DISTRIBUTIONAL PREFERENCES
AND
SORTING INTO DECISION-MAKING

BY

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ABSTRACT

Though deviating from pure self-interest in economic experiments encouraged the researchers to focus on the topic of 'social preferences', the certain types of social preferences obtained in the experiments are not direct representations of the real-life distributional preference behaviour. When subjects are not given the option of sorting between different economic environments, where they can choose to take the leader role to implement their choices over distributions and where they cannot, then these models would overestimate the impact of distributional preferences. This thesis experimentally studies the relationship between distributional preferences and willingness to decide in 2-person groups while focusing on the importance of sorting into decision-making. The decision maker is chosen via a voluntary mechanism that allows sorting of the subjects as those who are willing to take the leader role to determine the distribution and those who refrain from deciding. We find that differing from the social preferences model findings, when subjects are concerned with the leadership decision, the weight they put on the difference in their own monetary payoffs between distributions gets substantially smaller and approaches to zero, implying that they, instead, are rather concerned with their position in comparison with that of the other agent. We also find that though subjects with efficiency loving concerns are the majority of the sample, their willingness to implement their preferences is not statistically high. On the other hand, inequality averse subjects have the higher probability to be willing to decide to decrease the discrepancies between payoffs while the spiteful subjects are less willing to not allow the other person to get a higher payoff than them.

Keywords: Sorting, leadership, willingness to decide, social preferences, efficiency concern, egalitarianism, spitefulness, gender

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ABBREVIATIONS

AIB - Advantageous Inequality Block

CASE - College of Administrative Sciences and Economics

DIB - Disadvantageous Inequality Block

Eng - Engineering Faculty

EFF - Efficiency Lover

ELI - Eliminated due to inconsistent choices

HL - Hault&Laury Risk Aversion Coefficient

IAV - Inequality Averse

ILO - Inequality Lover

WTD - Willingness to Decide

WTP - Willingness to Pay

WTP^a - Willingness to Pay in the Advantageous Inequality Block

WTP^d - Willingness to Pay in the Disadvantageous Inequality Block

1. INTRODUCTION

In social contexts, making decisions on behalf of a group is a task with which people are often faced in their daily lives. These types of decisions can range from choosing a holiday plan for your family to making an investment decision for a fund under the name of your company where the individual preferences determine the payoff distribution for group members.

In the holiday example above, some people may follow their own holiday plan, whilst some may self-sacrifice to adapt the preferences of others. Nevertheless, there may also be some people who would prefer refraining from deciding on behalf of a group and leave it to someone else. Considering the possible decision problems, such a delegation strategy might be beneficial for payoff maximisation in some cases, where being the decider may bring along a self-sacrificial compromise for the group, while the same strategy might reduce the payoff in others.

Proving the real life situations, participants in experiments often act in a way which does not maximise their own monetary payoff when other participants' payoffs are also determined by their action, e.g. Charness and Rabin (2000; 2002), Andreoni and Miller (2002), Balafoutas *et al.* (2013), Fisman *et al.* (2014). This motivates researchers to provide insights into the nature of non-self-interested behaviour of individuals by conducting economic experiments as it is believed that the awareness on social preferences obtained from the experiments can eventually be implemented on several economic frameworks, such as redistribution of income – examples include unemployment benefits, government expenditures on healthcare, social security, *etc.*, changes in the tax schemes, consumer responses to price changes, changes in the wage and employee/employer responses, *etc.*

Surprising enough, though there is a large literature on social preferences experiments, the study of sorting, self-selection and delegation in distributional preferences is rather new. This means that social preferences have not been commonly examined through the perspective of leadership concept, yet. Moreover, Lazear *et al.* (2012) finds that sorting behaviour differentiates individuals who like sharing from those who share but prefer to avoid sharing if possible; so the overall sharing in the end significantly decreases. This finding suggests that if all subjects are asked for their sharing preferences without questioning their willingness to decide or if the decision maker role is randomly assigned independent of the willingness preference of a subject, then the studies using this mechanism will overestimate the extent of

social preferences. Similarly, Dana *et al.* (2006) finds that a substantial part of subjects given the dictator role in the experiment choose a costly exit option if this option leaves the receiver uninformed about the game.

Given this gap and confusion in the literature, Ertac *et al.* (2013) extend self-selection in distributional preferences concept in 3-person groups. They find that some individuals refrain from deciding on behalf of the group even though this choice for that specific distribution problem could turn out at their own disadvantage. Nonetheless, they also find that some individuals insist on choosing the decider role even though refraining is the weakly dominant strategy.

Developing on Ertac *et al.* (2013), the aim of this thesis is to obtain further insight into the relationship between social preferences and willingness to decide for the group, and thus to contribute to the literature with a deeper understanding of the effect of sorting into decision-making and distributional preferences. In order to achieve this goal, an experiment studying willingness to decide in 2-person groups is conducted. The experiment contains 18 decision problems that yield different benefits and costs associated with making the decision together with a different selection mechanism for the decider used in Ertac *et al.* (2013), and an additional risk aversion task followed by a 44-item personality questionnaire. Later, the willingness to decide of individuals is analysed by their social preference types, which are defined by their distributional preferences, and by other explanatory variables introduced into the social preference model. Thus, these all make this study more comprehensive and innovative than previous studies.

The questions investigated are:

1. What are the shares of the archetypes of distributional preferences in the sample?
2. What is the distribution of willing and unwilling individuals?
3. What are the allocation choices of willing and unwilling individuals?
4. Are there any preference reversals in individuals' decisions?
5. Is there a difference between willing and unwilling subjects regarding the social preferences model?
6. How could willingness to decide be explained by social preferences model?
7. What is the relationship between willingness to decide and archetypes of distributional preferences?

8. Is there a relationship between gender and archetypes of distributional preferences?
9. Is gender a significant determinant for willingness to decide?

The thesis is structured as follows: Chapter 2 gives an overview of the existing literature on social preferences and leadership in addition to the sorting into decision-making literature. Chapter 3 introduces the model used in the study: the social preferences model and a second model newly developed on the social preferences model to explain willingness to decide preferences of subjects. Chapter 4 describes the experimental design, Chapter 5 presents the results, and Chapter 6 concludes.

2. OVERVIEW OF THE LITERATURE

As this thesis includes different research areas, the literature review is divided into three sub-parts:

2.1. Distributional Preferences

Distributional preferences term is used to describe situations where the decider has concerns on not only his own monetary payoff but also those of other agents. Most economic models assume that all people are self-concerned and they do not care about others, *per se*. Though this assumption might be true for some people, it is not true for everyone. Reality presents several situations showing that unlike what the self-interest models suggest people are rather cooperative. Some examples are that majority of people pay their taxes, vote, join unions and participate in protests, spend effort on team works despite the best strategy suggested by self-interested models is to do the opposite. This is also observed in experiments that participants often demonstrate behaviours that do not maximise their own monetary payoff when those of others also depend on the decision that they give (Dawes and Thaler, 1988; Isaac and Walker 1988, 1991; Ostrom and Walker, 1991; Ledyard, 1995; Fehr and Gachter, 1996).

Determined by the importance of the others' payoffs in a subject's utility function, distributional choices of subjects yield their archetypes of distributional preferences. The most well-known ones are total payoff maximisation, inequality aversion, spiteful preferences and inequality loving. Loewenstein *et al.* (1989) provide clear evidence which present the importance of relative payoffs of agents. In their study, participants are asked to rank outcomes that vary in distribution of incomes between themselves and the other agent. Then by using these rankings they estimate how relative material payoffs take place in the utility function of the subject. The findings suggest that subjects show a great aversion against disadvantageous inequality. Though many also have the same behaviour towards advantageous inequality, it is statistically weaker in comparison with the previous case.

Similar to these findings of Loewenstein *et al.*(1989), Bolton (1991), Bolton and Ockenfels (1999), and Fehr and Schmidt (1999) develop models which suggest that an individual acts with the motivation to reduce the inequality between payoffs of her own and others; she sacrifices to help others when she is ahead of them, yet at the same time makes

sacrifices resulting in Pareto-damaging outcome, *i.e.* no one is better off but some are worse off, when she is behind.

An alternative model for distributional preferences suggests that people do not strongly dislike the inequality between payoffs but are more inclined to maximise the payoff of the person who has the minimum income with the motivation to increase the total payoffs (Yaari and Bar-Hillel, 1984; Andreoni and Miller, 1998, 2002). Charness and Rabin (2002) test the existing theories for social preferences by letting model parameters to have values in different ranges. They find that the latter model fit individual behaviour better as results show that subjects are more concerned with increasing the overall social welfare than with reducing the discrepancies in payoffs; many of the subjects sacrifice to increase the payoffs for all agents, specifically for minimum payoff agents.

Later, several studies practiced the distributional preferences models on several other contexts, such as distributional preferences among non-student adults, measurement of cross-country differences; the relationship between distributional preferences and political/economic outcomes within a country and political opinions of individuals (Roth *et al.*, 1991; Henrich *et al.*, 2006; Hermann *et al.*, 2008; Henrich *et al.*, 2010; Kranton *et al.*, 2013; Fisman *et al.*, 2014).

2.2. Willingness to Decide

The fact that being a leader in a group often puts the person into a position where she needs to make risky decisions which affect the payoff of all group members and to present herself in competitive environments, it is plausible for studies on leadership on behalf of a group to focus on risk taking behaviour of individuals, and competitiveness to explain the willingness to decide behaviour. Though the leadership concept as a whole extends beyond the aspect of taking risky decisions on behalf of a group and being competitive, these consist of two of the most easily measurable components in terms of experimental economics and social psychology.

Previous empirical studies show inequality between genders regarding the leadership role in several different areas such as in politics, at workplaces and in other public positions (Adler and Izraeli, 1994; Melkas and Anker, 1997; Eagly and Karau, 2002). Also, when the previously mentioned approach on studying leadership is experimentally examined, *i.e.* taking risky decisions for the group, Ertac and Gurdal (2012a) observe a surprising difference between men and women regarding their preferences over willingness to decide on behalf of a group.

Though there is an overall unwillingness to decide on behalf of a group, they further note that this unwillingness is more common among women than in men (Also see Ertac and Gurdal, 2012b and Ertac *et al.,* 2013). They also find that though there are no significant differences on risks taken individually and for the group among women, men tend to take more risk when they are the leader than are individuals.

In addition, results from abstract gamble experiments often show that women are more risk averse than men (Levin *et al.*, 1988; Schubert *et al.*, 1999; Hartog *et al.*, 2002; Moore and Eckel, 2003; Eckel and Grossman, 2008).

For the other component, competitiveness, literature presents that there are systematic gender differences in competitiveness (Niederle and Vesterlund, 2007; Croson and Gneezy, 2009). When competitiveness and distributional preferences relationship is examined, Bartling *et al.* (2009) find that egalitarian subjects less often self-select into competition. Also, when this link is explored for gender differences, experimental studies suggest that women are more egalitarian than men (Barber and Odean; 2001; Croson and Gneezy, 2009).

