, et al. (2002); Durante, et al. (2015); Engel (2011); Erkal, et al. (2011); Gee, et al. (2017); Krawczyk (2010)). Furthermore, it contributes to the literature validating survey-based measures (e.g. Armantier, et al. (2015); Dohmen, et al. (2011); Falk, et al. (2016); Fehr, et al. (2003); Glaeser, et al. (2000); Vischer, et al. (2013)). Lastly, we contribute to the abundant empirical literature using survey-based measures of political ideology.

In the next section we will give a systematic overview of the empirical literature using survey based measures of political ideology. This is followed by a description of the set-up of our experiment in section 3. In section 4 we discuss our subject pool and the experimental procedures. In section 5, we present our results. These results are discussed and conclusions are drawn in section 6.

## 2. Systematic literature review

To illustrate the relevance of our experiment, we have done a systematic literature review on studies using a survey-based measure of political ideology. The systematic search was performed using the Web of Science (WoS) database using the following 3 selection criteria: 1. The study uses self-reported survey measured left-right ideology, 2. The study performs a quantitative analysis, 3. The study uses left-right ideology as an explanatory variable.[4]

We used the following search terms and Boolean operators: 1. Political ideology AND survey (19). 2. Ideology AND survey (86). 3. Left AND right AND survey (125). 4.left AND right AND ideology (73). 5. Left* AND right* AND ideology (82). 6. left-wing AND right-wing (64). The number in parentheses indicates how many records were found with that search term, not taking into account any duplicates.

We found a total of 315 papers using the above search terms. After a first screening of the title, abstract and data section, 25 of the 315 papers were selected on the basis of mentioning survey measures

preferences. In our experiment this trade-off is between equality and efficiency. For an overview of the literature on dictator games, see Engel (2011). For more on distribution experiments, see Engelmann & Strobel (2004).

[4] The WoS database limited the search to articles published from 2000 onwards. The WoS search category was limited to papers from the field 'Economics'.

of left-right ideology. Second, we identified the studies using the left-right measure as an explanatory variable in their analyses. This led to 18 remaining studies, which are reported in table 2.1.

Table 2.1. Overview of papers identified in a systematic literature search

| **Author(s) (year)** | **Title** | **LR scale** | **Linear or Dummies?** | **Aim of paper** |
|---|---|---|---|---|
| Ansolabehere & Socorro Puy (2016) | Identity Voting | 10 points | Linearly | Authors aim to explain vote choice when multiple identities are present in the electorate, which leads to voting in line with identity, as well as other (e.g. left-right ideological) preferences. |
| Baslevent & Maran (2015) | Different patterns for different conditions: The influence of personal characteristics on attitudes towards medicine use | 10 points | Linearly | Authors study the determinants of individual attitudes towards use of medicines for common bodily problems. One of these determinants is found to be self-reported left-right ideology. |
| Bjornskov, et al. (2013) | Inequality and happiness: When perceived social mobility and economic reality do not match | 10 points | Dummies | Authors investigate how fairness perceptions, measured with left-right ideology, affect the relation between inequality and demand for redistribution/individual happiness. |
| Bodenstein & Faust (2017) | Who cares? European public opinion on foreign aid and political conditionality | 10 points | Linearly | Authors research the public opinion on (politically conditional) foreign aid in EU member states. They find that left-right ideology is a significant determinant. |
| Boeri, et al. (2001) | Would you like to shrink the welfare state? A survey of European citizens | 10 points | Dummies | Authors study the opinions on the welfare state and preferences for welfare state reforms, taking into account, among other things, political preferences measured with left-right self-reports. |
| de Benedictus & di Maio (2014) | Schools of thought and economists' opinions on economic policy | 5 points | Dummies | Authors examine how economists' opinions on economic policies is affected by both group- and individual characteristics, such as school of thought and left-right political ideology. |
| Di Tella & MacCullogh (2005) | Partisan social happiness | 10 points | Dummies | Authors test the underlying assumption of partisan models by examining how happiness of left-wingers versus right-wingers is affected by changes in the macro economy and in politics. |
| Di Tella, et al. (2008) | Crime and beliefs: Evidence from Latin America | 10 points | Linearly | Authors examine the effect of crime levels on economic preferences about e.g. the income distribution and privatization, by also taking into account the effect of political left-right ideology on these preferences. |
| Dreher & Ohler (2011) | Does government ideology affect personal happiness? A test | 10 points | Dummies | Authors investigate the (interaction) effect of government and individual (self-reported) left-right ideology on subjective well-being. |
| Durante & Knight (2012) | Partisan control, media bias and viewer responses: evidence from Berlusconi's Italy | 5 points | Linearly | Authors test if news content is affected by partisan control of the media and if and how viewers react to such a change by switching to channels more in line with their ideology. |

| | | | | |
|---|---|---|---|---|
| Edwards (2009) | Public support for the international economic organizations: Evidence from developing countries | 10 points | Linearly | Author studies how evaluations of the economy, education, gender and political left-right ideology affect public opinion regarding international economic organizations. |
| Garcia-Vinuela, et al. (2018) | The effect of valence and ideology in campaign conversion: panel evidence from three Spanish general elections | 10 points | Linearly | Authors research the determinants, one of which being left-right ideology, of vote conversion during the campaigning period. |
| Knoll, et al. (2013) | A note on the impact of economic regulation on life satisfaction | 10 points | Linearly | Authors examine the interaction between policy attitudes, such as left-right ideology, and preferences regarding deregulation on life-satisfaction. |
| Neumayer (2004) | The environment, left-wing political orientation and ecological economics | 10 points | Linearly | Authors test if the support for environmentalism is affected by self-reported left-right ideology, and if left-wing parties are more willing to support pro-environmental policies. |
| Pitlik, et al. (2011) | Near is my shirt but nearer is my skin: Ideology or self-interest as determinants of public opinion on fiscal policy issues | 5 points | Dummies | Authors examine how opinions regarding a variety of fiscal policy issues are affected by (subjective) self-interest and ideological preferences, captured with left-right self-reports. |
| Scully, et al. (2012) | National or European parliamentarians? Evidence from a new survey of the members of the European parliament | 10 points | Linearly | Authors research what determines preferences on a range of policies of old and new Members of the European Parliament. One of the determinants that is considered is left-right ideology. |
| Thomsson & Vostroknutov (2017) | Small-world conservatives and rigid liberals: Attitudes towards sharing in self-proclaimed left and right | 5 points | Dummies | Authors aim to reveal how giving behaviour is affected by self-reported left-right political ideology and rule-following norms using dictator games. |
| Torgler (2010) | Why do people go to war? | 10 points | Linearly | Authors investigate the factors that influence people's willingness to go to war. They find that self-reported political ideology matters. |

Note: This table gives an overview of the papers that were identified in a systematic literature search. The column 'LR scale' indicates on what scale left-right self-reports are measured. The column 'How is LR measure used?' indicates how the authors used the survey-measure of left-right ideology in their analyses, i.e. using dummies or as a linear variable.

If one thing stands out in Table 2.1, then it is the observation that survey measured ideology is used in various sub-fields of economics. It varies from defence and peace economics (Torgler (2010)), to common market economics (Scully, et al. (2012)), happiness studies (Bjornskov, et al. (2013) ;Dreher & Ohler (2011)), economic policy (Boeri, et al. (2001)), foreign aid (Bodenstein & Faust (2017)), environmental economics (Neumayer (2004)), social economics (Baslevent & Maran (2015)) and many more, to voting studies (Ansolabehere & Socorro Puy (2016); Garcia-Vinuela, et al. (2018)). This

highlights the common use of survey-based measures of political ideology in the economics literature. Additionally, it is noteworthy that studies deal with the modelling of political ideology in different ways. 11 out of the 18 studies model political ideology linearly (assuming that observed effects increase/decrease with the degree of reported ideology), whereas the rest has incorporated dummy variables to capture ideological differences between left-wing and right-wing individuals. Either way, this distinction relies on the assumption that the used measure is valid.

## 3. Experimental design

Our experiment is a distribution experiment. In short, there is a decision-maker that decides how to distribute income over three subjects; two receivers and him.[5] To capture the relative preference for equality and efficiency, the decision-maker chooses between an equal distribution, in which differences in earnings between subjects are minimized, and a less equal, but efficient distribution, which aggregate earnings are maximized.

In about half of the sessions, the decision-makers receive earnings as 'manna-from-heaven' to be distributed. In the other sessions decision-makers, first, perform a task. The income to be distributed depends, in turn, on their performance on this task. The first group of decision-makers is said to be in the luck treatment, whereas the second group is in the real effort treatment. These between-subject treatments are included to study entitlement concerns.

Within sessions, the decision-makers make three distributive choices. In the baseline round, the earnings allocated to the decision-maker are independent of the choice he makes. As such, the only motivation for choosing one distribution over the other can be argued to be a preference for equality or efficiency, since selfishness considerations do not play a role. In the other two rounds, the decision-maker either encounters a cost when choosing the equal outcome or when choosing the efficient outcome. By incorporating such costly choices, we give the decision-makers an additional incentive. They need to pay a cost to reveal their preference. It allows us to examine whether the choice in the baseline round is only motivated by the irrelevance of it for the earnings of the decision-maker.

In each experimental session, there are multiple groups of three subjects. Groups and the roles within a group are randomly allocated, each subject is anonymous and has no information about the other group members. To decide upon the relative performance (or luck) during the experiment, each group is matched to another group in the same session. Again, it is unknown to the decision-makers (and 'his' receivers) to which other decision-maker (and receivers) they are matched.

The experiment has two stages.

[5] From this point onwards, we refer to the decision-makers as he/him. However, about half of the decision-makers are female.

### *Stage 1: Real effort vs. luck treatment*

In the first stage, it is decided how much income the decision-maker is allowed to distribute compared to the decision-maker he is matched with. To induce entitlement, a real effort task is used to determine the (relative) income for distribution for about half of the decision-makers. For the others, it is randomly decided whether they can distribute more (or less) than the other decision-makers. This experimental design allows us to compare preferences for equality and efficiency in the presence of entitlement vis-à-vis luck. Moreover, by relating choices made in the experiment to left-right ideology, we can examine under which conditions stated ideology is able to predict incentivized behaviour.

In the real effort sessions, the decision-makers have to perform a task. Throughout the paper we call it the encoding task. It is the same task as the Encryption Task used in Erkal, et al. (2011).[6] The decision-makers are given an encoding table, in which numbers are assigned to letters of the alphabet. They are also given words (in a predetermined order). The task is to encode as many words as possible in a limited amount of time by replacing the letters of the word with numbers using the encoding table. In our experiment decision-makers were given 10 minutes to encode as many words as possible. For more details on the real effort-task, we refer to Erkal, et al. (2011).

