universität wien

MAGISTERARBEIT

Titel der Magisterarbeit

„Social Preferences in Voting on Redistribution”

Verfasser

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angestrebter akademischer Grad

Magister der Sozial- und Wirtschaftswissenschaften
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Wien, 2013

Studienkennzahl lt. Studienblatt:	A 066 913
Studienrichtung lt. Studienblatt:	Magisterstudium Volkswirtschaftslehre
Betreuerin / Betreuer	Melis Kartal, PhD.

Content:

1. Introduction

One main purpose of the modern social welfare state is the reduction of inequality in society. Currently, a major share of a government's budget is used to equalize living conditions across individuals. This is theoretically achieved by progressive taxation and a money transfer to those below the median income. In some countries governments try to reduce inequality also by publicly providing some private goods in the form of social services, like schools or hospitals to everyone in need (Corneo and Grüner 2002). Due to government's effort there is indeed an effect of redistribution on equality. The income share of the bottom two quintiles in 14 OECD countries is about 14,7% higher when calculated post-tax and transfer instead of pre-tax and transfer. Even in the US, one of the least redistributive countries of the western world the gap is 8% (Milanovic 2000).

These numbers show that some people prefer a certain degree of redistribution simply because it increases their own payoff. Individuals who are on a low step of the income ladder should in theory profit from a progressive tax and transfer system. Pocketbook interest therefore states that the poor will favor high levels of redistribution to acquire resources from the rich, while the rich will vote against redistributive policies to avoid this expropriation by the poor. However there are various explanations why citizens do not vote in line with this simple dichotomy. Dynamic considerations account for some of these deviations. Individuals will vote for higher redistribution levels than optimal if they want to insure themselves against possible backlashes and the associated drop in the income distribution. They might also deviate towards lower redistribution levels as they anticipate being rich in the future. Another explanation is that individuals are indirectly affected by the payoffs going to the other agents in the economy, for example through criminality. Higher inequality typically increases criminality and thereby raises private insurance costs also for the rich. The upper income classes might consequently prefer to leave the lowest income class some means of subsistence through a certain degree of redistribution. These explanations are however all in line with self-interest. There is also another channel how inequality can affect individuals redistribution decisions, namely by the way of "social justice". Some individuals may have a view on what constitutes a justifiable level of inequality in the society. There is willingness to give up some part of the own income in order to increase the amount of income going to the needy poor without having a direct or indirect profit from this transfer. However interpretations and perceptions of social justice and fairness are heterogeneous across agents and not everyone deviates from purely self-interested behavior. The frequency, magnitude and impact of these deviations from self-interest are exactly what is in the center of the present thesis.

In the following pages I deal with how social preferences, i.e. the notion of caring about the payoff going to relevant reference agents, affect people's behavior when voting on redistribution. In particular I put emphasis on inequality aversion, the tendency to dislike high inequality within a certain reference group. Several studies, which are presented in the second chapter of the thesis, found that individuals care for their own payoff as well as for the relative distribution of payoffs

among a group (see e.g. Tyran and Sausgruber 2006, Durante and Putterman 2009). There is a willingness to sacrifice the own income in order to increase the equality within the group. In this paper I want to contribute to the studies investigating this tendency of people especially in a context where individuals vote on redistribution. Therefore I follow a current trend which involved in the last two decades in the economic science and investigate my research questions with economic experiment. The experiment allows me to study the relative impacts of inequality aversion, self-interest and prosocial preferences on the individual level. Thereby I am able to find deviations from one of the main economic principle, the self-interest hypothesis, which are in line with the consensus of the existing literature.