2.3. Sorting Into Decision-Making

Though social preferences strongly effect individual decisions in the laboratory, Lazear *et al.* (2012) claim that if individuals have the opportunity to sort between sharing and non-sharing environments, the impact of social preferences will be different than the previous case. In order to better understand the effect of sorting, they create three groups of social preferences based on the observed sharing behaviour. First group is labelled as "willing sharers" who always prefer to share, the second is "reluctant sharers" who share but prefer to avoid if possible; and the third group is "non-sharers" who never share. They find that when avoiding the sharing environment is costless then the number of sharers decreases even when positive reciprocity is induced. They also observe that when sharing is subsidised, then the number of sharers entering the game increases; yet this increase comes from the least generous sharers group. Lastly, they find that when sharing brings a cost, it decreases the entry decision but the remaining sharers are those who share generously.

Similarly, experimental studies show that when exiting the dictator game has a low cost, then roughly one third of subjects prefer to have a lower payoff than the exact amount to finish the dictator game (Dana *et al.,* 2006 and Broberg *et al.,* 2007).

The important differences in the results carried by the introduction of sorting into the lab experiments are also observed in different real life contexts in economics, such as charitable giving and blood donations. DellaVigna *et al.* (2012) conduct fundraising experiments. They find that majority of donors refrain from communicating with the fundraiser to not donate but prefer to donate in door-to-door campaigns. Also, Lacetera *et al.* (2012) find a strong relationship between financial incentives and sorting among blood donors.

These studies strengthen the importance of the introduction of sorting into distributional preferences to provide the literature with more explanatory and accurate results.

3. THE MODEL - SOCIAL PREFERENCES AND WILLINGNESS TO DECIDE

3.1. Social Preferences Model

In this section, a similar approach built on Charness and Rabin (2002) is outlined regarding the distributional preferences of subjects in two-person groups. Differing from the work of Charness and Rabin (2002), reciprocity is not included in this model.

Let π_d and π_p denote the decider's and passive agent's payoffs, respectively. Suppose the formulation below represents the decider's preferences:

$$U_d(\pi_p, \pi_d) \equiv (\rho \cdot r + \sigma \cdot s) \cdot \pi_p + (1 - \rho \cdot r - \sigma \cdot s) \cdot \pi_d \quad (1)$$

where

$$r = 1 \; if \; \pi_d > \pi_p, \text{and } r = 0 \text{ otherwise;}$$

$$s = 1 \; if \; \pi_d < \pi_p, \text{and } s = 0 \text{ otherwise.}$$

When examined separately

$$U_d(\pi_p, \pi_d) \equiv \rho \cdot \pi_p + (1 - \rho) \cdot \pi_d, \text{ when } \pi_d \geq \pi_p;$$

$$U_d(\pi_p, \pi_d) \equiv \sigma \cdot \pi_p + (1 - \sigma) \cdot \pi_d, \text{ when } \pi_d \leq \pi_p.$$

This formulation suggests that the decider's utility is a weighted sum of her own material payoff and that of passive agent's where the weight that the decider puts on the passive agent's payoff depends on whether the decider is ahead of or behind the subject. The parameters ρ and σ allow for a variety of distributional preferences.

In that sense, simple competitive preferences form one of the distributional preferences type. This approach is based on the assumption that $\sigma \leq \rho \leq 0$. This expectation implies that the decider always prefer to get as high as possible in comparison to the passive agent while caring about her payoff at the same time. In short, competitive preferences suggest that people like to get higher payoffs comparing with that of others.

A rather more common approach regarding preferences over distributions is 'difference aversion' model. It has been practiced over a long time in the social preferences literature, e.g.

Loewenstein *et al.* (1989), Fehr and Schmidt (1999), Bolton and Ockenfels (2000), Kohler (2011). This model is based on the assumption that people prefer to minimise the differences between their own payoffs and those of the others which corresponds to $\sigma < 0 < \rho < 1$. These ranges for σ and ρ imply that the decider favours the higher monetary outcome while preferring equal payoffs, also wishing to lower passive agent's payoff when she is ahead of the decider. The studies listed above show that the data obtained from ultimatum games, public-good games and several similar games suit the difference aversion model.

However, there are experimental studies presenting evidence which falls short of matching the difference aversion model. For example, Andreoni and Miller (2002) analyse a number of simple dictator game preferences, and find that a substantial part of subjects give money to subjects who are already getting more monetary payoff. This finding in the experiment suggests the opposite of what difference aversion model implies. They define these preferences as social-welfare preferences which also cover the preferences which aim to equalise the payoffs, previously defined as difference aversion preferences.

Subsuming the different cases explored by Andreoni and Miller (2002), Charness and Rabin (2002) added reciprocity into the model and estimated the coefficients for different approaches by letting the weights take on the values $0 < \sigma \leq \rho \leq 1$. This range of parameters implies that subjects always prefer more both for themselves and the passive agent but they are more inclined to favour themselves when they are behind in comparison with the case when they are ahead. Also, when $\rho = \sigma = ½$, then the utility of the decider becomes $U_d(\pi_p, \pi_d) = (\pi_d + \pi_p)/2$ which implies that the decider puts equal weights on both her and the passive agent's payoff. So, basically, social-welfare preferences are a two-person case of a more general concept which is developed by Yaari and Bar-Hillel (1984) where there are more than two players, and players prefer to help all players while they are notably avid to help the worst-off subject. Similarly, earlier studies by Frohlich and Oppenheimer (1984, 1992) suggest that preferences aiming to maximise total payoffs are what subjects reach agreements on together with an income floor regarding all subjects in the group.

The last possibility for the social preferences is categorised as inequality loving preferences where the subject puts a higher payoff on the passive subject's income when she is ahead of the decider rather than she is behind.

3.2. Social Preferences Model with Willingness to Decide

As a new approach in the leadership literature, the above model is further developed by introducing willingness to decide concept to explain leadership preferences of subjects. So basically, in this model the weights γ, ρ and σ are estimated from the willingness to decide preferences of subjects together with those of other explanatory variables such as gender, risk aversion parameter, faculty, distributional preference type/willingness to pay of the decider to increase/decrease the payoff of the passive agent. These independent variables are examined for their effect on the leadership decision of the participants.

Given the fact that the above model, built on the work of Charness and Rabin (2002), is a new approach in the literature, my thesis contributes to the current literature on sorting by addressing leadership decisions through social preferences perspective.

4. EXPERIMENTAL DESIGN

4.1. Sessions

All sessions were conducted in Ankara with the students of TOBB University of Economics and Technology during May 2014. 108 subjects participated in the experiment (79 of male & 29 female) and 10 sessions were conducted; the amount of time spent in one session was on average 40 minutes. Software was programmed using Z-tree (Fischbacher 2007).

Upon arriving, all subjects were informed that they would earn money up to 23 liras according to their performance on the experiment, including a 5-lira show-up fee. Subjects were randomly assigned a unique ID number which identified them and stayed anonymous to the other participants throughout the experiment.

The design of this experiment consists of two parts, followed by a post-experimental questionnaire at the end: willingness to decide over payoff distributions and risk aversion measurement, respectively. In the first part, there are 18 decision tasks while there are 10 in the second.

4.2. Sections

4.2.1. Section I: Elicitation of Willingness to Decide and Distributional Preferences

The design of this part of the experiment builds on Ertac *et al.* (2013) and on Kerschbamer (2010). Subjects were randomly assigned to group of two, which did not change throughout Section I. During the whole experiment, group members were informed neither about the identity of their partners nor about their decisions. There was no interaction between the group members either.

This section consisted of distributional preferences, based on the double price-list technique developed by Kerschbamer (2010), and preferences for willingness to decide on behalf of the other. Subjects were exposed to 18 binary choices between allocations determining the payoff of the decision maker and that of the randomly matched anonymous second party.

In each problem, one of the payoff distributions is egalitarian (i.e., symmetrical), where both subjects get the same payoff, while the other one is non-egalitarian (i.e., asymmetrical), where subjects get unequal payoffs. In half of the problems, the decision maker is behind the second party in the asymmetrical allocation while in the other half the decision maker is ahead in asymmetrical allocation in monetary terms.

The egalitarian and non-egalitarian allocations alternated in each problem with the labels *Option A* and *Option B*. Half of the egalitarian distributions were displayed under the label '*Option A'* (odd numbers: 1, 3, 5 and so on) while the other half were displayed under *'Option B'* (even numbers: 2, 4, 6 and so on).

On the first screen of each period, subjects were asked to choose whether they would like to be assigned to the decider role for that specific distribution problem, and on the following screen, they are asked about the distribution they would choose in case they are assigned to this role. If no group member wants to be the decider, then one of them would be randomly selected for the decider role and her choice would be implemented (see Figure 1.a.).

Similarly, if both group members want to be the decider then the program randomly chooses one of the group members for this role to implement her preference over distributions. In other words, in a group consisting of Player I and Player II, in both cases, where none of the group members want or both of the group members want to be the decider, both Player I and Player II have .5 probability of ending up as the decision maker (see Figure 1.a.).

The distinct side of the selection mechanism in this experiment appears when only one subject wants to be the decider. Instead of directly attaining the decider role to the willing subject, the mechanism puts .5 probability on the willing subject being the decider and .5 probability on random selection between the two subjects which gives .25 probability to the unwilling subject ending up in the decider role despite her unwillingness. For example, let Player I be willing to be the decider while Player II wants to refrain from deciding (see Figure 1.b.). With .5 probability the program directly chooses to give the decider role to the willing subject, who is Player I in this example; and with .5 probability it chooses the random selection option which puts equal probabilities on either subject being the decider independent from her willingness to decide.

Figure 1: The selection mechanism of the decision maker

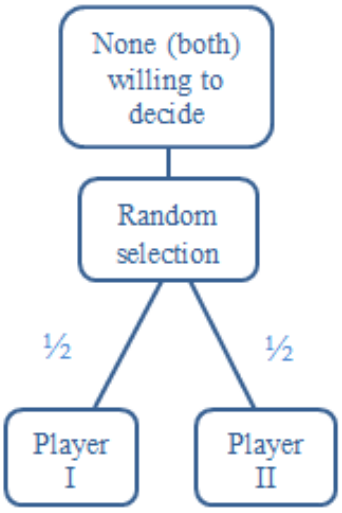

Figure 1.a. None (both) willing to decide

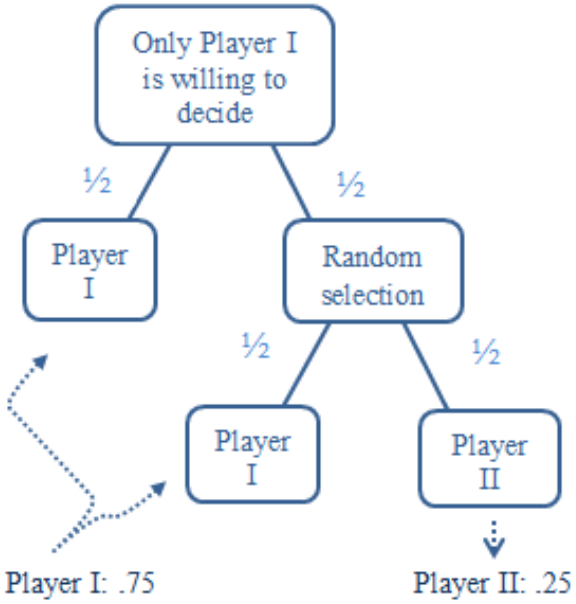

Figure 1.b. Only Player I is willing to decide

If the program chooses the random selection option, then the probability of either subject being the decider is .25 as the probability of this random selection option being chosen is .5 as the probability of either subject being chosen inside this mechanism is .5. Thus, in the end, Player I has .75 probability (.5 from the direct implementation of her willingness + .25 being chosen in the random selection option) to be the decider even though she is the only group member willing to decide, and Player II has .25 probability (the probability of being chosen in the random selection option) to end up as a decider despite her unwillingness. This mechanism motivates the participants to reveal their true preferences over payoff distributions even when they are not willing to decide.