The relative performance of the matched decision-makers determines who can distribute more than the other. The decision-maker that performs best is referred to as the high performer; the other is the low performer. The receivers do not do the encoding task, but are shown a short movie clip.[7] It is made clear that this is just to keep them busy during the time the decision-makers do the task.

In addition to the real effort treatment, there is a luck treatment. In these sessions decision-makers do not do the encoding task, but it is randomly decided which decision-maker has good luck and can distribute a higher amount than the one with bad luck.[8]

### *Stage 2: 3 distributive choices*

After it is determined which decision-makers can distribute more or less, the participants enter stage 2. This stage is the same for both between-subject treatments. There are three rounds, in which decision-makers choose how to distribute earnings over themselves and 'their' two receivers.[9]

In each round, decision-makers are shown a distribution matrix with two pre-determined earnings distributions. The distribution is either equal but inefficient, or unequal but efficient. In this second stage, we follow Engelmann & Strobel (2004), who study the relative importance of inequality

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[6] We are very grateful to Nisvan Erkal, who was willing to share the Ztree-code of their real effort task with us.

[7] The clip is about the university's Nobel Laureate Ben Feringa. We chose him as a topic, since he is closely related to the university and, therefore, related to the students' environment. However, it is most likely not politically, socially or in any way laden.

[8] Due to encoding task (10 minutes), the real-effort sessions are bit longer than the luck sessions; nevertheless, we belief that decisions are comparable between the two treatments. We choose not to have the decision-makers in the luck treatment do the encoding task, since putting in effort but not receiving any earned right for it might be considered unfair, and thus, affects choices afterwards. We follow Gee, et al. (2017) in this. Moreover, in Cherry (2001), Cherry, et al. (2002) and Krawczyk (2010) real-effort experiments are conducted in which subjects in luck-treatments do not do the task.

[9] The order of within-subject rounds differs between sessions, in order to exclude the possibility that choices are affected by this. However, to ensure that each decision-maker receives each round (only) once, we did not randomize the order of the rounds.

aversion, maximin and efficiency considerations using distribution experiments. Our distribution stage follows treatment '*Ey*' in Engelmann & Strobel (2004) in which individual's relative concerns regarding equality or efficiency considerations is tested. Different from their study, our decision-makers have the choice between two distributions, instead of three. Similar to their study, we made sure that fairness motives are in line with the equal distribution, since we are not interested in whether a choice for equality is intrinsically motivated by maximin preferences or inequality aversion.

To examine the strength of decision-makers' equality versus efficiency preferences, we vary the earnings of the decision-maker in each round. In the baseline round, the income of the decision-maker is independent of the distribution he chooses (table 3.1). In the two other rounds, this is not the case and decision-makers face a small cost to reveal their preference. That is, the costly rounds allow us to examine if the choices in the baseline are the result of its irrelevance to the earnings of the decision-maker.[10]

More specifically, in the costly efficiency round (table 3.2) the decision-maker has to forego some earnings to choose the efficient outcome. In turn, he has to forego some earnings to choose equality in the costly equality round (table 3.3). We ensured that the earnings for decision-makers over the two costly rounds is the same. As can be seen from tables 3.1, 3.2 and 3.3, the high-performing decision-maker (the decision-maker with good luck) earns an income of 9 when choosing the costly choice, regardless of this being equality or efficiency, and 10 otherwise. The low-performing decision-maker (the decision-maker with bad luck) earns an income of 4 when choosing the costly choice, regardless of this being equality or efficiency, and 5 otherwise. This ensures that the choices of the decision-maker in are comparable over the three rounds.[11] Receivers are not informed about the distributive choices made by 'their' decision-maker.

At the end of the experiment, one round is randomly picked to determine the earnings of participants, as to ensure that all three distributive choices are incentivized equally. The participants are informed which round this was and what their final earnings from the experiment are. Total earnings consists of the earnings from the experiment and a show-up fee. Earnings of participants are unknown to the others.[12]

[10] The reason for including the costly rounds is, thus, not to quantify the value that decision-makers give to equality or efficiency. We follow Engelmann & Strobel (2004) in this.

[11] A high-performing (good luck) decision-maker does not see the distributional matrices that are shown to the low-performing (bad luck) decision-maker, and vice versa.

[12] Before informing participants about their earnings, we asked receivers what they would have chosen if they were a decision-maker and which distribution they expect 'their' decision-maker to have chosen. At the same time, we asked decision-makers which distribution they would have chosen if they had different performance (or a different luck outcome). This part of the experiment is referred to in the instructions as the 'question-stage'. We tested for effects among receivers. As expected since receivers' choices are not incentivized, there are no treatment effects of real effort in this data. Moreover, left-right ideology has no predictive value. Results are available on request.

Table 3.1 Baseline distribution matrix

| | Receiver A | Decision-maker | Receiver B | Total Amount Distributed |
|---|---|---|---|---|
| **Low performance / Bad luck** | | | | |
| *Distribution 1* | 5 | 5 | 5 | 15 |
| *Distribution 2* | 9 | 5 | 3 | 17 |
| **High performance / Good luck** | | | | |
| *Distribution 1* | 10 | 10 | 10 | 30 |
| *Distribution 2* | 18 | 10 | 6 | 34 |

Table 3.2 Costly efficiency distribution matrix

| | Receiver A | Decision-maker | Receiver B | Total Amount Distributed |
|---|---|---|---|---|
| **Low performance / Bad luck** | | | | |
| *Distribution 1* | 5 | 5 | 5 | 15 |
| *Distribution 2* | 10 | 4 | 3 | 17 |
| **High performance / Good luck** | | | | |
| *Distribution 1* | 10 | 10 | 10 | 30 |
| *Distribution 2* | 19 | 9 | 6 | 34 |

Table 3.3 Costly equality distribution matrix

| | Receiver A | Decision-maker | Receiver B | Total Amount Distributed |
|---|---|---|---|---|
| **Low performance / Bad luck** | | | | |
| *Distribution 1* | 4 | 4 | 4 | 12 |
| *Distribution 2* | 7 | 5 | 2 | 14 |
| **High performance / Good luck** | | | | |
| *Distribution 1* | 9 | 9 | 9 | 27 |
| *Distribution 2* | 16 | 10 | 5 | 31 |

### 3.1 Predictions for behaviour of decision-makers

We interpret a choice of the decision-maker for the equal distribution as revealed preference for equality. A choice for the efficient outcome is considered as revealed preference for efficiency. We expect that decision-makers behave in line with their stated ideology. This means that, compared to centre decision-makers, we expect self-reported right-wingers to prefer efficiency. In turn, we expect self-reported left-wingers to prefer equality. However, taking into consideration the ideological differences regarding beliefs about the role of luck and effort, we expect this behaviour to be conditional on entitlement. More specifically, we expect left-wing decision-makers to behave in line with their ideology under luck, whereas we expect right-wing decision-makers to do so when they feel entitled to their earnings.

## 4. Data and Experimental Procedures

The experiment was conducted during four days in October 2017 in the Groningen Experimental Economics (GrEE) Lab with students of the University of Groningen. The experiment was programmed using Ztree (Fischbacher (2007)). We ran 11 sessions, each with 18 or 30 subjects, totalling to 306

participants. As such, there are 102 decision-makers and 204 receivers.[13] Each participant could join the experiment only once. Average earnings were 13 euro, including a show-up fee of 4.50 euro. The sessions lasted between 30 and 45 minutes including instructions.

To obtain a left-right measure of political ideology, we elicited self-reports of ideology via an online survey that participants had to complete before the experiment. This survey consisted of 35 questions about all sorts of topics in order to prevent participants guessing what we are after.[14] To measure left-right ideology, we use the following question: '*In political matters, people talk of 'the left' and 'the right'. How would you place your views on this scale, generally speaking?*' This question is used in this form in multiple large-scale surveys such as the World Value Survey and European Value Survey. The answer options ranged from 1 (left) to 10 (right). To further reduce experimenter demand effects, we included a significant time delay between the survey and the experiment. Table 4.1 gives an overview of the mean amount of days between the survey and the experiment across between-subject treatment, for the decision-makers only. From the table it is clear that, on average, there was more than two weeks between filling out the survey and the experimental session for the decision-makers. This should be enough to eliminate memory effects as research shows that a delay of 20 minutes or more would suffice (Saris & van Meurs (1990); Saris (2003)). However, most validation studies aim to have at least a week between the survey and the experiment. Furthermore, the number of survey respondents is lower than the actual number of decision makers. This is due to the fact that one participant that was randomly assigned to be a decision-maker did not complete the survey. Since we need the self-report of left-right ideology for the purpose of our research, we drop this participant from the dataset. Our estimation sample, thus, consists of 101 decision-makers.

Table 4.1 Summary statistics of the days between survey and experiment by between-subject treatment

| | **Mean** | **SD** | **Min** | **Max** | **N** |
|---|---|---|---|---|---|
| **Luck treatment** | 19 | 9 | 0 | 33 | 49 |
| **Real Effort treatment** | 17 | 9 | 3 | 30 | 52 |
| **All Decision-makers** | 18 | 9 | 0 | 33 | 101 |

The experiment was held in one of the computer-rooms of the Faculty of Economics and Business. The participants were randomly assigned a role (decision-maker or receiver) by picking a number out of a bowl. Each number corresponded to a computer, which was either programmed to be a decision-maker or a receiver. Then, instructions were given to them on paper and read out aloud.[15] To make sure that the procedure was understood by all, the participants made test questions, which were discussed by the

[13] We aimed to have a sample consisting of students from as many different disciplines as possible to avoid any sample selection biases. Due to the location of the GrEELab on campus and the fact that all social science faculties (except economics) and the law faculty are located in the city centre of Groningen, we targeted mostly economics, business, spatial sciences, natural sciences, biology and artificial intelligence students. Of the 306 participants, 43% studies economics, 46% business management and 11% is in a different field of study.

[14] The survey is available upon request.

[15] In the instructions we avoid value-laden words such as 'equal' and 'efficient'. The instructions can be found in appendix B, which include some (example) screenshots of the different stages in the experiment.

experimenter before the start of the experiment. The experiment ended with a short survey consisting of four socio-economic questions and an open question, in which participants could comment on the experiment.

For the empirical analysis, we restrict our sample to decision-makers only. Table 4.2 gives an overview of their personal characteristics and shows the average amount of words encoded by low-performing and high-performing decision-makers. In our sample, 38 percent of all decision-makers study economics. As economics students have been found to be biased towards efficiency (Fehr, et al. (2006)) and to have political attitudes skewed to the right (Delis, et al. (2017); Fischer, et al. (2017)), this could lead to sample selection effects.[16] Furthermore, half of our decision-makers is female. Existing studies find that women are more likely to be inequality averse and more likely to support redistribution (e.g. Alesina & Giuliano (2011); Croson & Gneezy (2009); Guillaud (2013)). In the empirical analysis, we control for gender and studying economics.