In particular I design an experiment consisting of features from similar experiments by Höchtl et al. 2012 and Cabrales et al. 2012. Individuals are randomly sorted into groups of five and face a risky effort task, confronting them with the two opportunities of exerting either low or high effort. While high effort is associated with costs it also increases the chances of an individual to get into the upper income class. According to the effort decisions of the group members and a random component, given the individual decisions require splitting of ties, individuals are sorted into the two income classes with fixed size. After observing the allocation of individuals to income classes they vote by majority rule on a redistribution schedule, similar to a tax and transfer system. The median voter's choice is implemented and the participants of the experiment receive the associated payoffs from their income class. Experimental subjects play for 16 rounds in two treatments with a rich and a poor majority, while the group composition changes after each round. Applying an economic experiment of this form allows me to compare the results of my modifications directly to studies presented in the literature review, while social preferences found in economic experiments like mine often serve as lower bounds for behavior in the field (see Bellemare and Kröger 2007 or Gächter et al. 2004).

On the one hand I am able to compare my experimental design with Cabrales et al. Therein the authors conduct a similar experiment on social insurance and find that individuals do not differentiate between the sources of poverty when voting on redistribution. They find no conditionality of the individual vote on the effort choice of other group members in their experiment. I challenge this finding by letting participants go through a similar risky effort stage, however I change the structure of the redistribution decision afterwards. Cabrales et al. provide the participants with an all-or-nothing redistribution option (cf. 2012). This means that the rich have to lift the poor to the same income level (or even higher given the poor did not exert effort) if they favor redistribution. On the contrary I offer the participants 16 allocation options which allow the rich to compensate the poor only to some extent. Thereby I try to find confirmation for the notion that individuals care how income classes are made up. Given rich individuals can observe how others also try and show the same effort to get rich, however fail, they will show some kind of pity and empathy and compensate them to a higher level as if the poor will not choose to exert costly effort and only try to live of the benevolence of the others. A further justification for this notion is found in Cappelen et al., who do not just find that there is a large demand for redistribution even when pre-

tax income is already realized and certain, but also that redistribution is larger if inequalities stem from choice rather than luck. However their findings are for pairs of two and it is questionable whether these results can generalize to larger groups (cf. 2013).

On the other hand I deal with the impact of inequality aversion and social preferences on the aggregate level. A prominent input against the impact of social preferences is that, even if they exist on the individual level, they are unlikely to affect aggregate economic outcomes. I try to give a clearer picture of this objection by testing whether inequality averse voters can be pivotal in votes on redistribution. By looking at the effect of a change in the group structure of three rich and two poor types in the rich majority treatment to three poor and two rich types in the poor majority treatment I am able to relate the impact of inequality averse voters on the pivotality of individuals. Höchtl et al. apply the same group structure to their experimental design and find that inequality averse voters can only affect the group outcome when the rich class is in majority. In particular they find that an inequality averse rich individual is pivotal when there is a rich majority. While this individual will consequently change the median redistribution alternative to a higher level, under a poor majority it takes all three individuals to be inequality averse to arrive at a higher level of equality. I investigate whether this asymmetric dependency on structural parameters, termed asymmetry effect, also exists when the income classes are endogenously determined according to a risky effort choice. Höchtl et al. on the contrary sort experimental participants to income classes randomly (cf. 2012). Further, as in my experiment there is also a possible explanation for deviations from the self-interest vote towards a lower redistribution level due to regarding the relative advantage of the rich income class as justly deserved, I am also able to find a similar effect for this social preference in the other direction. Poor individuals acknowledging the difference in income classes are more likely to affect the group outcome under a poor majority treatment than under a rich majority. In a rich majority it would take all three rich individuals to deviate towards a lower redistribution level than under self-interest, which proves to be highly unlikely.

My thesis provides a valuable insight for economic theory when making statements about the demand for redistribution. Classical economic theory can fall victim to fallacy when disregarding social preferences on the individual level as well as on the aggregate. Individuals do worry about the inequality in a certain reference group however I am not able to prove that the source of the inequality is important for the magnitude and frequency of individuals' inequality aversion. By modifying certain features from existing experiments I am able to analyze their effects and state whether and to what extent the results of these studies were driven by their specific experimental design.