The order of the problems in Table 1 is the same with subjects saw during the experiment. Subjects were informed about the selection mechanism of the decision maker before the experiment. There was no feedback about the willingness to decide of the other group member or the outcome of the problems throughout the experiment.

Table 1: Distribution Problems*

		Egalitarian Distribution		Non-egalitarian Distribution	
		Decider	Other	Decider	Other
Disadvantageous Inequality Block (DIB)	**Problem 1**	50	50	40	65
	Problem 2	50	50	45	65
	Problem 3	50	50	50	65
	Problem 4	50	50	55	65
	Problem 5	50	50	60	65
Advantageous Inequality Block (AIB)	**Problem 6**	50	50	40	35
	Problem 7	50	50	45	35
	Problem 8	50	50	50	35
	Problem 9	50	50	55	35
	Problem 10	50	50	60	35
Reversals Block (RB)	**Problem 11**	50	50	50	75
	Problem 12	50	50	50	100
	Problem 13	50	50	60	50
	Problem 14	50	50	100	50
	Problem 15	50	50	70	95
	Problem 16	50	50	75	50
	Problem 17	50	50	95	70
	Problem 18	50	50	50	60

**The values in Table 1 are in points where 1 point = .2 liras*

As presented in Table 1, the egalitarian allocation gives 50 points to both parties at the exchange rate of 20 Lira-Kurus per point (i.e., 5 pts = 1 lira). In the first and the second blocks both containing 5 problems, the own material payoff in the asymmetrical allocation increases in an order while that of the second party's payoffs stay constant. The binary choices 1 to 5 are labelled in Table 1 (but not in the experimental instructions) as disadvantageous inequality block (DIB). In the DIB, the payoff of the passive agent in the asymmetrical allocation stays constant at 65 pts while that of the decision maker's increases by 5 pts in each following problem from 40 pts in the first one to 60 pts in the last one. In the next 5 problems from 6 to 10 – the advantageous inequality block (AIB) –, the payoff of the passive agent in the

asymmetrical allocation stays constant at 35 pts while that of the decision maker's increases by 5 pts in each following problem from 40 pts to 60 pts.

The last 8 binary decision problems are labelled as reversal block as the first 4 asymmetrical allocations in this block are later also presented in reverse orders. For example, in Problem 11 the asymmetrical allocation consists of (50; 75) points where the first component in the parentheses belongs to the decider and the second component in the very parentheses belongs to the passive agent. Therefore, the reverse pair of this problem should contain (75; 50) in the asymmetrical allocation block which makes Problem 16 the reversed pair of Problem 11. Continuing with this approach, the problems and reverse pairs are as follows: Problem 11 and 16; Problem 12 and 14; Problem 13 and 18; and Problem 15 and 17.

In this experiment, random payment scheme was used; subjects were explained that only one of the 18 decisions would be randomly selected at the end of the experiment for payment.

4.2.2. Section II: Elicitation of Hault&Laury Risk Aversion

Once completing Section I, subjects were introduced to a new part where they would play individually to reveal their individual risk attitude. To measure the incentivised individual risk preferences of subjects a similar version of the Holt & Laury lottery-choice task (2002) was used as commonly referred in economics. There are 10 decisions in this part, asking the subjects to choose between ten paired lotteries of which payoffs range from .06 to 2.31 liras. For the first four pairs, the safe option, Lottery A, gives a higher expected payoff than the risky option, Lottery B; while for the last six pairs the risky option, Lottery B, gives a higher expected payoff than the safe option, Lottery A. Hence, a risk neutral individual is expected to switch from Lottery A to Lottery B at the fifth problem after making four safe choices, and later stick to Lottery B (see, Table 2).

As in Section I, subjects were informed that only one of the ten pairs of lotteries would be randomly selected, then the chosen lottery would be conducted and the payment would be made accordingly.

Table 2: Holt & Laury lottery-choice**

	Lottery A	Lottery B
1	10% chance of 40 pts, 90% chance of 32 pts	10% chance of 77 pts, 90% chance of 2 pts
2	20% chance of 40 pts, 80% chance of 32 pts	20% chance of 77 pts, 80% chance of 2 pts
3	30% chance of 40 pts, 70% chance of 32 pts	30% chance of 77 pts, 70% chance of 2 pts
4	40% chance of 40 pts, 60% chance of 32 pts	40% chance of 77 pts, 60% chance of 2 pts
5	50% chance of 40 pts, 50% chance of 32 pts	50% chance of 77 pts, 50% chance of 2 pts
6	60% chance of 40 pts, 40% chance of 32 pts	60% chance of 77 pts, 40% chance of 2 pts
7	70% chance of 40 pts, 30% chance of 32 pts	70% chance of 77 pts, 30% chance of 2 pts
8	80% chance of 40 pts, 20% chance of 32 pts	80% chance of 77 pts, 20% chance of 2 pts
9	90% chance of 40 pts, 10% chance of 32 pts	90% chance of 77 pts, 10% chance of 2 pts
10	100% chance of 40 pts, 0% chance of 32 pts	100% chance of 77 pts, 0% chance of 2 pts

***The values in Table 2 are in points where 1 point = .03 liras*

Once both parts were finished, a post-experimental questionnaire was administered, asking for basic demographics and 44-item inventory that measures an individual on the Big Five Factors (dimensions) of personality (Goldberg, 1993).

After completing the questionnaire, subjects were paid according to their ID numbers, anonymously. The average earnings were 12.12 liras (this corresponded to $5.8 at the date of the experiment).

5. RESULTS

5.1. Measuring WTP and Creating the Archetypes of Distributional Preferences

Given the design of the experiment in Section I, a rational subject[1] could only switch from the symmetrical allocation to the asymmetrical one in the 5-problem blocks (DIB: 1 to 5 and AIB: 6 to 10) at most once, and never in the other direction. Subjects making multiple switches in any domain are eliminated from the sample as this would dilute the estimations (24 subjects are eliminated[2]). These switch points obtained separately in the two blocks provide information both about the willingness to pay and the types of subjects regarding their distributional preferences.

Building on Kerschbamer's (2010) work, a subject choosing the asymmetrical allocation in the very first decision problem reveals that she is benevolent in the DIB since she is willing to give up her own material payoff just to increase the passive agent's payoff. Respectively, this subject is willing to give up at least 10 points to increase the payoff of the passive agent by 15 points. In Table A1, this is presented with "$WTP^d \geq 0.67$", as it shows that in the DIB the subject is willing to give up 0.67 points of her material payoff to increase that of the passive agent's by 1 point. In this concept, WTP stands for "willingness to pay" and the superscript 'd' shows the DIB while later superscript 'a' shows the AIB. On the contrary, a subject switching to the asymmetrical allocation in the fourth or later (or never) shows malevolence in the DIB. Malevolence implies that the subject is willing to give up her own material payoff just to decrease that of the passive agent; this is represented with a negative WTP^d in Table A1.

Likewise, a subject switching to the asymmetrical allocation in the AIB before the fourth problem reveals malevolence – as she is willing to give up her own income to decrease the passive agent's payoff – while switching at a later stage or not switching at all shows

[1] This relies on the minimal assumptions concerning the rationality of subjects, Kerschbamer (2010) defines a rational subject whose preferences assure the axioms on preferences such as completeness, transitivity and strict monotonicity.

[2] The experiment did not give the subjects the opportunity to reveal indifference in two options. So, the subjects who have multiple switch points are examined for the possibility of their indifference to check whether we can consider them rational or not (see Andersen *et al.*, 2006), however no axioms or rationale could provide a satisfying motivation behind such preferences as they strictly violate the axioms for indifference to hold. Thus, this leaves us with nothing but the necessity to eliminate them from the sample in order to be able to present findings on archetypes of distributional preferences.

benevolence in the AIB. Similar to that of in DIB, a positive WTP implies benevolence whereas a negative value implies malevolence in the AIB (see, Table A1 in the Appendices).

In addition to the WTP, the switch points are also used to determine the archetypes of distributional preferences. These two measures are exploited separately; as they both are built on the same variables, it would cause multicolinearity when they are included in the regression all together.

Following the Balafoutas *et al.*(2013) work, the archetypes of distributional preferences are defined as below:

- EFF: a subject who is benevolent in both domains is efficiency loving;
- IAV: a subject who is malevolent in the DIB while benevolent in the AIB is inequality averse;
- SPI: a subject who is malevolent in both domains is spiteful;
- ILO: a subject who is benevolent in the DIB while malevolent in the AIB is inequality loving;
- ELI: a subject who makes multiple switches in any domain is eliminated.

Therefore, we describe efficiency loving as having the motivation to increase the other party's payoff even if this would result in a decrease in her own payoff. Inequality averse subjects are the ones who prefer the higher payoff whenever possible but prefers to decrease the passive agent's payoff when she gets a higher payoff than she, as the deciders, does. Spiteful subjects favour putting the other agent into a disadvantageous position whenever possible. Inequality lovers, completing the preference types, prefer the other agent to get a higher payoff than them when the asymmetrical allocation gives an advantageous to the other party and prefer the other agent to get a lower payoff than them when the asymmetrical allocation puts the other subject into a disadvantageous position. (For the eliminated subjects please see footnote 2).

Table 3: Distribution of archetypes

Types	Number of subjects* *Incl. ELI | Excl. ELI	Frequency* *Incl. ELI | Excl. ELI
EFF	55	51% | 66%
IAV	14	13% | 17%
SPI	8	7% | 9%
ILO	7	7% | 8%
ELI	24	22% | -
Total	108 | 84	

Table 3 shows the distributions of archetypes in the sample. When the subjects with inconsistent choices (22%) are eliminated, the sample results in 66% of subjects with efficiency concern, 17% with inequality aversion, 9% with spiteful preferences and lastly 8% with inequality loving. These are more or less consistent with the findings of Balafoutas *et al.* (2013); 67%, 13%, 13% and 7%, respectively.