Figure 4.1 shows the distribution of self-reported left-right ideology among all our decision-makers and figure 4.2 shows the chosen distributions by decision-makers split according to second stage rounds. It seems that a slight majority of the decision-makers in our sample has a preference for equality. In the baseline round, about 60 percent of the decision-makers choose the equal distribution instead of the efficient one. Furthermore, we observe that the decisions in the two costly-choice rounds are as would be expected, being induced by the design of the experiment. In the costly efficiency round 90 percent chooses the equal outcome over the efficient one. Even though choices are also affected in the costly equality round, the differences are not as large. A majority of decision-makers chooses efficiency instead of equality in this round, however, more decision-makers seem to be willing to forego some of their own income to have an equal distribution of earnings.

The question is: can left-right political ideology explain these choices? And if so, does the effect of ideology differ when decision-makers feel entitled to the earnings they are distributing? In the next section, we discuss our findings in light of these questions.

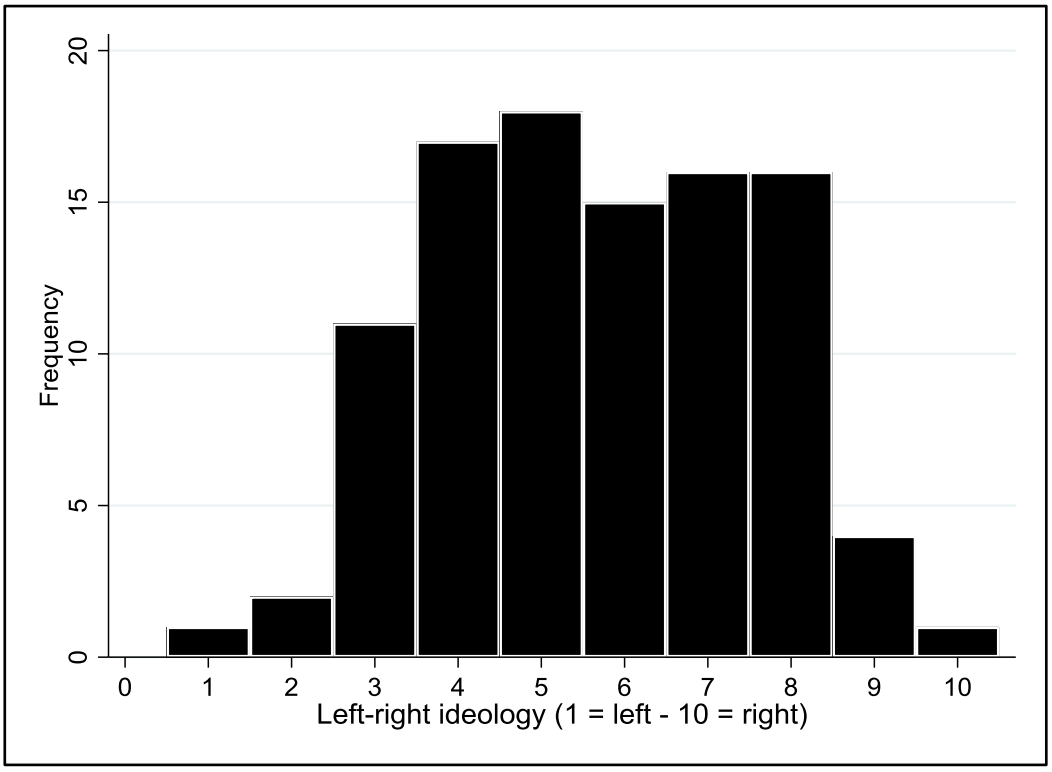
Table 4.2 Characteristics of decision-makers by treatment

| | **Female** | **Age** | **Dutch** | **Studies Economics** | **Left-right ideology** | **Encoded words** | **N** |
|---|---|---|---|---|---|---|---|
| **Bad Luck** | 46% | 20 | 54% | 52% | 5.9 (1.8) | - | 24 |
| **Good Luck** | 52% | 20 | 36% | 54% | 5.3 (1.8) | - | 25 |
| **Low Performance** | 58% | 21 | 38% | 27% | 6.0 (2.3) | 33 | 26 |
| **High Performance** | 46% | 21 | 46% | 23% | 5.5 (1.7) | 47 | 26 |
| **All Decision-makers** | 50% | 20 | 44% | 38% | 5.6 (1.9) | - | 101 |

Note: The table shows percentages or means of the variable of interest. For left-right ideology, the standard deviation is in parentheses. Encoded words indicate the mean amount of words encoded during the real effort stage. Decision-makers in the luck treatment do not do the encoding task.

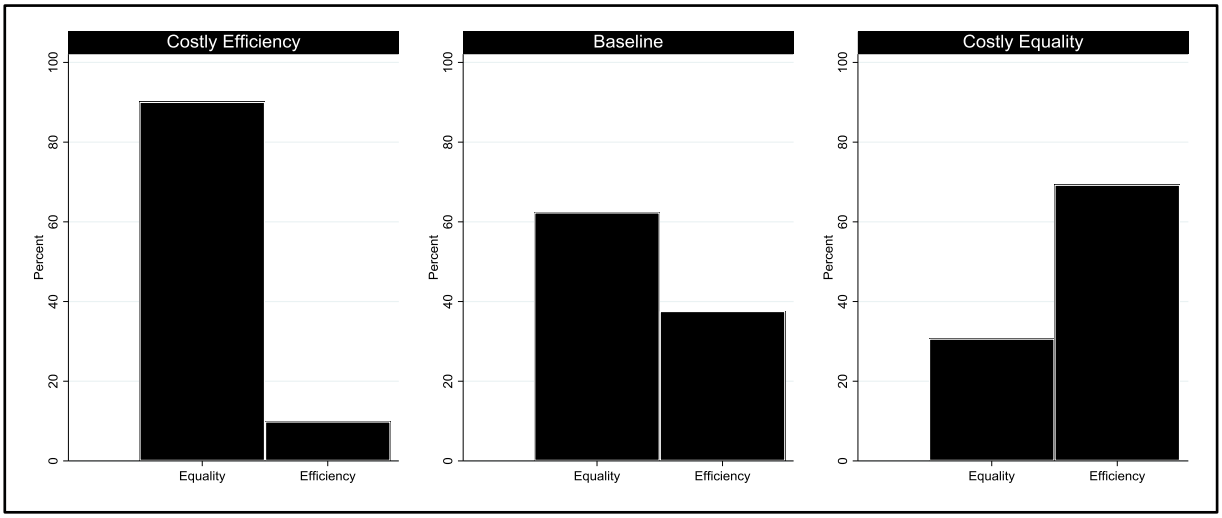
[16] In our sample, the distribution of left-right beliefs of the decision-makers that study economics is not particularly skewed to the right. See figure A1 in the appendix.

Figure 4.1 Distribution of self-reported left-right ideology of decision-makers




Note: x-axis shows self-reported left-right ideology measured in a survey administered before the experiment. Ideology is measured in a 10-point scale ranging from 1 (left) to 10 (right). Y-axis shows the number of decision-makers that reported to have a certain left-right ideology.

Figure 4.2 Choice of equal vs efficient distribution by decision-makers split by round




Note: the x-axis shows the distributions chosen by the decision-makers. They choose between an equal outcome (referred to in figure as 'Equality') and an efficient, unequal outcome (referred to as 'Efficiency'). The figure splits these choices according to the rounds in the second stage of the experiment. The Y-axis shows the percentage of decision-makers choosing one distribution over the other.

## 5. Results

We first consider the baseline distributive choices made by our decision-makers.[17] We distinguish between subjects with left-wing, centre and right-wing ideology using dummies. As such, we do not force political beliefs to be linear.[18] Additionally, we split distributional choices based on luck and effort, and do not take into account performance or the degree of luck.[19]

We begin with some simple descriptives. In figure 5.1 we show the distributions chosen by the decision-makers split by ideology, as well as by effort. Firstly, the figure shows that the majority of left-wing and centre decision-makers prefer equality to efficiency, regardless of entitlement. Secondly, while it seems that there is no difference in behaviour under luck and real effort for left-wingers, there are differences for centre decision-makers. Whereas there is only a slight preference for equality in the luck treatment, in the real effort treatment more than 80 percent of the centre decision-makers choose the equal distribution over the efficient one. As such, there are more decision-makers choosing equality over efficiency with centre ideology than left-wing ideology. Thirdly, for right-wingers entitlement concerns also appear to have an effect on the distributional choices made in the experiment. The majority of right-wing decision-makers chooses the equal outcome under luck. It is even the case that, in the luck treatment, percentage-wise more right-wing decision-makers choose the equal distribution than left-wing decision-makers. However, this pattern changes in case of real effort. Then, choices of right-wingers are equally split between equality and efficiency. Fourthly, a chi-square test of independence between ideology and distributional choice (i.e. equality versus efficiency preferences) cannot reject the null of no association under luck. When entitlement concerns play a role, however, we do reject the null and conclude that ideology and preferences are associated. Overall, it seems that entitlement concerns affect the behaviour of our centre and right-wing decision-makers, whereas left-wing decision-makers are not affected. Moreover, behaviour seems to be slightly more in line with self-reported ideology when decision-makers feel entitled compared to behaviour in the luck treatment.

To formally test the validity of left-right political ideology, we estimate interaction models, in which the effects of ideology on choices are evaluated conditional on luck and real effort.[20] Specifically, our model has interactions between the real effort treatment and left and right ideology. Our dependent variable is binary. We record a choice for the equal distribution as a 0 and a choice for the efficient

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[17] We first identified inconsistent decision-makers. Inconsistency is defined as a distributive choice that goes against the monetary incentive in a costly round and that is different from the choice in the baseline round. For example, a baseline choice for equality combined with a choice for efficiency in the costly efficiency round is considered inconsistent. 6 out of 101 decision-makers show inconsistent behaviour. We include them in our main analyses; however, we test for robustness by considering only consistent decision-makers.

[18] Subjects with self-reported ideology on the 10-point scale between 1 and 4 are considered left-wingers. Those with a self-report of 7 or higher are considered to have right-wing ideology. Subjects with a self-reported ideology score of 5 or 6 are considered centre ideologists.