The rest of the thesis is built up as follows: Chapter 2 gives further motivation for my topic and provides an extensive review over the existing literature. Thereby I introduce the reader to studies on social preferences in general and especially inequality aversion, social preferences in the context of redistribution and the role of effort. The third chapter presents the economic experiment I used to

approach the topic and highlights the advantages and limitations of the experimental approach. Chapter 4 discusses theory on redistribution and deduces hypotheses about different explanations of behavior when voting on redistribution. Chapter 5 provides an overview of the results, in particular I present descriptive statistics and statistical tests of hypotheses from the previous chapter. Chapter 6 concludes and discusses further limitations of the study.

2. Literature Review

a. What are Social Preferences?

The self-interest principle of economics is one of the most important cornerstones in the economic field. A long lasting tradition of economic research insisted and relied on this hypothesis and a large amount of research still nowadays builds upon the notion that individuals are driven solely by the interest of maximizing the own material payoff. The economic self-interest hypothesis is the assumption that "*all* people are *exclusively* motivated by their material self-interest" (Fehr and Fischbacher 2002, C1). Together with perfect rationality this motivates the view of an individual as a homo oeconomicus.

This assumption has been and is still subject to considerable criticism from within the field of economics as well as from other areas (for example biological as well as sociological research). One central line of argument is that the notion of self-interest ignores heterogeneity of people with respect to other-regarding preferences, a finding which in the last decade of research was indicated by a large number of studies. Fehr and Fischbacher argue that when neglecting other-regarding preferences, economists fail to understand core concepts of their science and that an overwhelming fraction of the population exhibits such preferences which indeed matter in the aggregate outcome of core concepts such as competition, coordination and collective action (cf. 2002, C1-C2). The authors therein define social- or other-regarding preferences in the following way:

"A person exhibits social preferences if the person not only cares about the material resources allocated to her but also cares about the material resources allocated to relevant reference agents." (Fehr and Fischbacher 2002, C2).

It is important to note that the shape and magnitude of an individual's social preferences largely depend on the context, on the mentioned reference agents as well as on the form of the game[1]. Standard economic theory performs pretty well without other-regarding preferences in market-type games such as double auctions, single auctions with private values, procurement contracting or market search – situations which involve interaction among many mutually anonymous agents capable of forming third party enforceable contracts. However there is large evidence of situations where other-regarding preferences can explain failures in standard theory such as contexts similar to

[1] The observation that the social context, the saliency of particular agents as well as the social proximity towards the reference agents largely influence the outcome, is a reason for the use of economic experiments in determining the influence of other-regarding preferences. With economic experiments these factors can be controlled and the important parameters driving the decisions can be varied in a controlled way.

dictator games, ultimatum games, trust games, public good games with punishment or binary gift exchange games – all together situations which mostly include strategic interactions (cf. Eckel and Gintis 2010, 110). The role of experimental economics has thereby been particularly important and experiments are often used to discover the impact of social preferences.

There are several types of social preferences as there are also multiple ways how individuals can care about the payoff that goes to other individuals. An extensive list of social preferences can be found in Murphy and Ackermann (2012), however for the purpose of this study a short overview of social preferences roughly in line with Fehr and Fischbacher (2002) is more than sufficient. These most important social preferences include:

Reciprocity: A reciprocal individual responds to hostile perceived actions in a hostile way, while kindly perceived actions are returned by kindly behavior. An important feature of reciprocity is that the individual has no expectation of a future material gain from the other individual, thereby including no elements of coordination. Reciprocity can for instance be observed in trust or gift exchange games (e.g. Fehr et al. 1998)

Pure Altruism: Altruism means that a person values resources, allocated to a relevant reference agent positively (cf. Fehr and Fischbacher 2002, C3).

Envy: The pure contrary to altruism is envy. This means that a person values resources allocated to a relevant reference agent always negatively (cf. Fehr and Fischbacher 2002, C4).

Inequality Aversion: An inequality averse person receives additional disutility if the distribution of material resources is inequitable. Therefore the individual is altruistic towards a person if the other's payoff is below an equitable benchmark and feels envy if the other's payoff is above this reference level. Prominent inclusions of inequality aversion in a utility function are Fehr and Schmidt (1999) and Bolton and Ockenfels (2000).