5.2. Willingness to Decide and Allocation Choices

5.2.1. Willingness to Decide and Allocation Choices in Disadvantageous Block

Table 4 and 5 represents the distribution of willing and unwilling subjects regarding the decider role and the allocation preferences of both groups.

In the disadvantageous block, the selfish rationality involved with any positive probability on the other agent choosing the asymmetrical distribution suggests that the subject should refrain from deciding as she could get a higher payoff than that of she could get by willing. Nevertheless, a substantial part of subjects are willing for the problems 1 to 5 (55%). For the other disadvantageous problems (namely Problem 11, 12, 15 and 18) subjects show less willingness in comparison with they did in the first 5 problems; however there are still a large fraction of subjects willing to decide (37%). This decrease in the overall willingness might imply that subjects get a better understanding of the experiment in the following periods.

Table 4: Willingness to Decide and Allocation Choices in the Disadvantageous Block

		Total	Egalitarian	Non-egalitarian
Problem 1	Willing	67%	65%	2%
	Unwilling	33%	30%	3%
Problem 2	Willing	50%	39%	11%
	Unwilling	50%	38%	12%
Problem 3	Willing	45%	14%	31%
	Unwilling	55%	18%	37%
Problem 4	Willing	56%	4%	52%
	Unwilling	44%	6%	38%
Problem 5	Willing	56%	2%	54%
	Unwilling	44%	4%	40%
Problem 11	Willing	38%	13%	25%
	Unwilling	62%	11%	51%
Problem 12	Willing	32%	6%	26%
	Unwilling	68%	20%	48%
Problem 15	Willing	43%	5%	38%
	Unwilling	57%	6%	51%
Problem 18	Willing	35%	8%	27%
	Unwilling	65%	15%	50%

For problems allowing Pareto-improvement for both parties when the decider is at a disadvantageous position in the asymmetrical allocation column (i.e., Problems 4, 5 and 15), the willingness to decide depends on risk aversion of the subject ($p<.02$) and the belief that she has on the decider's choosing the asymmetrical allocation. For the aforementioned 3 problems, 48% of subjects are unwilling.

5.2.2. Willingness to Decide and Allocation Choices in the Advantageous Block

Given the selection mechanism regarding the leader role, both selfishly rational preferences and behindness aversion indicate that subjects should be willing to decide for each decision problem when they earn more than the passive agent in the asymmetrical allocation column. Unlike the selfish rationality violation of subjects when they are behind, only a small fraction of subjects violate this. The highest percentages of violations are observed in Problems 6 and 7, 14% and 18 %, respectively. Overall, subjects show a great willingness for deciding.

Table 5: Willingness to Decide and Allocation Choices in the Advantageous Block

		Total	Egalitarian	Non-egalitarian
Problem 6	Willing	86%	85%	1%
	Unwilling	14%	13%	1%
Problem 7	Willing	82%	79%	4%
	Unwilling	18%	17%	1%
Problem 8	Willing	89%	73%	17%
	Unwilling	11%	10%	1%
Problem 9	Willing	94%	42%	52%
	Unwilling	6%	5%	1%
Problem 10	Willing	94%	32%	62%
	Unwilling	6%	4%	2%
Problem 13	Willing	96%	7%	89%
	Unwilling	4%	0%	4%
Problem 14	Willing	95%	2%	93%
	Unwilling	5%	4%	1%
Problem 16	Willing	95%	1%	94%
	Unwilling	5%	2%	2%
Problem 17	Willing	95%	1%	94%
	Unwilling	5%	2%	3%

5.3. Preference Reversals[3]

A preference reversal is a term used to characterise experimental results which display violations regarding the transitivity of the preferences (Karni and Safra, 1987). This phenomenon is first presented by Lichtenstein and Slovic (1971) who designed experiments to reveal the preferences of subjects over pairs of lotteries. Soon after, exposing the subjects to two risky lotteries with close expected values has become a common method to identify the preference reversals.

For example, let lottery H offer a high probability of winning a modest sum of money while lottery L offers a low probability of winning a relatively large amount of money. These lotteries from the study of Tversky *et al.* (1990) are presented below:

Lottery H: with probability of .78 win $10

Lottery L: with probability of .08 win $100

Their findings suggest that when subjects were offered lottery H and L, most of them chose H over L whose expected utility is higher than that of H, $8 and $7.8, respectively. Nevertheless, when the same subjects were asked for their lowest selling price of these lotteries, a majority of them state a higher price for lottery L than for H.

For a simple diagnostic analysis of this preference reversal, let C_H and C_L denote the minimum selling price (cash equivalent) of the lotteries H and L; and $\succ$ and $\sim$ denote strict preference and indifference relationship between the preferences, respectively. Therefore, with the assumption that invariance holds, which suggests that a decision maker prefers a lottery A to a cash amount B if and only if her selling price for A exceeds B – implying that C_A = B iff A $\sim$ B, a preference reversal happens to arise when H $\succ$ L, and $C_L > C_H$, entailing the cycle below

$$C_H \sim H \succ \mathrm{L} \sim C_L \succ C_H$$

where the two equalities are implied by invariance and the two revealed preferences represent inequalities create the preference reversal (Tversky *et al.*1990).

[3] Prior to conducting the experiment the main expectation was to observe a significant number of preference reversals, hence the main aim of this study was to try to explain the factors affecting a subject's making preference reversals. However, failing the expectations the observations were not satisfying enough to focus on this very topic. Therefore, though the subject 'Preference Reversals' is not the focus of this study, the details are presented in this section.

However, different than this common methodology on eliciting preference reversals, in this experiment, a distinct approach is referred to bring out such violations. Since there were no lotteries involved in this procedure, the preference reversals occurred solely by the violation of transitivity rather than getting accompanied by invariance as no selling prices were included in the experiment.

Given the mechanism of Section I in the experiment, if a subject who is willing to decide for a problem in the Reversals Block (RB) and choosing the egalitarian distribution later chooses the non-egalitarian distribution while keeping her willingness to decide present when she is faced with the reverse of the very problem reveals preference reversal by violating the transitivity axiom[4].

The reversal pairs are presented below:

- **Reversal I:** Let Subject A be willing to decide for Problem 11 and choose the egalitarian distribution over the non-egalitarian

$$(50\,;50) \succ (50{:}\,75) \tag{2}$$

where the first component in the parentheses belongs to the decider, who is Subject A in this example, while the second belongs to the other agent.

By not refraining from deciding, Subject A indirectly reveals the following preference

$$(50\,;50) \succ (75{:}\,50) \tag{3}$$

as the worst outcome Subject A could get by refraining is (50 ; 50) while the best outcome she could get by avoiding deciding is (75 ; 50).

Following this, if Subject A shows willingness to decide and chooses the non-egalitarian distribution for Problem 16

$$(75\,;50) \succ (50{:}\,50) \tag{4}$$

[4] Transitivity : For all $x, y, z \in X$, if $x \succcurlyeq y$ and $y \succcurlyeq z$, then $x \succcurlyeq z$ (Mas-Colell *et al., 1995).*

then (3) followed by (4) clearly violates transitivity, assuming that preferences are reflexive[5], which creates the preference reversal presented below:

$$(75\,;50) \succ (50{:}\,50) \succ (75{:}\,50) \qquad (5)$$

The subjects who exhibit preference reversals for this distribution pair consist of 10% of the sample. The majority of subjects violating transitivity are males, 80%; while females consist of 20% of this group. When these subjects are grouped according to their types, efficiency lover, inequality averse and eliminated subjects have the same frequency in showing violations of transitivity, 27%, while spiteful subjects present the 18% of the group. There is no inequality lover subject showing preference reversals.

- **Reversal II:** Let Subject A be willing to decide for Problem 12 and choose the egalitarian distribution over the non-egalitarian

$$(50\,;50) \succ (50{:}\,100) \qquad (6)$$

where the first component in the parentheses belongs to the decider, who is Subject A in this example, while the second belongs to the other agent.

By not refraining from deciding, Subject A indirectly reveals the following preference

$$(50\,;50) \succ (100{:}\,50) \qquad (7)$$

as the worst outcome Subject A could get by refraining is (50 ; 50) while the best outcome she could get by avoiding deciding is (100 ; 50).

Following this, if Subject A shows willingness to decide and chooses the non-egalitarian distribution for Problem 14

$$(100\,;50) \succ (50{:}\,50) \qquad (8)$$

Then (7) followed by (8) clearly violates transitivity, assuming that preferences are reflexive, which creates the preference reversal presented below:

$$(100\,;50) \succ (50{:}\,50) \succ (100{:}\,50) \qquad (9)$$

[5] Reflexiveness: $x \succcurlyeq x$, for all $x \in X$ (*ibid).*

Unlike what expected prior to conducting the experiment there are no significant preference reversals observed for this distribution pair, 3%.

- **Reversal III:** Likewise, let Subject A be willing to decide for Problem 13 and choose the non-egalitarian distribution over the egalitarian

$$(60\,;50) \succ (50{:}\,50) \tag{10}$$

where the first component in the parentheses belongs to the decider, who is Subject A in this example, while the second belongs to the other agent.

Following this, if Subject A shows willingness to decide and chooses the egalitarian distribution for Problem 18

$$(50\,;50) \succ (50{:}\,60) \tag{11}$$

By not refraining from deciding, Subject A indirectly reveals the following preference

$$(60\,;50) \succ (50{:}\,50) \tag{12}$$

as the worst outcome Subject A could get by refraining is (50 ; 50) while the best outcome she could get by avoiding deciding is (60 ; 50).

Then (10) followed by (11) and indirectly by (12) clearly violate transitivity, assuming that preferences are reflexive, which creates the preference reversal presented below:

$$(60\,;50) \succ (50{:}\,50) \succ (60{:}\,50) \tag{13}$$

The subjects who exhibit preference reversals for this distribution pair consist of 6% of the sample. Unlike the ratios in Reversal 1, 70% of subjects making this reversal are females. However, this rather small group is not suitable to draw conclusions based on the types as half of the subjects are from the eliminated group as a result of their inconsistent choices in the first two blocks.

- **Reversal IV:** Let Subject A be willing to decide for Problem 15 and choose the egalitarian distribution over the non-egalitarian

$$(50\,;50) \succ (70;95) \tag{14}$$

where the first component in the parentheses belongs to the decider, who is Subject A in this example, while the second belongs to the other agent.

By not refraining from deciding, Subject A indirectly reveals the following preference

$$(50\,;50) \succ (95{:}\,70) \tag{15}$$

as the worst outcome Subject A could get by refraining is (50 ; 50) while the best outcome she could get by avoiding deciding is (95 ; 70).

Following this, if Subject A shows willingness to decide and chooses the non-egalitarian distribution for Problem 17

$$(95\,;70) \succ (50{:}\,50) \tag{16}$$

Then (15) followed by (16) clearly violates transitivity, assuming that preferences are reflexive, which creates the preference reversal presented below:

$$(95\,;70) \succ (50{:}\,50) \succ (95{:}\,70) \tag{17}$$

Unlike what expected prior to conducting the experiment there are no preference reversals observed for this distribution pair.