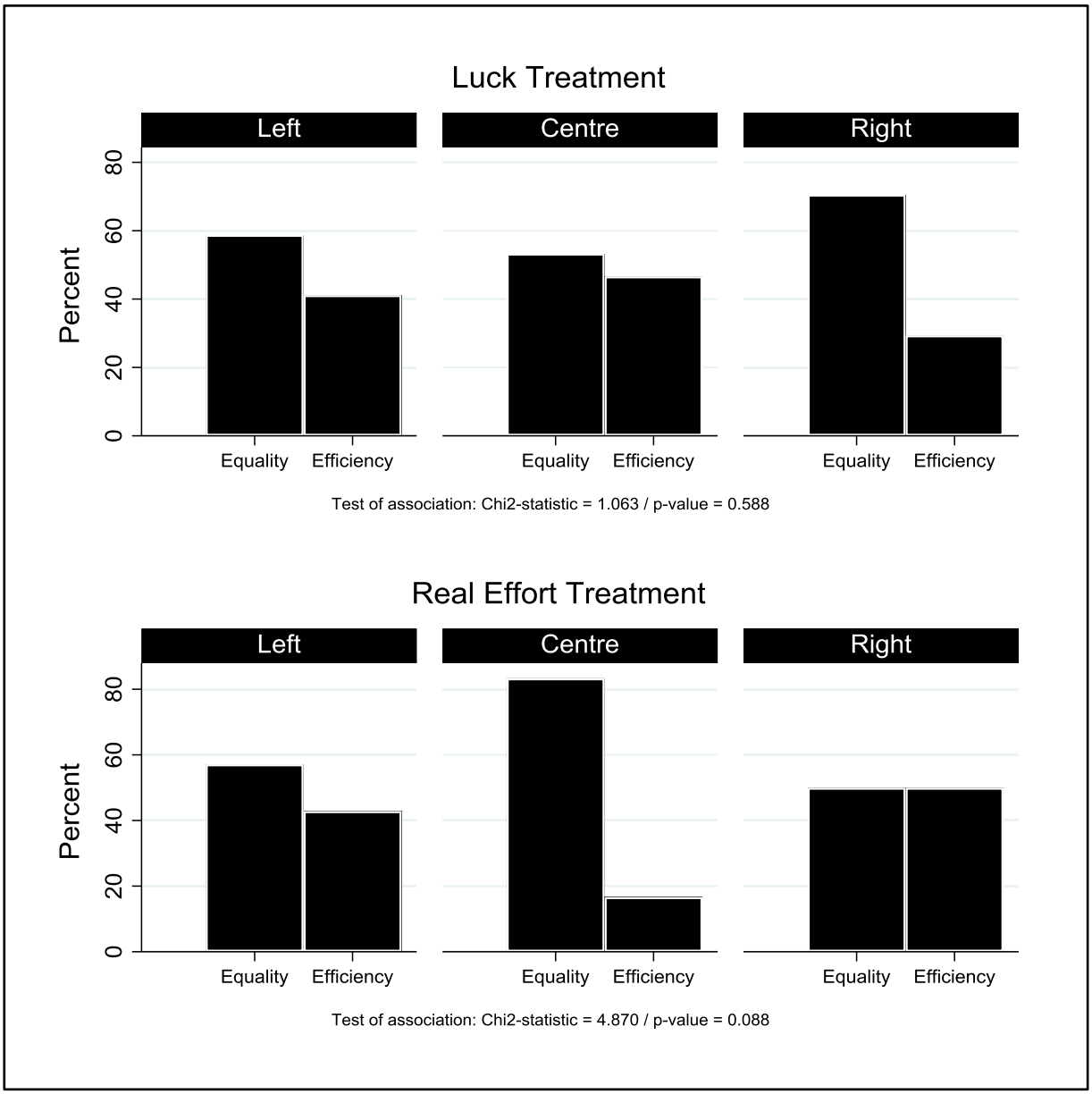
[19] To ensure this choice does not affect our results, we conducted the same analyses while distinguishing between good luck, bad luck, low performance and high performance. Patterns uncovered in the descriptive figures in this section not affected by this. Graphs are available on request. Distinguishing between ideology, entitlement and performance in the regression analyses would result in models with two three-way interactions. The estimation results, which are available upon request, show that there is no statistically significant difference between decision-makers with bad luck and good luck or high-performers and low-performers.

[20] We also estimate unconditional models, i.e. without interactions. In these models, left-right ideology does not have significant effects on choices made in the experiment. See table A1 in Appendix A for results.

distribution as a 1. We therefore estimate both Probit and Linear Probability Models (LPMs).[21] With LPMs, evidence for conditionality of the effect of ideology on the treatment is found when the interaction term is statistically significant. With Probit models, evidence for conditionality is found when the difference in marginal effects of ideology between the luck and the real effort treatment is statistically significant (Puhani (2012)). We control for gender with a female dummy variable, and for studying economics, also with a dummy variable. Robust standard errors are in parentheses. Table 5.1 shows estimation output and table 5.2 shows marginal effects, as well as a significance test of the difference for the Probit specifications. Decision-makers with self-reported centre ideology are the reference category.

[21] Since both models have their pros and cons, we present the results of the pooled probit model and the LPM. A disadvantage of the probit model is the interpretation of interaction terms (Ai & Norton (2003)). This is, however, simplified by the fact that we use our treatment dummies to distinguish between the 2 treatment groups, and are not directly interested in the interaction term itself. The LPM model might be easier to interpret; however, a downside is that predicted probabilities can lie outside the [0:1] bound. Results are similar across the two models.

Figure 5.1 Baseline choices of equal vs efficient distribution by decision-makers split by left-centre-right ideology and by between-subject treatment




Note: The figure shows histograms of the distributional choices of decision-makers by subjects' political ideology, i.e. left, centre or right. For these histograms, only baseline choices are considered. The x-axes show the distributions chosen by the decision-makers. They choose between an equal outcome (referred to in figure as 'Equality') and an efficient, unequal outcome (referred to as 'Efficiency'). The Y-axes show the percentage of decision-makers choosing one distribution over the other. The chi-square test of association test the null of independence between ideology and the chosen distributions, i.e. preferences for equality and efficiency.

As table 5.1 and 5.2 show, we find an effect of ideology on the choices made in the experiment. In particular, the interaction term between right-wing ideology and the real effort dummy is significant for both specifications. Moreover, the difference between the marginal effect of right-wing ideology in the real effort treatment is significantly different (at the 1% level) from that in the luck treatment for the Probit specification. We thus find that right-wing decision-makers in the real effort treatment behave significantly different from those in the luck treatment. These findings also indicate that, only when

decision-makers feel entitled, the likelihood of choosing the efficient over the equal outcome is significantly higher when self-reporting as right-wing (compared to centre-ideologists).

We do not find any effect of left-wing ideology on the choice for efficiency versus equality, regardless of luck or real effort. The interaction terms in table 5.1 and the difference between marginal effects in table 5.2 are insignificant for left-wing ideology. This finding suggests that left-wingers do not behave significantly different from decision-makers with centre ideology. This can mean one of two things. Either decision-makers that identify as left-wing do not significantly prefer equality to efficiency, or centre decision-makers behave as if they were left-wing. The former would indicate that left-wing decision-makers do not behave in line with their self-reported ideology, whereas the latter would suggest that centre decision-makers have similar equality versus efficiency preferences as left-wing decision-makers. We have no way of formally distinguishing between these two scenarios. However, both cases are indicative of a low predictive power of the centre-left side of the left-right spectrum of ideology.

The average marginal effects in table 5.2 confirm these findings. Under luck, the marginal effects of ideology on preferences measured with the experiment are insignificant. Hence, with 'manna-from-heaven', both left-wing and right-wing ideology do not have any predictive value. In the real effort treatment, there is an effect of political beliefs. Specifically, right-wing ideology has a significantly positive marginal effect on the likelihood of preferring efficiency to equality. We thus find that, compared to centre decision-makers, right-wingers significantly prefer the efficient distribution to the equal one when they feel entitled. Looking at effect size, we find that right-wing decision-makers that feel entitled are about 30 percentage points more likely to prefer efficiency to equality than decision-makers with centre ideology.[22] In sum, we find that the predictive power of survey-measured ideology on preferences for equality versus efficiency is limited to right-wing ideology and conditional on entitlement concerns.[23]

[22] Contrary to our expectations, we also find a significant (at the 10% level) positive effect in the probit specification for left-wing decision-makers that feel entitled. However, table 5.1 shows no significance for left-wing ideology or its interaction, and table 5.2 no significant difference between the marginal effect under luck and under real effort.

[23] The results in this section are robust to excluding the extremes of the left-right scale (i.e. self-reports lower than 3 and higher than 8), and to restricting the sample to decision-makers that chose consistently over within-subject rounds. Results available on request.

Table 5.1. Estimation output of the model conditional on entitlement – baseline

| **Dependent variable: Distribution** | (1) *Probit* | (2) *LPM* |
|---|---|---|
| Left Dummy | 0.094 | -0.097 |
| | (0.126) | (0.181) |
| Right Dummy | 0.041 | -0.257 |
| | (0.110) | (0.169) |
| Real Effort Dummy | 0.038 | -0.271* |
| | (0.104) | (0.160) |
| Real Effort Dummy x Left Dummy | 1.056 | 0.343 |
| | (0.694) | (0.242) |
| Real Effort Dummy x Right Dummy | 1.613** | 0.536** |
| | (0.674) | (0.218) |
| Female Dummy | -0.244** | -0.240** |
| | (0.098) | (0.096) |
| Studies Economics Dummy | 0.148 | 0.126 |
| | (0.110) | (0.108) |
| Constant | 0.376*** | 0.556*** |
| | (0.139) | (0.154) |
| Observations | 99 | 99 |
| Pseudo R-squared | 0.052 | |
| Log-likelihood | 2.063 | |
| Adjusted R-squared | | 0.087 |
| F-statistic | | 2.817 |
| (p-value) | | (0.011) |

Note: This table shows the estimation output of the model for the baseline sample. The reference group consists of the decision-makers with centre ideology. Robust standard errors are in parentheses. Significance is indicated as follows: *** p<0.01, ** p<0.05, * p<0.1. The coefficients are estimated using a probit specification (see column probit) or using a linear probability model (see column LPM). The dependent variable 'distribution' is binary; a choice for the equal distribution is classified as a 0; a choice for the efficient distribution as a 1.