Social Welfare Maximization: A social welfare maximizing or efficiency loving individual gains (additional) utility from increasing the material payoff for a joint reference group (including himself). Someone who is exclusively efficiency loving would in a decision situation about payoff distributions always choose the one maximizing the common payoff to the group, irrespective of his own standing in the distribution or of equality within the group. In line with this social preference are individuals who sacrifice themselves or others for the greater good.

Maximin: A person with maximin preferences cares about the material payoff of the worst-off individual in the society. This is in line with Rawls's "Theory of Justice" (1971) that inequalities in a group are tolerable as long as they increase the floor of the payoff distribution. Frohlich et al. (1987) conduct experiments and are able to explain group choices as a combination of welfare and maximin preferences.

In this thesis social preferences enter in the way of fairness views towards a distribution of resources. Therefore, although reciprocity is a prominent social preference, affecting many economic situations and decisions, in this context it will not be considered important, as it contains a dynamic element. The main focus will be on the relative importance of inequality aversion and self-interest in different contexts, while also efficiency and maximin preferences will be important, as they often exhibit either a trade off with inequality aversion or amplify its effect.

One example for the entanglement of inequality aversion, efficiency and maximin is given in Table 1. The first situation depicts the two options A and B which involve different allocations among three individuals.

Allocation	A	B
Person 1	9	8
Person 2	8	8
Person 3	4	8
Total	21	24

Table 1: Distribution Situation (Engelmann and Strobel 2004, 2)

If an individual (e.g. person 2) chooses option B, the observer cannot clearly imply that the decision was driven by inequality aversion, as B also yields the maximum payoff to the whole group and is therefore in line with prosocial behavior. B is also the option with the highest floor, therefore the choice could also be explained by a maximin preference. While in the second situation, depicted in Table 2, a tradeoff between inequality aversion and the other two explanations is implemented.

Allocation	A	B	C
Person 1	9	8	11
Person 2	8	8	10
Person 3	4	8	9
Total	21	24	30

Table 2: Distribution Situation (Engelmann and Strobel 2004, 3)

An inequality averse person would still prefer option B, yielding the most equal distribution of outcomes to all individuals in the group, but the option would no longer be in line with the other social preferences. Efficiency loving as well as maximin individuals would opt for C and thereby chose the highest sum of payoffs as well as the highest payoff to the worst off individual.

b. Inequality Aversion

Recent attempts to incorporate other-regarding preferences into the standard economic model and, by this means help to explain anomalous observed behavior, have focused on modeling fairness views as self-centered inequality aversion[2]. The most prominent and simplest models including

[2] "Inequity aversion is self- centered if people do not care per se about inequity that exists among other people but are only interested in the fairness of their own material payoff relative to the payoff of others" (Fehr and Schmidt 1999, 819). The broader concept of inequity aversion may depend on many factors, in some setting and especially in laboratory experiments the concept can be reasonably approximated by inequality aversion (cf. Tyran and Sausgruber 2006, 471).

inequality aversion in the individual utility function and still explaining contradicting evidence regarding the impact and magnitude of fairness and self-interest are: Fehr and Schmidt's (1999) "*A Theory of Fairness, Competition and Cooperation*" and Bolton and Ockenfels' (2000) "*ERC A Theory of Equity, Reciprocity, and Competition*". Central to both approaches is the notion that at least some individuals care about the relative payoff in the distribution of material resources.

Fehr and Schmidt, A Theory of Fairness, Competition and Cooperation (1999): The only deviation from standard theory that is integrated in the model of Fehr and Schmidt is the assumption that in addition to purely self-interested individuals a fraction of people is motivated by fairness considerations. The authors assume a utility function of the following form:

$$u_i(x) = x_i - \alpha_i \frac{1}{n-1} \sum_{j \neq i} max\{x_j - x_i, 0\} - \beta_i \frac{1}{n-1} \sum_{j \neq i} max\{x_i - x_j, 0\} \qquad (1)$$