5.4. The Model

5.4.1. Social Preferences Model

The sample means of ρ and σ are estimated by performing maximum likelihood estimation on the binary-response data using the logit regression. Therefore, the values that best match the predicted probabilities of the observed behaviour are determined. Below is the logit regression used to estimate the parameters:

$$p(Egal) = \frac{e^{U(Egal)}}{e^{U(Egal)} + e^{U(Non-egal)}} \tag{18}$$

where $p(Egal)$ represents the probability of choosing the egalitarian distribution when faced with two binary distributions of which one is non-egalitarian. U(Egal) and U(Non-egal) are the utilities that the decision maker obtains from choosing the egalitarian and the non-egalitarian distributions, respectively. The utilities are only defined for the decider.

In order to estimate (18), let L1 and R1 denote the payoffs of the decider and the passive agent, respectively, in the egalitarian distribution. Similarly, let L2 and R2 denote the payoffs of the decider and the passive agent, respectively, in the non-egalitarian distribution. Then,

$$\begin{aligned} U(Egal) &= (\rho \cdot r_1 + \sigma \cdot s_1) \cdot R1 + (1 - \rho \cdot r_1 - \sigma \cdot s_1) \cdot L1 \qquad (19) \\ &= L1 \qquad \textit{(As L1=R1 in egalitarian distributions)} \end{aligned}$$

and

$$U(Non-egal) = (\rho \cdot r_2 + \sigma \cdot s_2) \cdot R2 + (1 - \rho \cdot r_2 - \sigma \cdot s_2) \cdot L2 \tag{20}$$

Therefore, the logit function is

$$\begin{aligned} U(Egal) - U(Non-egal) &= L1 - (\rho \cdot r + \sigma \cdot s) \cdot R2 - (1 - \rho \cdot r - \sigma \cdot s) \cdot L2 \qquad (21) \\ &= L1 - L2 + \rho \cdot r \cdot (L2 - R2) + \sigma \cdot s \cdot (L2 - R2) \end{aligned}$$

Since the dummies s and r are only presented in the utility function for the non-egalitarian distribution their subscripts are dropped.

Hence, the regression to be estimated becomes

$$log\left(\frac{p(Egal)}{1-p(Egal)}\right) = \beta_0 + \gamma \cdot (L1 - L2) + \rho \cdot r \cdot (L2 - R2) + \sigma \cdot s \cdot (L2 - R2) \quad (22)$$

where β_0 represents the constant, γ measures the effect of a change in the decider's payoff between egalitarian and non-egalitarian options, ρ again is the weight put on the passive agent's payoff when the decider is ahead, and σ is the weight put on the passive agent's payoff when the decider is behind.

Table 6 shows the parameter estimates for the logit model.

Table 6: Regression estimates for γ, ρ and σ

Logit regressions. Dependent variable: ChoiceEgal – Choosing the egalitarian allocation		
	(All subjects)	(Except the eliminated)
VARIABLES	ChoiceEgal	ChoiceEgal
γ	0.175***	0.216***
	(0.0222)	(0.0357)
ρ	0.0907***	0.103***
	(0.0131)	(0.0170)
σ	0.000109	0.00369
	(0.00418)	(0.00501)
Constant	-0.537***	-0.530***
	(0.124)	(0.166)
Prob>chi2	0.000	0.000
Observations	1,944	1,512

N^1=108 and N^2=84 (Subjects with inconsistent choices are eliminated)
Robust standard errors are in parentheses, clustered by subject.
*** p<0.01, ** p<0.05, * p<0.1

The estimate for σ, the weight that the subject puts on the passive agent's material payoff when she is at a disadvantageous position in the asymmetrical allocation, is not significant even when the subjects with inconsistent choices are eliminated. The findings from the logit regression suggest that γ, the weight put on the own material payoff difference between egalitarian and non-egalitarian allocation is .22 when the inconsistent choices are eliminated. The weight put on the passive subject's payoff, ρ, is estimated as .10 when the decider is ahead. Pseudo likelihood is higher when the inconsistent choices are eliminated.

When the model parameters are estimated separately for each archetype of distributional preferences, γ and ρ show differences. Table 7 presents the type specific logit regressions. Type EFF, SPI and ILO subjects put almost the same amount of weight on the difference between egalitarian and non-egalitarian allocations regarding their own material payoff; .230, .238 and .216, respectively. As expected, $\rho > 0$, significantly, .16, and has a higher value than the overall estimate, .10. Also, meeting the expectations, $\rho < 0$ for type SPI and ILO subjects as these subjects reveal malevolence. The parameter σ is not significant for any of these three types.

Table 7: Regression estimates for γ, ρ and σ by archetypes

Logit regressions. Dependent variable: ChoiceEgal – Choosing the egalitarian allocation				
VARIABLES	(EFF) ChoiceEgal	(IAV) ChoiceEgal	(SPI) ChoiceEgal	(ILO) ChoiceEgal
γ	0.230***	0.432***	0.238***	0.216***
	(0.0462)	(0.109)	(0.0592)	(0.0575)
ρ	0.160***	0.111**	-0.208***	-0.144**
	(0.0243)	(0.0514)	(0.0424)	(0.0651)
σ	0.00697	0.0178*	-0.00625	0.0238
	(0.00621)	(0.0105)	(0.0288)	(0.0277)
Constant	-0.911***	0.458**	1.093***	0.0568
	(0.254)	(0.232)	(0.377)	(1.032)
Prob>chi2	0.000	0.000	0.000	0.000
Observations	990	252	144	126

N^{EFF}=55; N^{IAV}=14; N^{SPI}=8 and N^{ILO}=7 (Subjects with inconsistent choices are eliminated)
Robust standard errors are in parentheses, clustered by subject.
*** p<0.01, ** p<0.05, * p<0.1

Type IAV subjects show a greater weight on the difference in their own payoff between egalitarian and non-egalitarian allocations, $\gamma = .432$ (p<.01). The parameter $\rho > 0$, significantly, and it gives the closest estimate to the overall ρ, .111. The parameter σ is significant only for this type, and it is close to 0 but still shows that the positive weight they put on the passive subject's payoff when they are behind, .018.

Though parameter estimates differ among archetypes, the differences between the parameters of efficiency loving and inequality averse subjects are not statistically significant while the estimates for spiteful and inequality averse subjects differ from the rest of the sample (See, Table A2 in the Appendices). However, since the subjects with these two types consist of

the minority of the sample, 14% in total, the estimates for the representative individual obtained from the sample as a whole can be considered as an accurate measure.

However, the significant differences in the sample while exploiting the social preferences model appear when the sample is divided into two groups, as willing and unwilling subjects. Statistics show that willing subjects put a greater weight on the differences in their own payoff between the egalitarian and non-egalitarian distributions than the unwilling subjects, .271 and .153, respectively. Similarly, the weights put on the passive agent's payoff when the decider is ahead differ between the willing and unwilling subjects. Interestingly, unwilling subjects put a greater weight on the passive agent's payoff when the decider is at an advantageous position in the asymmetrical allocation than the willing subjects, .186 and .10, respectively. Statistics show that these differences between the estimates of γ and ρ significantly differ between the willing and unwilling subjects (See, Table A3 in the Appendices). Again, σ is insignificant for all three regressions.

Table 8: Regression estimates for γ, ρ and σ by willingness to decide

Logit regressions. Dependent variable: ChoiceEgal – Choosing the egalitarian allocation			
VARIABLES	Basic Model	w/ Willing Sbjs	w/ unWilling Sbjs
γ	0.216***	0.271***	0.153***
	(0.0357)	(0.0383)	(0.0330)
ρ	0.103***	0.100***	0.186***
	(0.0170)	(0.0206)	(0.0310)
σ	0.00369	0.00916	-0.00152
	(0.00501)	(0.00909)	(0.00593)
Constant	-0.530***	-0.372	-0.711***
	(0.166)	(0.255)	(0.218)
Prob>chi2	0.000	0.000	0.000
Observations	1,512	1,049	463

Subjects with inconsistent choices are eliminated.
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Therefore, this significance of the differences between the parameter estimates of these two groups might suggest that sorting is required when certain policy interventions are in focus as there are discrepancies between the distributional concerns of subjects who are willing and who are unwilling.

5.4.2. Applying Social Preferences Model to Willingness to Decide Concept – estimating ρ and σ with WTD

Analogous with the social preferences model, a logit regression is used to estimate the parameters. Similar to that of social preferences, (22), the regression to be estimated is

$$log\left(\frac{p(Willing)}{1-p(Willing)}\right) = \beta_0 + \gamma \cdot (L1 - L2) + \rho \cdot r \cdot (L2 - R2) + \sigma \cdot s \cdot (L2 - R2) + \beta_4 \cdot X \quad (23)$$

where $p(Willing)$ is the probability of willing to decide, X represents the other explanatory variables added into the regression and β_4 measures the effect of X.

Surprisingly enough, the logit regression analyses show that when willingness to decide is the dependent variable, then γ, the weight put on the difference in own payment between egalitarian and non-egalitarian choices, becomes much smaller and gets closer to 0, while it is estimated as 0.216 in the common social preferences model.

On the other hand, ρ, the weight put on the passive agent's payoff when the decider is ahead, is estimated almost the same with that is estimated in social preferences model without willingness to decide. While σ, the weight on the passive agent's payoff when the decider is behind, is not found significant in the common social preferences model, it is significantly estimated as .028 in this model. The fact that the estimates of ρ and σ don't change between different models with willingness to decide show their robustness.

These estimates of ρ and σ fall into the range $0 < \sigma \leq \rho \leq 1$ which is suggested by Andreoni and Miller (2002) and Charness and Rabin (2002). Though the estimate of σ is the same with that of Charness and Rabin (2002), their estimate for ρ is much higher than this model predicts, .424 vs .112, respectively. Considering that the estimate of ρ is almost the same between the model adapted from Charness and Rabin (2002), common social preferences model and the one with WTD, the difference between the estimates of ρ's might be attributed to sampling differences, such as culture, the faculties of students, etc.