Table 5.2 Marginal effects of ideology in Luck vs Real Effort groups – baseline

| **Dependent variable: Distribution** | **Left-wing** | | **Right-wing** | |
|---|---|---|---|---|
| | *Probit* | *LPM* | *Probit* | *LPM* |
| Decision-makers under Luck | -0.088 | -0.097 | -0.240 | -0.257 |
| | (0.151) | (0.181) | (0.147) | (0.169) |
| Decision-makers under Real Effort | 0.257* | 0.245 | 0.292** | 0.279** |
| | (0.156) | (0.166) | (0.138) | (0.136) |
| Observations | 99 | 99 | 99 | 99 |
| z-statistic | 1.61 | | 2.66 | |
| (p-value) | (0.107) | | (0.008) | |

Note: This table shows marginal effects for left-wing decision-makers (columns 2&3) and right-wing decision-makers (columns 4&5). The reference group consists of the decision-makers with centre ideology. Standard errors are in parentheses. Significance is indicated as follows: *** p<0.01, ** p<0.05, * p<0.1. The marginal effects are calculated from coefficients estimated using a probit specification (see columns probit) or using a linear probability model (see columns LPM). The dependent variable 'distribution' is binary; a choice for the equal distribution is classified as a 0; a choice for the efficient distribution as a 1. The z-statistic shows the result of testing whether the marginal effect of left-wing (or right-wing) decision-makers under luck is significantly different from that under real effort in the Probit models. For the LPMs this can be deduced from the (in)significance of the interaction terms in table 5.1.

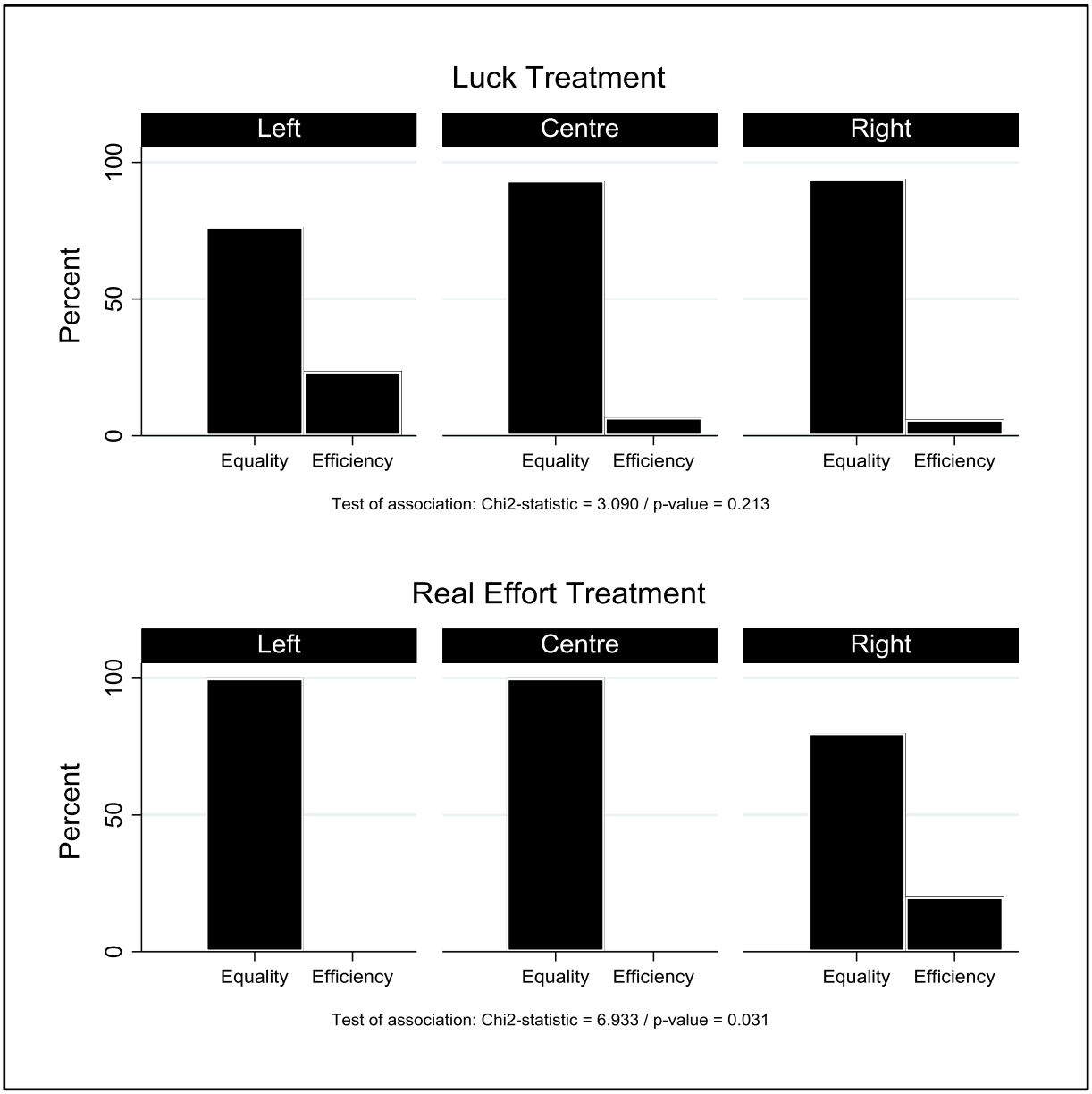
## 5.2 Costly Choices

In this section, we test if our baseline results are robust to monetary incentives or whether they are the result of the irrelevance of the choice to the earnings of the decision-maker. We start again with some simple descriptives. In figure 5.2, we show the choices made in the costly efficiency round and in figure 5.3 those made in the costly equality round.

Whereas in the baseline left-wing decision-makers seemed mostly unaffected by entitlement, there is a slight increase in choosing the equal distribution under real effort when efficiency is costly, but not when equality is costly. Moreover, in both costly choice rounds, there are slightly more centre decision-makers choosing equality when they feel entitled. The figures also seem to suggest that right-wingers more often choose the efficient distribution, even when efficiency is costly. This behaviour is especially prevalent when right-wingers feel entitled to what is distributed. This is in line with their behavioural pattern in the baseline round. Furthermore, tests of association indicate that ideology and distributional choice are dependent on each other only when entitlement concerns play a role, which also confirms our findings in the baseline.

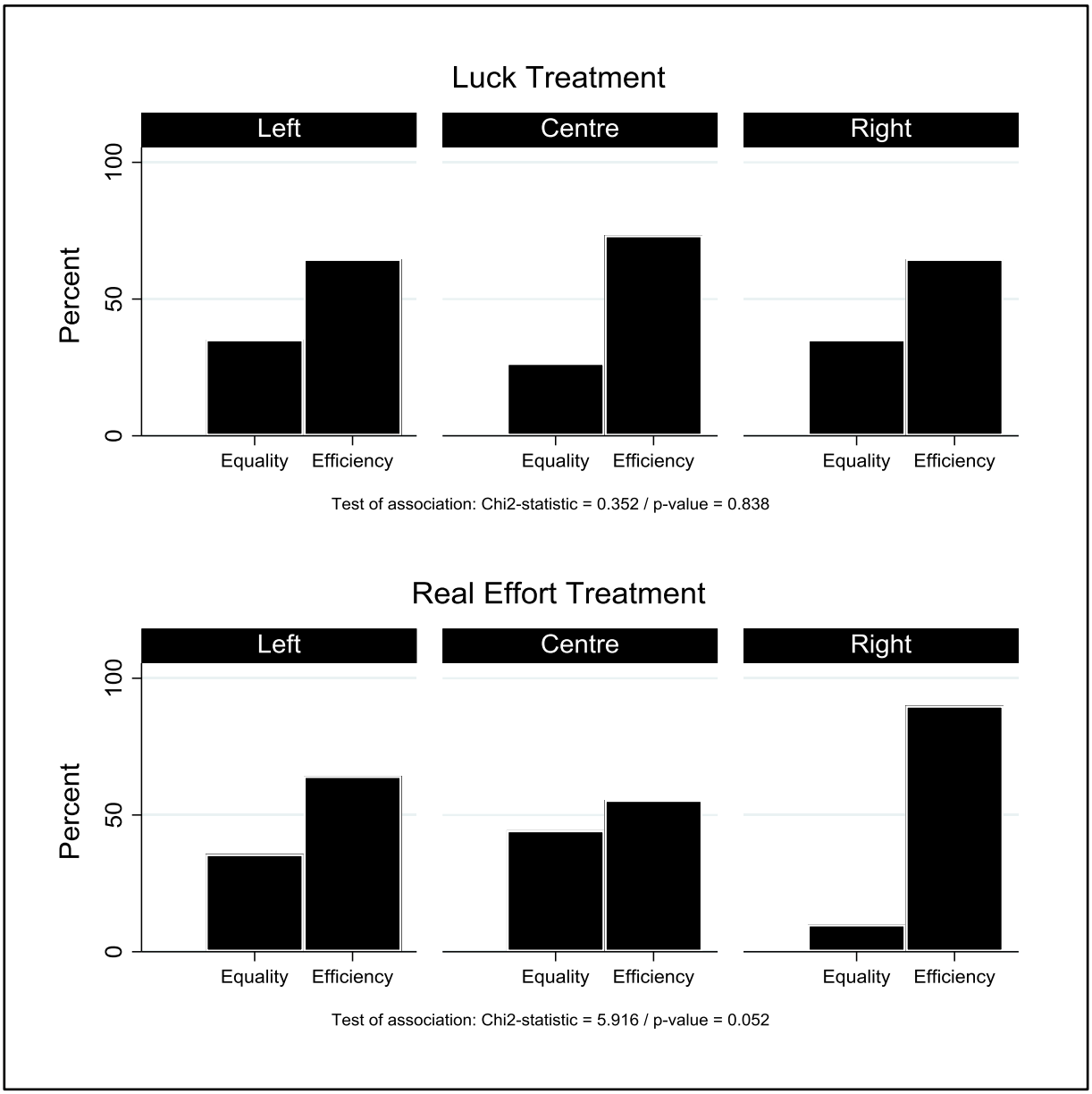
However, figure 5.3 also reveals that all left-wing and centre decision-makers choose the equal distribution under real effort in the costly efficiency round. This means that there is no variation in our dependent variable for these ideological groups. As such, we cannot estimate our model for the choices made in this round. In what follows we, thus, present the results of estimating our model for the costly equality choices only.

Figure 5.2 Costly efficiency choices of equal vs efficient distribution by decision-makers split by left-centre-right ideology and by between-subject treatment




Note: The figure shows histograms of the distributional choices of decision-makers by subjects' political ideology, i.e. left, centre or right. For these histograms, only choices in the costly efficiency round are considered. The x-axes show the distributions chosen by the decision-makers. They choose between an equal outcome (referred to in figure as 'Equality') and an efficient, unequal outcome (referred to as 'Efficiency'). The Y-axes show the percentage of decision-makers choosing one distribution over the other. The chi-square test of association test the null of independence between ideology and the chosen distributions, i.e. preferences for equality and efficiency.

Figure 5.3 Costly equality choices of equal vs efficient distribution by decision-makers split by left-centre-right ideology and by between-subject treatment




Note: The figure shows histograms of the distributional choices of decision-makers by subjects' political ideology, i.e. left, centre or right. For these histograms, only choices in the costly equality round are considered. The x-axes show the distributions chosen by the decision-makers. They choose between an equal outcome (referred to in figure as 'Equality') and an efficient, unequal outcome (referred to as 'Efficiency'). The Y-axes show the percentage of decision-makers choosing one distribution over the other.