where $\beta_i \leq \alpha_i$ and $0 \leq \beta_i < 1$. In this formulation subject i's utility depends on x_i, the material payoff going to the individual minus the possible utility losses captured by the second and third terms. The second term is the disutility a subject experiences from being behind others in the resource distribution, referred to as disadvantageous inequality. How much a certain individual dislikes lacking behind is captured by the magnitude of the individual parameter α_i. The third term is the disutility a subject experiences when being ahead of others. The parameter β_i captures the size of the effect and with the assumption of $\beta_i \leq \alpha_i$ it is believed that a player suffers more (or at least the same) from inequality that is disadvantageous. By assuming that $0 \leq \beta_i$, Fehr and Schmidt rule out the existence of subjects that like being ahead of others. They claim that although $0 > \beta_i$ might be a realistic case, the existence of such individuals has no impact on equilibrium behavior (Fehr and Schmidt 1999, 824).

The model of Fehr and Schmidt can explain behavior in contexts of ultimatum games, where experimental evidence refutes predictions of standard economic theory, as well as in market games, where very unequal outcomes arise in a competitive equilibrium, as predicted by standard theory. Also the typically observed outcomes of public good games, with and without punishment, are in line with the utility specification of Fehr and Schmidt. As long as there is a fraction of people caring about inequitable outcomes, the option to punish can help sustain a higher cooperation level, while this fraction of people is not sufficient to overcome the free-rider problem when punishment in the public good game is not possible. They highlight that which preference type is decisive for the prevailing behavior in equilibrium is entirely determined by the economic environment of the decision (cf. Fehr and Schmidt 1999).

One paper worth mentioning in the context of inequality aversion for redistribution is Tyran and Sausgruber's (2006) "*A little fairness may induce a lot of redistribution in democracy*". The authors adapt Fehr and Schmidt's (1999) framework for analyzing voting decisions in experimental redistribution situations, when the population exhibits heterogeneous fairness preferences. In their experiment subjects were randomly allocated in voting committees of five, with three income

classes: the rich (n_r= 2; x_r= 250), the middle-class (n_m= 2; x_m= 185) and the poor (n_p= 1; x_p= 60). The subjects were randomly allocated to classes and could, using majority vote, decide upon a redistribution option, deducting a tax t_r= 50 from each rich individual and reallocating the benefit of b_p= 100 towards the poorest. Accepting the proposal goes in hand with a loss of 5 units from the middle class[3]. In analyzing the experiment the authors make predictions about the voting behavior in line with either the classical standard theory or the model of behavior that Fehr and Schmidt use[4]. According to standard theory the rich and the middle should unanimously vote against redistribution (prediction: 0% yes votes), while the poor vote in favor of redistribution (prediction: 100% yes votes). The model including inequality aversion on the other hand predicts 40% and 70% of yes votes among the rich and middle class respectively, while the prediction for the poor voters is the same as in the standard model. The experimental results clearly support the Fehr and Schmidt specification. 33.7% of the rich, 70% of the middle and 96.3% of the poorest class vote for the redistribution proposal. The conclusion is that in this scenario inequality-aversion predicts voting better than the self-interest model. A few highly inequality avers rich and many little inequality averse middle-class individuals can cause a redistribution from rich to poor even if the poor are in a minority (cf. Tyran and Sausgruber 2006).

The limitations of this study are apparent. As no task is included to determine the position of an individual in the income distribution, the subjects in the experiment might not perceive their relative welfare as deserved. This might lead to an unrealistically high approval of redistribution. Also the efficiency loss coming from the redistribution is negligibly small (1/93), containing no apparent tradeoff between equality and efficiency. These shortcomings are dealt with in latter follow up studies about social preferences in voting on redistribution.

Bolton and Ockenfels, ERC: A Theory of Equity, Reciprocity, and Competition (2000): Bolton and Ockenfels come up with a model to describe the role of three types of behavior captured in the lab: equity, reciprocity and competition. The model is kept rather simple, however it also succeeds to fit reasonably well with a large number of experimental observations. The theory of Bolton and Ockenfels also departs from standard theory in that, besides a pecuniary payoff individuals care about the relative payoff, that is how the own pecuniary payoff compares to the payoff of others (cf. Bolton and Ockenfels 2000, 166).