Table 9: WTD based on Social Preferences Model

Logit regressions. Dependent variable: isWilling – Being willing to decide				
VARIABLES	(1)	(2)	(3)	(4)
$\gamma^{\dagger}$	0.0187***	0.0193***	0.0190***	0.0191***
	(0.00699)	(0.00721)	(0.00714)	(0.00713)
$\rho^{\dagger}$	0.111***	0.113***	0.112***	0.112***
	(0.0181)	(0.0188)	(0.0185)	(0.0186)
$\sigma^{\dagger}$	0.0271***	0.0281***	0.0277***	0.0277***
	(0.00463)	(0.00475)	(0.00468)	(0.00469)
gender$^{\text{ϟ}}$		0.0847**	0.0921**	0.0807*
		(.04225)	(0.0426)	(.0442)
HL$^{\text{ϯ}}$		-0.0085		
Eng$^{\text{ϟ}}$		-0.0067		
		(0.0518)		
CASE$^{\text{ϟ}}$		-0.1041*		
		(.0627)		
EFF$^{\text{ϟ}}$		-.0665	-0.0628	
		(0.0491)	(.0502)	
SPI$^{\text{ϟ}}$		-0.2286**	-0.1808**	
		(0.1012)	(.093)	
ILO$^{\text{ϟ}}$		-0.1097*	-0.1146*	
		(0.0623)	(.0714)	
$^{\xi}$WTP^{d}				-0.000024
$^{\xi}$WTP^{a}				0.000116**
Constant	0.543***			
	(0.128)			
Prob(chi2)	0.000	0.000	0.000	0.000
Observations	1,512	1,512	1,512	1,512

Robust standard errors in parentheses; clustered by subject.
*** p<0.01, ** p<0.05, * p<0.1

†: The variables for γ, ρ and σ are presented as coefficients in order to compare the results with the findings of Charness and Rabin (2002).
ϟ: The variables gender, Eng, CASE, EFF, SPI, ILO are in margins.
ϯ: The variable HL is represented in its marginal effect, i.e. the effect of an increase at the switch point to the Lottery B by 1 point on the dependent variable.
ξ: The variables WTP^{d} and WTP^{a} are presented in their marginal effects, i.e. the effect of an increase in these variables by .001 on the dependent variable.

Overall, the parameter estimates of γ, ρ and σ suggest that subjects are not concerned much with the differences in their own payoffs between the egalitarian and non-egalitarian distributions while they are deciding to decide but they rather do care about their position in

comparison with that of the passive agent when they are faced with willingness to decide concept.

Consistent with the previous studies, women are significantly less willing to decide on behalf of a group (Croson and Gneezy, 2009; Ertac and Gurdal, 2012a; 2012b; Ertac *et al.*,2013). Specifically in this experiment, being a woman decreases the willingness to decide ($p<.05$). The fact that in order to get into a position of a leader, one needs to self-select herself into competitive environments, this finding is also in line with the conclusions of competitiveness and gender studies. These studies show that there is a significant difference between the competitive behaviours of men and women, which further can help explaining the observed gender pay gap and occupational changes for promotion (Gneezy et al., 2003; Niederle and Vesterlund, 2007, 2010; Sutter and Rützler, 2010; Wozniak et al., 2010).

Failing both the expectations built prior to conducting the experiment and findings from the experiments testing competitiveness and risk aversion (Balafoutas *et al.*, 2012; Bartling *et al.* 2009), risk aversion parameter is not a significant explanatory variable for individuals' willingness to decide behaviour. However, as previous studies also find (Gneezy and Potters, 1997; Croson and Gneezy, 2009; Balafoutas *et al.* 2012), a Pearson χ^2 test shows that women are significantly more risk averse than men ($p<.02$).

One of the most interesting results from this experiment is that spiteful subjects are less willing to decide in comparison to the inequality averse subjects who rank the highest for willingness to decide among archetypes of distributional preferences ($p<.05$). Similarly, inequality lover subjects, who consist of the 8% of the sample as do the spiteful subjects, are less willing to decide comparing with inequality averse subjects ($p<.1$). Being an efficiency lover does not have a significant effect on willingness to decide.

In order to give a better picture for the willingness and distributional preferences types of subjects found in the regression, Table 10 below presents the archetype specific willingness preferences.

Table 10: Distributional Preference Types and Willingness to Decide

Types	Willingness (Overall)	Willingness when behind**	Willingness when ahead***
EFF	70%	48%	92%
IAV	74%	55%	93%
SPI	62%	29%	94%
ILO	64%	40%	89%
ELI	69%	53%	85%

****** Periods 1, 2, 3, 4, 5, 11, 12, 15 and 18.

******* Periods 6, 7, 8, 9, 10, 13, 14, 16 and 17.

As Table 10 shows, when overall willingness for deciding is analysed, the highest willingness is observed among inequality-averse subjects (74%). They also rank the highest when they are behind the passive agent – when unwilling could yield a higher payoff (55%). A Pearson χ^2 test rejects the null hypothesis of independence between type IAV and willingness to decide (p=.09). The same hypothesis is rejected at a higher significance level when it is tested only for the decision problems where the subject is behind than the passive agent in the asymmetrical allocation column (p=.05). So, this result implies that the inequality averse subjects are eager to take the leader role to eliminate the inequality in the allocations when they are behind the passive agent. However, a Pearson χ^2 test shows that this association becomes insignificant when the decider is ahead (p=0.68).

Even though subjects with efficiency concern constitute the largest part of the sample together with their second highest rank in overall willingness to decide, a Pearson χ^2 test shows that there is no relationship between willingness to decide and having efficiency concern (p=.47). The insignificant relationship is also present in both cases, when the decider is behind and when the decider is ahead (p=.27 and p=.77, respectively).

The second significant relationship between the archetypes of distributional preferences and willingness to decide is observed when a Pearson χ^2 test is run on spiteful subjects. The test rejects the null hypothesis of independence between type SPI and overall willingness to decide (p=.03). This suggests that spiteful subjects are significantly less willing to decide as they have the lowest rank in overall willingness to decide. The significance level increases when the hypothesis is tested for the problems where the decider is at a disadvantageous position (p=.00). This finding shows that even though spiteful subjects are malevolent regarding their

distributional preferences, they are significantly less willing to take the leader role and implement their preferences despite the possibility of ending up at a worse outcome when the other agent takes the leader role and chooses the worse outcome. Similar to that of type IAV, statistics suggests that this relationship becomes insignificant when the decider is ahead (p=.41).

The statistics fall short of rejecting the null hypothesis of independence between inequality lover subjects and overall willingness to decide (p=0.20). The statistics are neither significant when the decider is ahead nor when behind (p=.24 and p=.35, respectively).

These findings differ from Balafoutas *et al.* (2012) findings on the relationship between competitiveness and archetypes of distributional preferences. They find that inequality averse and spiteful subjects shy away from competition, while efficiency lovers are more willing to enter the competitive environment. This implies that spiteful and inequality averse individuals are not often expected to appear as leaders while efficiency lovers have a higher tendency to be leaders. However, this difference could be attributable to the power of relationship between competitiveness and willingness to decide. As in this thesis the subjects are concerned with determining the social welfare by willing to implement their own preferences while those in the Balafoutas *et al.* (2012) experiment act with self-selection concern, the motivation of subjects in these two experiments completely differ which can further result in different findings.

The above findings obtained by analysing the relationship between archetypes of distributional preferences and willingness to decide present the importance of sorting. Similar to that of Lazear *et al.* (2012) findings, when sorting is introduced into the data, the overall concern of efficiency declines. As analysis shows, efficiency lovers do not necessarily would like to take the leader role to implement their decisions. They refrain from deciding when they believe in any positive probability for the other agent choosing the non-egalitarian distribution, which would provide them a higher payoff than the case that they take the leader role, despite the probability that the other agent might not choose the Pareto-improving distribution and the concerned efficiency might not be reached in the end. Similarly, spiteful subjects rather prefer not to implement their competitive preferences even though the other agent can get the decider role and get a higher payoff for herself.

In the last model, instead of archetypes of distributional preferences, willingness to decide parameters are used to explain willingness to decide behaviour. The results show the estimates for the weight on the difference in own payoff between egalitarian and non-egalitarian

choices, weight on the other subject's payoff when the decision maker is ahead/behind do not show a significant difference than the previous models. In addition, it also suggests that the decider's willingness to pay to increase the other agent's payoff when she, as a decider, is ahead increases the willingness to decide by .000116 ($p<.01$). However, the decider's willingness to pay to increase the other agent's payoff when she, as a decider, is behind does not have a significant effect on a person's willingness to decide behaviour.

5.5. Gender and Archetypes of Distributional Preferences Relationship

In line with the previous studies suggesting that distributional preferences differ significantly between men and women, a Pearson χ^2 test rejects the hypothesis that there is no relationship between gender and archetypes of distributional preferences ($p=.00$). Table 11 below presents the distribution percentage of the archetypes among women and men.

Table 11: Distribution of archetype percentages among women and men

Types	Women	Men
EFF	31%	58%
IAV	21%	10%
SPI	3%	9%
ILO	10%	5%
ELI	35%	18%

Analyses suggest a significant difference for all types regarding the distributional preferences between women and men. As seen from Table 11, women are more egalitarian than men (Andreoni and Vesterlund, 2001; Guth *et al.*, 2007). Also, the analysis of efficiency loving types shows that men have a higher level of efficiency concern than women. This might be explained with the findings of earlier studies showing that men emerge as leaders strikingly more often than do women (Ertac and Gurdal, 2012a, 2012b). As leaders are responsible of the well-being of their group then it is plausible to expect that they have a higher concern for efficiency. Another interesting finding might be that the percentage of women making inconsistent choices is twice that of men.

6. CONCLUSIONS

This thesis experimentally studies the relationship between distributional preferences and willingness to decide also focusing on the importance of sorting into-decision making. While the studies on different aspects of leadership from the perspective of competitiveness, risk aversion, culture, hormones, and gender have received a rather high amount of attention in the recent years, the connection of distributional preferences and leadership has been ignored. However, to make the analysis of the link between these two more valid and realistic, sorting into decision-making concept needs to be introduced. As being the leader necessitates taking decisions on behalf of a group and often determining the overall well-being of other people, analysing the impact of distributional preferences on willingness to decide, with a more down to earth results supported by sorting, can provide a simple-minded touchstone for a better insight of the determinants of leadership.

The most important findings come from the link between willingness to decide and archetypes of distributional preferences. The analyses suggest that despite their concern for efficiency, there is no significant relationship between the efficiency lover type and willingness to decide, which means that efficiency lover subjects do not necessarily want to take the leader role to implement their Pareto-improving decisions. However, inequality averse subjects have a higher tendency to take the leader role and decrease the difference between payoffs of subjects. These findings contradict with the findings of Balafoutas *et al.* (2012) who observe that efficiency lover subjects self-select significantly more often into competitive environments while inequality averse subjects shy away from competition (Bartling *et al.* 2009). This might be a direct result of the different motivations of subjects in the experiments: in this experiment subjects are expected to determine the payoff of the passive agent as well as that of their own while in the experiments of Balafoutas *et al.* (2012) and Bartling *et al.* (2009) subjects later have only self-concern while their competitiveness levels are measured.

Interestingly, spiteful subjects are rather reluctant to take the leader role and implement their own distributional preferences which exhibit malevolence in both cases, when they are behind and when they are ahead. This seems consistent with the findings of Balafoutas *et al.* (2012) based on the assumption that the two aspects of leadership, willingness to decide and competitiveness, are somewhat related. Similarly, inequality loving subjects also show reluctance on willing to implement their preferences.