Table 5.3 shows estimation results for the costly equality round and table 5.4 the corresponding marginal effects. We find (once again) that self-reported right-wing ideology has predictive value in explaining observed choices in the experiment when decision-makers feel entitled to what they are distributing. Moreover, we find that, under real effort, having self-reported right-wing ideology increases the likelihood of choosing the efficient distribution with around 30 percentage points. As is the case for baseline choices, self-reported left-wing ideology has no predictive power, regardless of there being

entitlement concerns or not. We, thus, find that decision-makers with this ideology do not behave significantly different from centre decision-makers.

To conclude, we find that our baseline results are robust to small monetary incentives when comparing results of the baseline and costly equality rounds. Unfortunately, we cannot test this for costly efficiency choices.[24]

Table 5.3 Estimation output of the model conditional on entitlement – costly equality

| **Dependent variable: Distribution** | (1)<br>*Probit* | (2)<br>*LPM* |
|---|---|---|
| Left Dummy | -0.274 | -0.094 |
| | (0.509) | (0.167) |
| Right Dummy | -0.432 | -0.145 |
| | (0.512) | (0.171) |
| Real Effort Dummy | -0.381 | -0.149 |
| | (0.489) | (0.164) |
| Real Effort Dummy x Left Dummy | 0.551 | 0.197 |
| | (0.675) | (0.240) |
| Real Effort Dummy x Right Dummy | 1.545** | 0.465** |
| | (0.707) | (0.220) |
| Female Dummy | -0.029 | 0.003 |
| | (0.276) | (0.092) |
| Studies Economics Dummy | 0.643** | 0.193** |
| | (0.299) | (0.091) |
| Constant | 0.413 | 0.660*** |
| | (0.430) | (0.135) |
| Observations | 99 | 99 |
| Pseudo R-squared | 0.098 | |
| Log-likelihood | -54.787 | |
| Adjusted R-squared | | 0.038 |
| F-statistic | | 2.272 |
| (p-value) | | (0.035) |

Note: This table shows the estimation for the costly equality sample. The reference group consists of the decision-makers with centre ideology. Robust standard errors are in parentheses. Significance is indicated as follows: *** p<0.01, ** p<0.05, * p<0.1. The coefficients are estimated using a probit specification (see column probit) or using a linear probability model (see column LPM). The dependent variable 'distribution' is binary; a choice for the equal distribution is classified as a 0; a choice for the efficient distribution as a 1.

[24] As in the baseline sample, results are robust to excluding the extremes of the left-right scale (i.e. self-reports lower than 3 and higher than 8), and to restricting the sample to decision-makers that chose consistently over within-subject rounds. Results are available on request.

Table 5.4 Marginal effects of ideology in Luck vs Real Effort groups – costly equality

| **Dependent variable: Distribution** | **Left-wing** | | **Right-wing** | |
|---|---|---|---|---|
| | *Probit* | *LPM* | *Probit* | *LPM* |
| Decision-makers under Luck | -0.097 | -0.094 | -0.153 | -0.145 |
| | (0.180) | (0.167) | (0.179) | (0.171) |
| Decision-makers under Real Effort | 0.076 | 0.103 | 0.288*** | 0.320** |
| | (0.118) | (0.174) | (0.105) | (0.134) |
| Observations | 99 | 99 | 99 | 99 |
| z-statistic | 0.81 | | 2.12 | |
| (p-value) | (0.418) | | (0.034) | |

Note: This table shows marginal effects for left-wing decision-makers (columns 2&3) and right-wing decision-makers (columns 4&5). The reference group consists of the decision-makers with centre ideology. Standard errors are in parentheses. Significance is indicated as follows: *** p<0.01, ** p<0.05, * p<0.1. The marginal effects are calculated from coefficients estimated using a probit specification (see columns probit) or using a linear probability model (see columns LPM). The dependent variable 'distribution' is binary; a choice for the equal distribution is classified as a 0; a choice for the efficient distribution as a 1. The t-statistic shows the result of testing whether the marginal effect of left-wing (or right-wing) decision-makers under luck is significantly different from that under real effort in the Probit models. For the LPMs this can be deduced from the (in)significance of the interaction terms in table 5.1.

# 6. Conclusion

In this paper we examine the predictive validity of self-reported left-right political ideology. We test whether individuals only perceive themselves as having a certain ideology or also act in accordance with it.

Reviewing our results, we conclude that only self-reported right-wing ideology has predictive value. Decision-makers that self-report to be right-wing significantly prefer the efficient distribution to the equal one. This result is conditional on entitlement. When income is earned from a real-effort task, self-reported right-wing decision-makers significantly prefer efficiency to equality. Stated left-wing ideology, however, does not have any predictive value, regardless of luck or effort. Thus, our findings indicate that left-wing decision-makers do not behave differently than centre ones. This either implies that left-wingers do not behave in line with their stated ideology or that self-assessed centre-ideology decision-makers behave as if they were left-wing. Formally, we cannot distinguish between the two. However, our descriptive analysis points in the direction of the latter scenario.

We thus conclude that only right-wingers act in line with their stated political ideology. Based on these findings it seems that right-wing ideology is still related to the traditional economic interpretation of left versus right, whereas a stated left-wing ideology does not to represent this conventional political divide. Hence, survey-measured right-wing ideology has predictive validity. However, it is unclear what is being measured by centre and left-wing ideology. This may have implications for empirical studies relying on self-reported measures of left-right ideology. Not finding an effect of ideology could, after all, also be the result of using a measure that does not capture what it is believed to capture.

At this stage it is speculative what could explain the similarity between left and centre decision-makers. Individuals may obtain expressive utility by stating adherence to left political ideology in a survey. However, in our experiment the decision makers are pivotal, i.e. their choice fully determines the outcome for their group. As it is likely that instrumental utility is larger than non-instrumental motivations during the experiment, this may explain the observed behaviour. It could also be that our decision-makers interpret the left-side of the left-right spectrum differently and that other dimensions of ideology are dominating the economic context. These are questions we would like to answer in future research.

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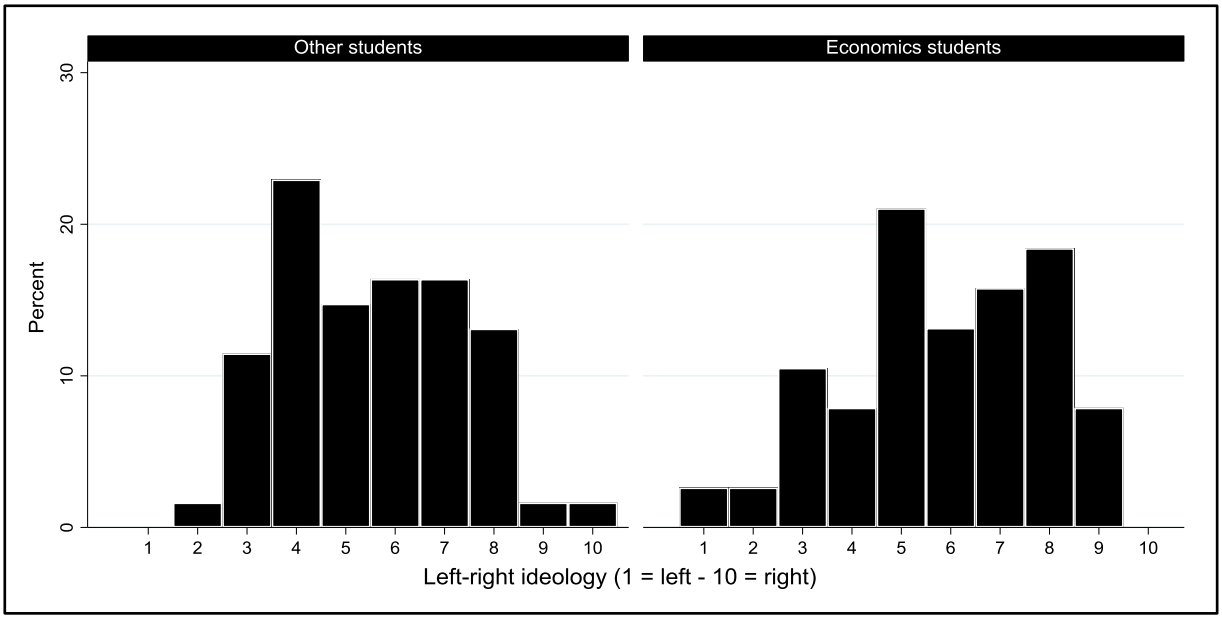
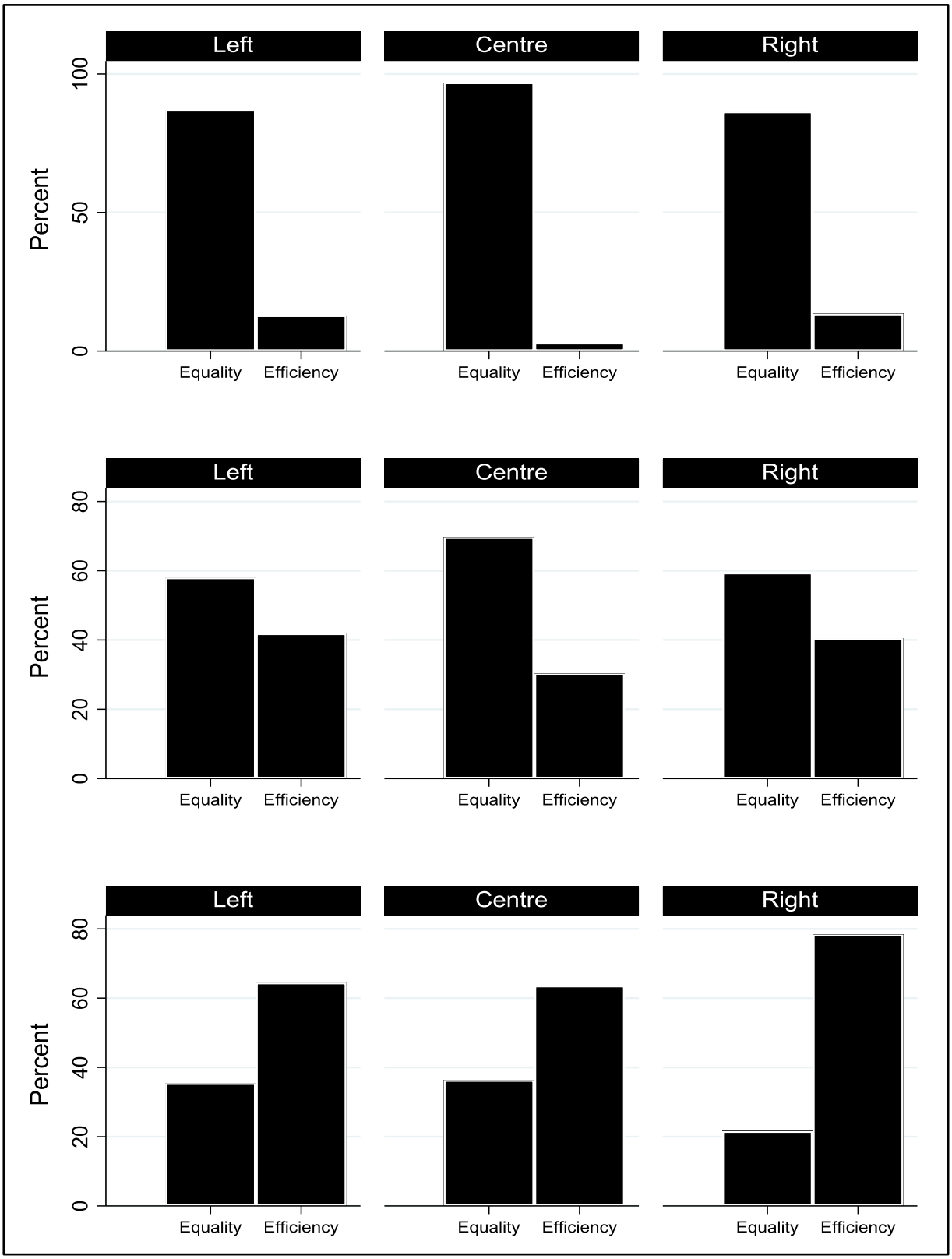
# Appendix A

Figure A1 Distribution of left-right ideology by field of study of decision-makers




Note: This figure shows histograms of the distribution of left-right ideology for economics students (right-panel) and students with other disciplines (left-panel). We cannot reject the hypothesis that left-right ideology is normally distributed based on its skewness for economics students or for students with a different discipline.

Figure A2 Choices of equal vs efficient distribution by decision-makers split by left-centre-right ideology - upper panel: Baseline / middle panel: Costly Efficiency / lower panel: Costly Equality




Note: In the panels, the sample of decision-makers is split according to the within-subject round. In the upper panel the baseline round; in the middle panel the costly efficiency round; and in lower panel the costly equality round are shown. The figures show the distributional choices of decision-makers split according to subjects' political ideology, i.e. left, centre or right. The x-axes show the distributions chosen by the decision-makers: an equal one (referred to as 'Equality') and an efficient one (referred to as 'Efficiency'). The Y-axes show the percentage of decision-makers choosing one distribution over the other.

Table A1 Estimation output of model testing for treatment effects unconditional on ideology

| **Dependent variable: Distribution** | **Baseline** | | **Costly Efficiency** | | **Costly Equality** | |
|---|---|---|---|---|---|---|
| | *Probit* | *LPM* | *Probit* | *LPM* | *Probit* | *LPM* |
| Left Dummy | 0.271 | 0.586 | 0.074 | 0.094 | 0.072 | 0.023 |
| | (0.348) | (0.516) | (0.340) | (0.126) | (0.063) | (0.124) |
| Right Dummy | 0.120 | 0.802 | 0.355 | 0.041 | 0.100 | 0.114 |
| | (0.320) | (0.499) | (0.327) | (0.110) | (0.069) | (0.108) |
| Real Effort Dummy | 0.087 | -0.406 | 0.311 | 0.038 | -0.065 | 0.087 |
| | (0.287) | (0.301) | (0.272) | (0.104) | (0.057) | (0.094) |
| Female Dummy | -0.671** | -0.516 | -0.015 | -0.244** | -0.080 | -0.003 |
| | (0.270) | (0.355) | (0.272) | (0.098) | (0.061) | (0.093) |
| Studies Economics Dummy | 0.403 | -0.403 | 0.675** | 0.148 | -0.066 | 0.211** |
| | (0.296) | (0.349) | (0.293) | (0.110) | (0.059) | (0.091) |
| Constant | -0.342 | -1.274** | -0.012 | 0.376*** | 0.142* | 0.523*** |
| | (0.376) | (0.502) | (0.362) | (0.139) | (0.076) | (0.133) |
| Observations | 99 | 99 | 99 | 99 | 99 | 99 |
| Pseudo R-squared | 0.078 | | 0.097 | | 0.056 | |
| Log-likelihood | -60.311 | | -29.254 | | -57.350 | |
| Adjusted R-squared | | 0.052 | | 0.005 | | 0.012 |
| F-statistic | | 2.063 | | 1.282 | | 1.659 |
| (p-value) | | 0.077 | | 0.056 | | 0.063 |

Note: This table shows the estimation output for the Baseline sample in columns 2&3, for Costly Efficiency in columns 4&5 and for Costly Equality in columns 6&7. The reference group consists of the decision-makers with centre ideology. Robust standard errors are in parentheses. Significance is indicated as follows: *** p<0.01, ** p<0.05, * p<0.1. The coefficients are estimated using a probit specification (see columns probit) or using a linear probability model (see columns LPM). The dependent variable 'distribution' is binary; a choice for the equal distribution is classified as a 0; a choice for the efficient distribution as a 1.

# Appendix B

These are the instructions used in the real effort sessions. The instructions for the luck sessions were adapted where necessary and are available on request.

**Instructions**

Thank you for participating in this experiment. Please read these instructions carefully. If you need clarification or explanation, ask the experimenter(s). Do not communicate with each other from now until the experiment ends. This is economic research; we are interested in the decisions you make under the conditions we set. This experiment is run according to the standards and rules of the GREELab.

**General**

This is a distribution experiment, in which individual decisions determine collective earnings. Please follow the instructions carefully when making your decisions. Your attendance earns you 4.50€ (the show-up fee). Your final earnings are somewhere between 5.50€ and 14.00€, depending on the choices made in the experiment. Your earnings will be transferred to your bank account via your 'FEDRbp' account. We strive to transfer your earnings within 5 working days. Your earnings are unknown to the other participants.

**Explanation of the experiment**

At the start of the experiment, you are randomly matched to 2 other people in the room. This means that during the experiment, you are part of a group of 3 people. Furthermore, each group of 3 is matched to another group of 3 in the room.

***What is your role?***

When the experiment begins, you are informed about your role. You are either a decision-maker or a receiver. It is randomly decided which role you have.

In each group of 3, there is 1 decision-maker and there are 2 receivers. The earnings of each person in a group depend on the decisions that are made by the decision-maker. Throughout the experiment, earnings are denoted in Experimental Currency Units (ECU).

*If your role is: Decision-maker*

You have an active role throughout the experiment and the earnings of yourself and the 2 receivers depend on your performance and decisions in the experiment.

*If you role is: Receiver*

You have a passive role throughout most of the experiment. Your earnings depend on the performance and decisions of the decision-maker.

In short, this is a distribution experiment; the decision-makers decide how to distribute earnings over themselves and the 2 receivers. The experiment has 3 stages. You participate once in each stage.

***Stage 1: Encoding task***

*If your role is: Decision-maker*

In the first stage, you are given a task. This task is called the encoding task. During the task, you are offered a number of words. The task is to encode these words into numbers using an encoding table. Table 1 is an example of an encoding table. After you have encoded a word correctly and pressed OK, you are given the next word. You have 10 minutes (600 seconds) to encode as many words as possible. All decision-makers are given the same words to encode in the same order.

Table 1. Example encoding table

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 4 | 15 | 7 | 10 | 19 | 21 | 1 | 26 | 23 | 11 | 5 | 18 | 6 | 17 | 12 | 8 | 14 | 24 | 2 | 25 | 13 | 3 | 16 | 22 | 9 |

Note: this encoding table has different entries from the one used during the experiment.

*Example: The word that is given to you is EXPERIMENT. Using table 1, this word is encoded as follows: E=10, X=16, P=12, E=10, R=14, I=26, M=18, E=10, N=6, T=2.*

After 10 minutes, the computer counts the amount of words you have encoded correctly. It then compares your correctly encoded amount of words with the amount of words the decision-maker of the group you are matched with has correctly encoded. Based on which of you has encoded the most words, it is determined who has performed the best.

- If you have encoded more words than the other decision-maker, you are the high performer.
- If you have encoded fewer words than the other decision-maker, you are the low performer.
- If you have encoded exactly the same amount of words as the other decision-maker, the computer randomly decides which one of you is the high performer. The other decision-maker then is the low performer.

When the task ends, you are informed of your performance relative to the other decision-maker. That is, you are informed whether you are the high performer or the low-performer.

- If you are the high-performing decision-maker, you are entitled to distribute a higher amount of earnings than the low-performing decision-maker.
- If you are the low-performing decision-maker, you are entitled to distribute a lower amount of earnings than the high-performing decision-maker.

*If you role is: Receiver*

The role of the receiver is passive throughout most of the experiment. You do not do the encoding task, but you wait until the decision-maker has finished his/her task.

During the 10 minutes (600 seconds), in which the decision-maker is doing the task, you are shown a short film about Ben Feringa, the Nobel Prize winner. This film is only for entertainment purposes, i.e. to keep you busy during the time the decision-makers are doing the encoding task. The film has no sound, but has English subtitles.