The results show another interesting finding that the weight on the own difference in payoffs between egalitarian and non-egalitarian choices declines substantially and gets close to 0 while the parameter estimates for ρ and σ do not exhibit much of a difference from the common social preferences model. This finding might imply that at a point of deciding whether to decide or not, a subject cares more about the relative position of herself for the asymmetrical distribution in comparison with the other agent rather than caring much about the difference in her own payoff between distributions. As there are no previous studies addressing to this very point, further research is needed to explain the underlying reasons of this behaviour.

When the social preferences model of Charness and Rabin (2002) is used to explain the data, the results show that the parameter estimates in the model, *i.e.* the weight put on the own payoff difference between distributions, the weight put on the passive agent's payoff when the decider is ahead and when the decider is behind, differ among willing and unwilling subjects. This implies that without the option of sorting the model would overestimate the impact of distributional preferences, therefore sorting is required when certain policy interventions are in focus.

Differing from the studies on sorting in distribution problems – which yield a fixed payoff when a subject refrains from deciding – in this experiment, opting out of decision-making means that the other agent will determine the payoff of the subject who just opted out (for a similar design see Ertac *et al.* 2013). Within this context, differing from the previous findings (Ertac and Gurdal, 2012a, 2012b; Ertac *et al.*, 2013), the results show that only a small fraction of subjects refrain from deciding when refraining brings a lower payoff or put them into a disadvantageous position. However, for the problems where the passive agent is at an advantageous position in the non-egalitarian distribution about 50% of subjects are willing to decide while the dominant strategy is to refrain from deciding. This might be a result of the new selection mechanism for the decider which gives a .25 probability to unwilling subjects while the other party is willing; subjects might be motivated to prefer to be willing to decide as a result of this mechanism.

The final important findings of this thesis are the gender specific differences. Results presents a replication of a clear gender difference in the willingness to decide (Croson and Gneezy, 2009; Ertac and Gurdal, 2012a; 2012b; Ertac *et al.* 2013)– being a woman decreases willingness to decide by .085 times. Also, as previous studies suggest (Barber and Odean, 2001; Croson and Gneezy, 2009), women are more risk averse in general ($p<.00$). In addition, consistent with the earlier findings on the difference in distributional preferences between men

and women (Andreoni and Vesterlund, 2001; Güth et al., 2007), a Pearson χ^2 test shows that women are more egalitarian than men, and men are more of an efficiency lover than women ($p<.00$ for both). These findings further can help explaining the observed gender pay gap and occupational changes for promotion (Gneezy et al., 2003; Niederle and Vesterlund, 2007, 2010; Sutter and Rützler, 2010; Wozniak et al., 2010).

Despite the expectations for preference reversals prior to conducting the experiment, the number of subjects who systematically violate transitivity regarding distributional preferences and willingness to decide is insignificantly small.

Most of the studies on distributional preferences build on the laboratory experiments where the subjects are attained to the decider role randomly. However, in real life contexts people have the opportunity to avoid such environments. Hence, measuring distributional preferences without giving subjects the option of sorting overestimates the extent of social preferences. Similar to the findings of Lazear *et al.* (2012), the fact that willingness to decide differ among different archetypes of distributional preferences, focusing on sorting reveals its importance in several economic contexts such as fund-raising, blood donation, labour market decisions, *etc.*

Further research should study the determinants of willingness to decide and its relationship with distributional preferences across different decision-making contexts. Motivated by the findings of Fisman *et al.*(2014), wealthier subjects are less fair-minded while low income subjects and African Americans have a higher concern for efficiency, one might add this variable into the sorting into decision-making concept. Also, subjects' beliefs on the other agent preferences might yield important insights into the willingness and preference behaviour.

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APPENDICES

A. APPENDIX I: ADDITIONAL TABLES

Table A1: Revealed WTP based on switch points

Disadvantageous Inequality Block (DIB)

The point subject switches to the non-egalitarian in the DIB	WTP^d			Proxy for WTP^d used
1	+0.67	$\leq WTP^d$		+0.67
2	+0.33	$\leq WTP^d <$	+0.67	+0.50
3	+0.00	$\leq WTP^d <$	+0.33	+0.17
4	-0.33	$\leq WTP^d <$	-0.00	-0.17
5	-0.67	$\leq WTP^d <$	-0.33	-0.50
never		$WTP^d <$	-0.67	-0.67

Advantageous Inequality Block (AIB)

The point subject switches to the non-egalitarian in the AIB	WTP^a			Proxy for WTP^a used
1		$WTP^a \leq$	-0.67	-0.67
2	-0.67	$< WTP^a \leq$	-0.33	-0.50
3	-0.33	$< WTP^a \leq$	-0.00	-0.17
4	+0.00	$< WTP^a \leq$	+0.33	+0.17
5	+0.33	$< WTP^a \leq$	+0.67	+0.50
never	+0.67	$< WTP^a$		+0.67

Table A2: Basic Model and Archetype Interaction Model

Logit regressions. Dependent variable: isWilling – Being willing to decide		
VARIABLES	Basic Model	Archetype Interaction Model
γ	0.216***	0.221***
	(0.0357)	(0.0441)
IAV_γ		0.214*
		(0.122)
SPI_γ		-0.000428
		(0.0644)
ILO_γ		0.000123
		(0.0691)
ρ	0.103***	0.134***
	(0.0170)	(0.0186)
IAV_ρ		0.0213
		(0.0432)
SPI_ρ		-0.213***
		(0.0240)
ILO_ρ		-0.237***
		(0.0355)
σ	0.00369	0.0231**
	(0.00501)	(0.0100)
IAV_σ		-0.0329*
		(0.0168)
SPI_σ		-0.0901**
		(0.0354)
ILO_σ		-0.0163
		(0.0224)
Constant	-0.530***	-0.442**
	(0.166)	(0.182)
Prob>chi2	0.000	0.000
Observations	1,512	1,512
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1		

Table A3: Basic Model and Willingness Interaction Model

Logit regressions. Dependent variable: isWilling – Being willing to decide		
VARIABLES	Basic Model	Willingness Interaction Model
γ	0.216***	0.152***
	(0.0357)	(0.0321)
Willing_γ		0.122***
		(0.0416)
ρ	0.103***	0.179***
	(0.0170)	(0.0298)
Willing_ρ		-0.0690**
		(0.0297)
σ	0.00369	0.00349
	(0.00501)	(0.00642)
Willing_σ		-0.000655
		(0.00988)
Constant	-0.530***	-0.554***
	(0.166)	(0.184)
Prob		
Observations	1,512	1,512
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1		