***Stage 2: 3 rounds of distributive choices***

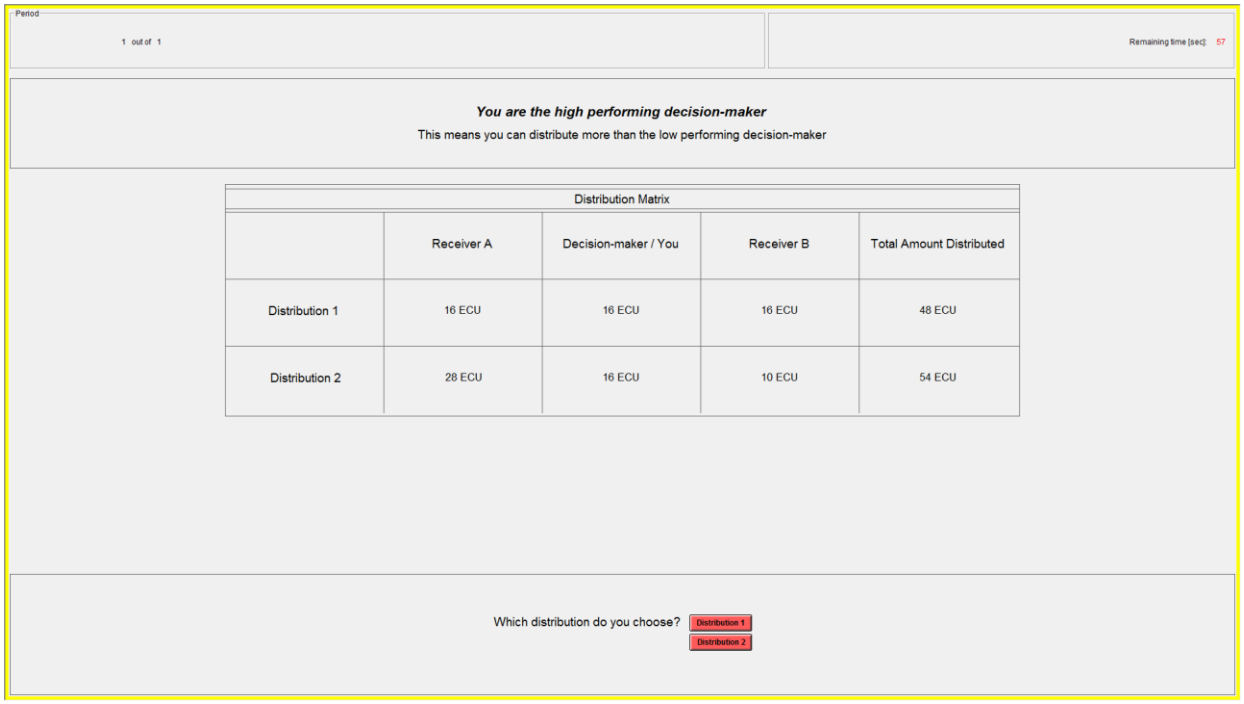
*If your role is: Decision-maker*

The second stage consists of 3 rounds. In each round, you are asked to distribute earnings over yourself and the 2 receivers. That is, you make 3 distributive decisions. The earnings of yourself and the 2 receivers depend on the decision you make. Each round, you have a choice between 2 distributions.

- In distribution 1, you and the receivers obtain the same amount of earnings.
- In distribution 2, the earnings that you and the receivers obtain are different. Earnings for one receiver are lower than your earnings; earnings for the other receiver are higher than your earnings.
- Additionally, aggregate earnings in distribution 2 are higher than in distribution 1.

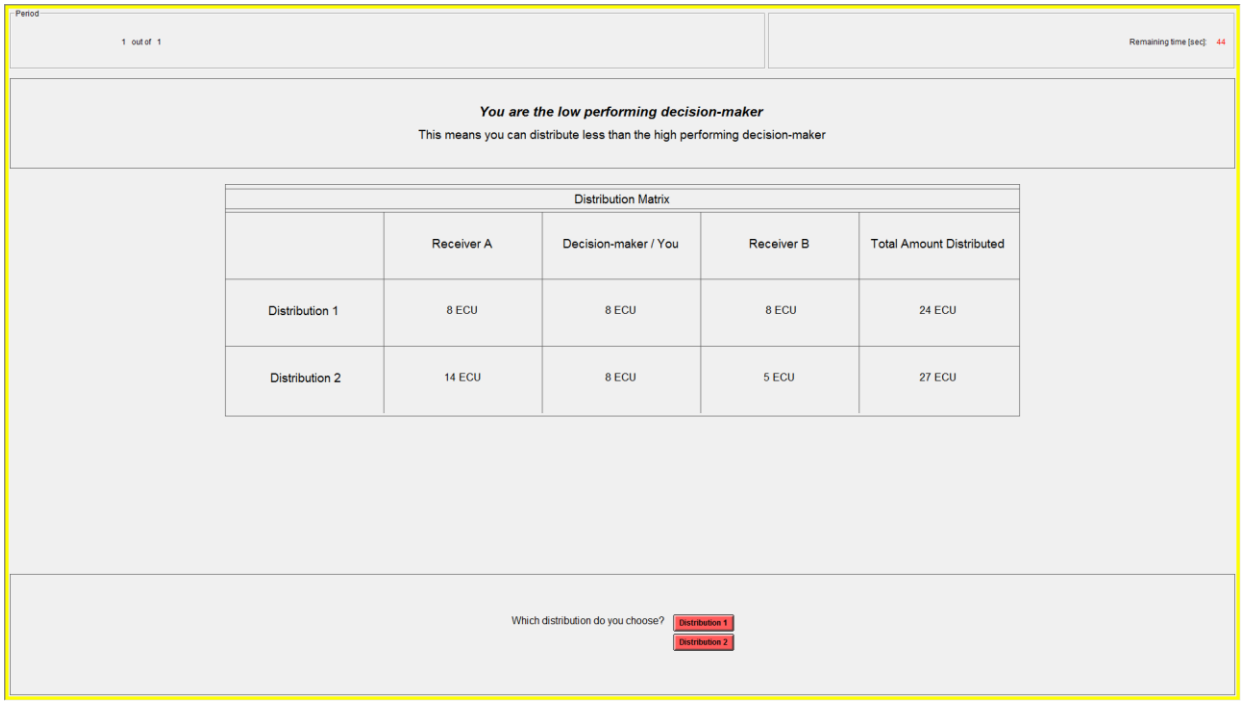
The 2 distributions you can choose from are presented in a distribution matrix. Depending on your performance in the encoding task, you can distribute more or less than the decision-maker of the group you are matched with. See figure 1 for an example screen of a round in stage 2 that is shown to a high-performing decision-maker and figure 2 for the screen that is shown to a low-performing decision-maker.

Figure 1. Example screen stage 2 - High-performing decision-maker




Note: The entries of the distribution matrix in the example screen are different from those used in the experiment.

Figure 2. Example screen stage 2 - Low-performing decision-maker

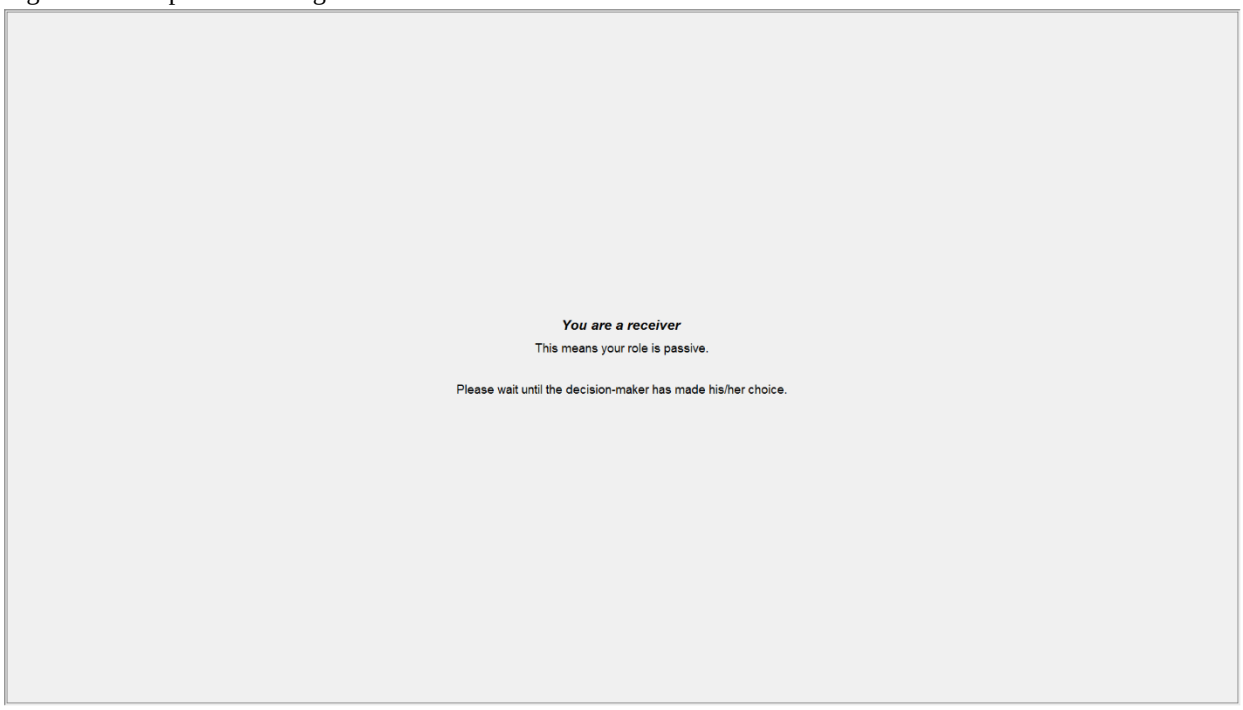



Note: The entries of the distribution matrix in the example screen are different from those used in the experiment.

*If you role is: Receiver*

Also during stage 2, you have a passive role. Your earnings depend on the performance and the choices made by the decision-makers. During each of the 3 rounds you wait until the decision-maker has made his/her distributive choice. See figure 3 for an example screen of a round in stage 2.

Figure 3. Example screen stage 2 – Receiver



***Stage 3: Question-stage***

In the third stage, you are asked to answer some questions regarding the experiment. This holds for both decision-makers and receivers.

***What are your earnings?***

After stage 3 has ended, you see how much you have earned during the experiment in ECU. These ECU are converted to euros at the exchange rate 2 ECU = 1 €.

Out of the 3 distributive decisions that are made by the decision-makers, 1 decision is randomly chosen by the computer to be paid out. In addition, you receive a show-up fee of 4.50€. Your earnings in the experiment plus the show-up fee make up your total earnings.

***Survey***

The experiment ends with a short survey consisting of 5 questions. At the end of this survey, you are informed of your total earnings in euros. For payment purposes, we ask you for your student-number and email-address. Before analysis, data is anonymized.

**Summary**

- You are randomly matched to 2 persons to form a group of 3. Then you are paired to another group consisting of 3 persons.
- In each group there are 2 receivers and 1 decision-maker.
- It is randomly decided whether you are a decision-maker or a receiver.
- If you are a receiver, your role is passive throughout most of the experiment.
- If you are a decision-maker you have to do the encoding task in the first stage.
- Based on your relative performance you are a high performer or a low performer.
- High performing decision-makers are entitled to distribute more earnings than low performers.
- In the second stage, there are 3 rounds.
- In each round, the decision-makers decide how to distribute earnings over themselves and the 2 receivers.
- As such, the decision-makers make 3 distributive choices; 1 is randomly chosen to pay out.
- In the third stage, both the decision-maker and the receivers are asked some questions.

**Test Questions**

| | **Answer** |
|---|---|
| How many decision-makers and how many receivers are in 1 group? | |
| How many people in your group do the encoding task? | |
| What determines whether you can distribute a higher amount compared to the other decision-maker? | |
| If the decision-maker choses distribution 1, does everyone in the group earn the same amount? | |
| Aggregate earnings are higher in which income distribution? | |
| Who determines the earnings of the receivers? | |
| How many rounds are chosen to pay out after the experiment? | |

**Are there any questions before we begin the experiment?**