Figure A1: WTD for Disadvantageous Distributions

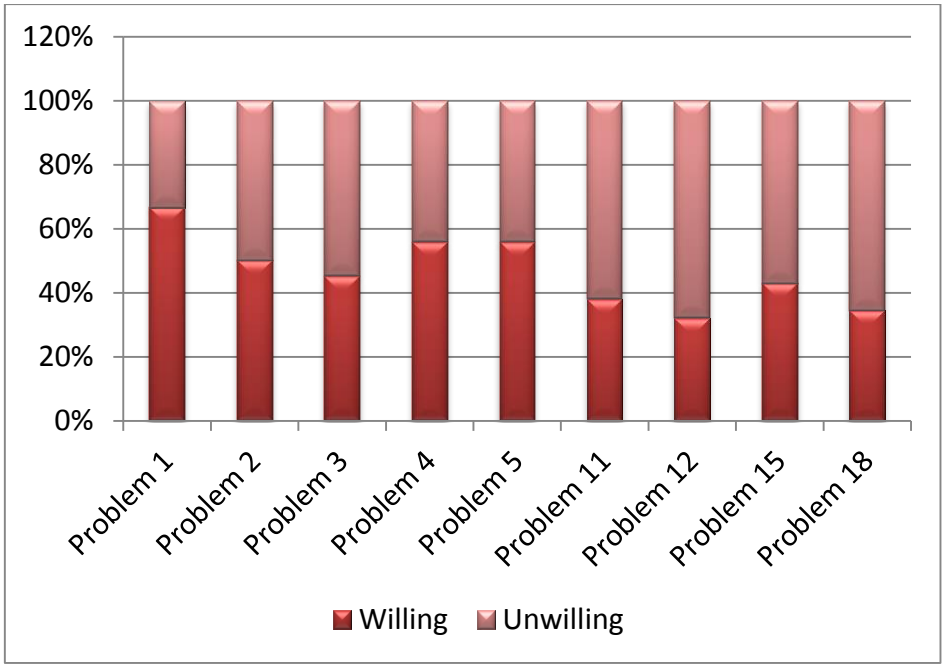


Figure A2: Preferences Over Disadvantageous Distributions While Willing

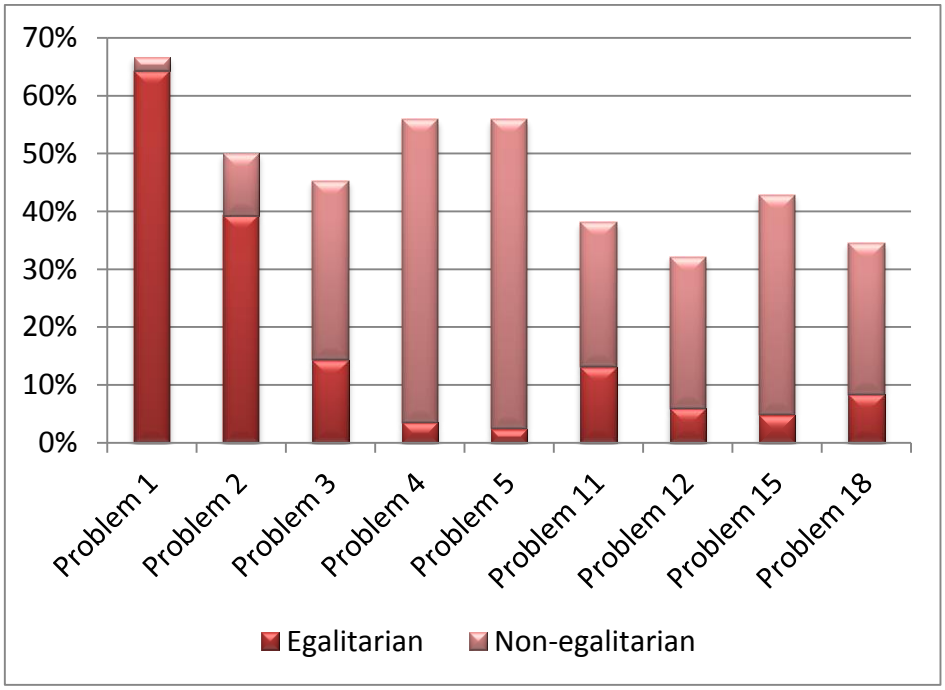


Figure A3: Preferences Over Disadvantageous Distributions While Unwilling

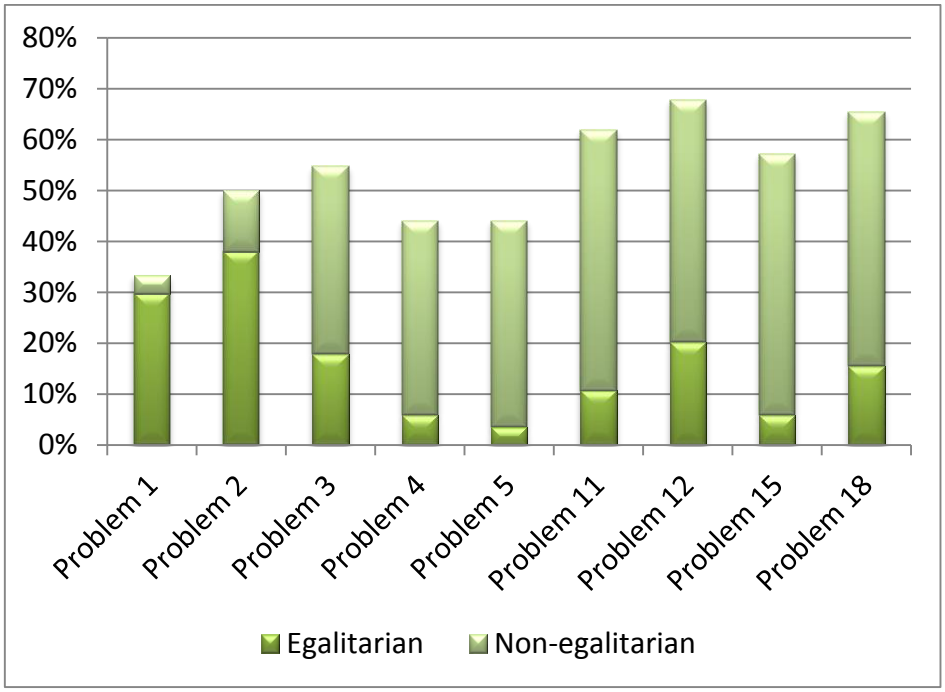


Figure A4: WTD for Advantageous Distributions

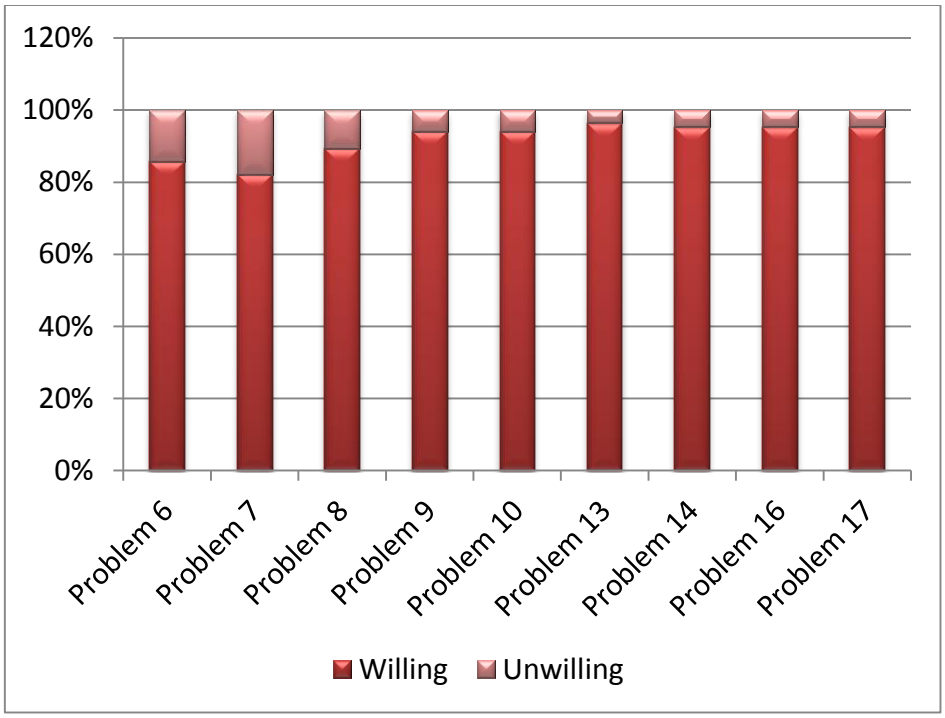


Figure A5: Preferences Over Advantageous Distributions While Willing

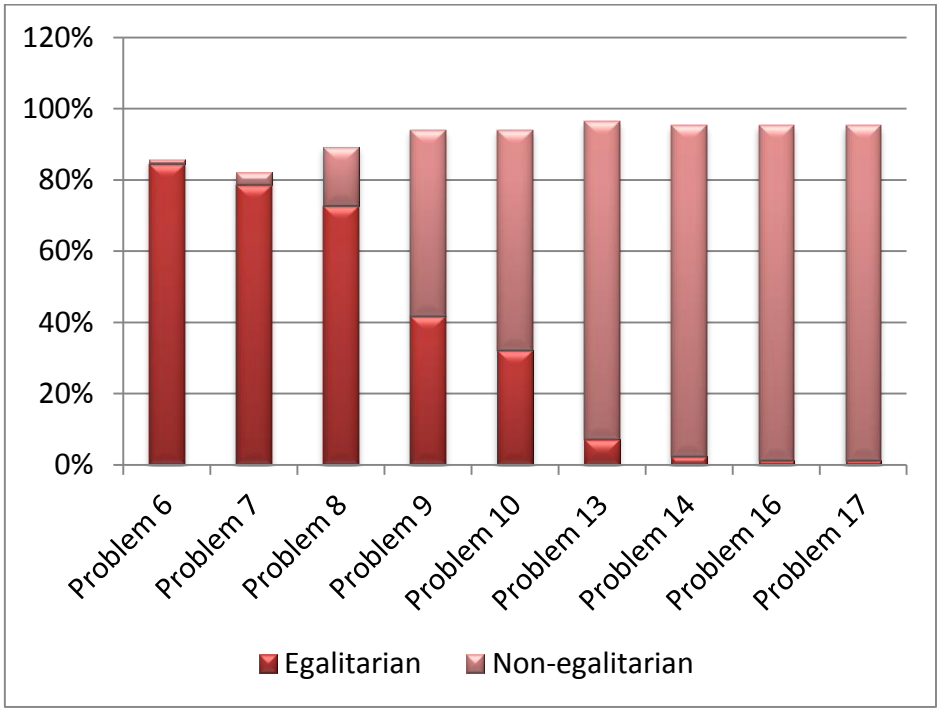
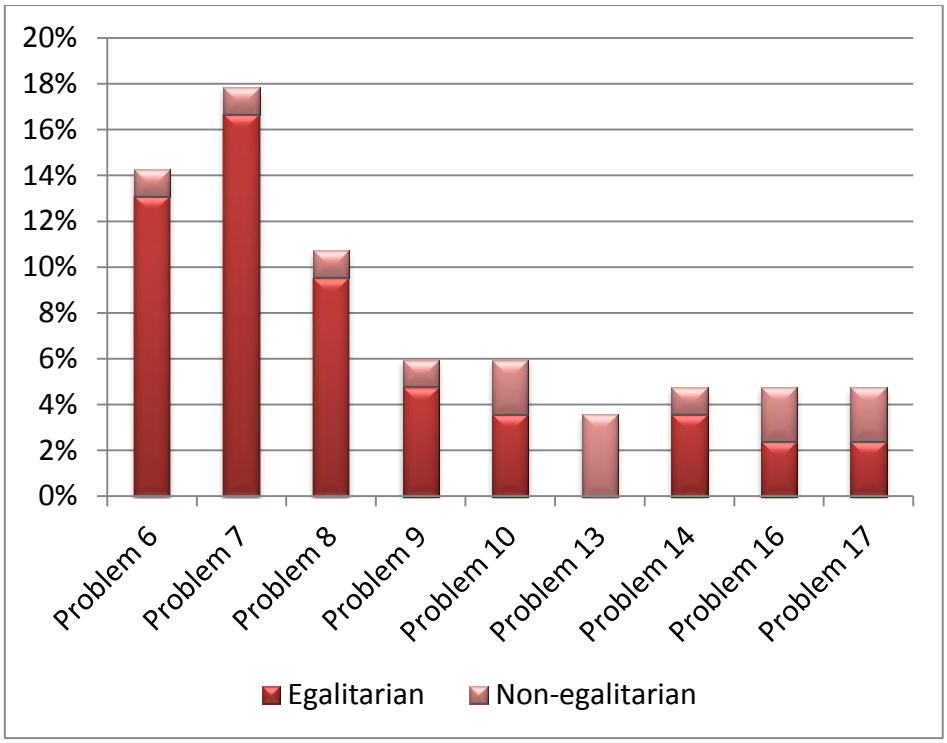


Figure A6: Preferences Over Advantageous Distributions While Unwilling



B. APPENDIX II: EXPERIMENTAL INSTRUCTIONS

Welcome!

In today's experiment you will play a game that consists of 3 sections.

At the beginning of Section I, you and another participant will be assigned to a group which will stay the same till the end of this section. You will not get to know the identity of the other participant, neither during nor after the experiment. You will not get to know the choices made by the other parties either. Similarly, the participant will not get to know your identity or choices either.

In this section, in each round, you will see two possible payoff distributions for you and your partner. These distributions are labelled as Option A and Option B.

On the first screen of each round, you will be first asked whether you would like to be the decider for that particular distribution problem or not. On the second screen, you will be asked for your preference over Option A and Option B in case you are assigned to this role.

For each round in this section, only one of the group members can get the decider role. This role will be assigned based on your preferences and the selection mechanism defined on the program:

- If none of you wants to be the decider than the program will randomly select one of you, which puts a probability of .5 on you ending up as the decider.
- Similarly, if both of you wants to be the decider, then the program will randomly give the decider role one of you, which again puts a probability of .5 on you ending up as the decider.
- If only one of you wants to be the decider then with .5 probability, the program will directly give the decider role to the subjects who wants this role; and with .5 probability the program will randomly select one of you regardless of your preference over the decider role. Therefore, if only one subject wants to be the decider, then the probability of her being the decider is .75 while that of the one who doesn't want to be the decider is .25. This implies that even though you do not want to be the decider for that particular distribution problem you can end up as a decider.

The distributions you will see are in experiment currency: 5 experiment currency correspond to 1 lira.

At the end of this section, only one of the rounds will be randomly selected to determine your earnings at the end. Therefore, it is important that you make all decisions carefully.

After completing 18 distributional problems in Section I, you will start on Section 2. In this section you are asked to choose one of two lotteries differing in terms of winning probabilities and monetary payoffs. There are 10 lottery pairs in this section. Similar to Section 1, only one of 10 problems will be chosen; what you earn will be determined by your chance and will be paid in addition to what you earned in the previous section. Again, it is important that you make all decisions carefully.

After completing Section 2, you will be asked to fill a questionnaire.

If you have any questions, please ask before the experiment.

Please, do not talk during the experiment.

If you have any questions during the experiment, please keep silent and raise your hand, I will answer your question.

Thank you!