The specified utility function looks the following way:

$$u_i(y_i, \sigma_i) = a_i \cdot y_i - b_i \cdot (\sigma_i - \frac{1}{n})^2 \qquad (2)$$

[3] This covers the (rather small) efficiency loss from redistribution and creates a tension between the prediction of standard theory and the Fehr and Schmidt model.

[4] Tyran and Sausgruber use Fehr and Schmidt's quantitative estimates for the distributions of the preference parameters α_i and β_i. The distribution consistent with experimental evidence on the ultimatum game was: α = 0: 30%, α = 0.5: 30%, α = 1: 30% and α = 4: 10%; β = 0: 30%, β = 0.25: 30% and β = 0.6: 40% (cf. Fehr and Schmidt 1999, 843-844).

where y_i is person i's material payoff and σ_i describes the relative payoff, i.e. the own payoff divided by the sum of all players' payoffs $\sigma_i = \frac{y_i}{\sum_{j=1}^{n} y_j}$. a_i and b_i are the weights attached to the personal and relative payoff. How much an individual cares about equity is determined by the relation of a_i and b_i. For b_i = 0 the individual's utility function[5] reduces to the one of a self-oriented individual maximizing only her pecuniary payoff. As other-regarding preferences get more important and b_i increases (keeping a_i fixed), an individual's optimal payoff moves closer to $\frac{1}{n}$. The relation of a_i and b_i describes the possible trade-off included in the ERC-utility function. If an individual's pecuniary payoff is already above the "fair" share $\frac{1}{n}$, an additional increase in y_i might not yield a higher utility level. This is obviously not the case if the pecuniary payoff is below the "fair" share, as the increase in y_i increases the first term, while it reduces the second term accounting for the inequality aversion (cf. Sauermann and Kaiser 2010, 671).

One paper experimentally analyzing distribution decisions using the ERC-theory is Sauermann and Kaiser's (2010) "*Taking others into account: self-interest and fairness in majority decision making*". They construct payoff tables which include a single core prediction and possible deviations, which are chosen if a certain degree of inequality aversion in line with ERC is assumed. They find that voting patterns are explained by self-interest as well as self-centered fairness. In their experimental design five person committees vote using majority rule about one of eight distribution alternatives. They conducted experimental sessions with 20 rounds and stranger matching thereby making each distribution decision a one-shot game in the incentive and fairness structure. As no information was passed on about previous rounds the authors were able to isolate the pure effect of inequality aversion without the influence of reciprocal fairness. Each payoff table has one core prediction for completely self-interested agents. Besides the core alternative payoff tables differed in the likelihood of deviation from this alternative in line with Bolton and Ockenfels's ERC (Sauermann and Kaiser 2010, 681-684). This means that some payoff tables needed only a low level of inequality aversion to deviate from the core, while in others participants had to sacrifice a bigger amount of points to implement a fairer distribution (referred to as different stabilities of the core)[6]. They find that ERC explains the behavior of the subjects in majority decision making most accurately (as compared to explanations by global equality and Salant and Goodstein's (1990) selection set), especially for low values of b, i.e. when little inequality aversion is needed and the core has a low stability (cf. Sauermann and Kaiser 2010)[7].

[5] Bolton and Ockenfels use the term "motivational function", as a special class of expected utility functions. The reason is that motivational function emphasizes the statement about objectives that motivate people instead of goods that yield utility (Bolton and Ockenfels 2000, 171).

[6] Some of the alternatives in Sauermann and Kaiser's tables also differed in the total amount of payoffs to the whole group to check for welfare maximizing behavior, however they do not find an impact of this specific other-regarding preference on the group outcome (cf. 2010).

[7] Finke (2011) criticizes the statistical analysis of the experimental design by Sauermann and Kaiser and concludes that the patterns of behavior found in the experiment are better explained by an error term than by Bolton and Ockenfels ERC theory. Finke claims that the authors forgot an error component on the individual level and thereby mistook randomness for fairness by interpreting collective group outcomes. He includes a term for random shocks against the core into the

Comparing the performance of the two theories:

Although both theories deal with the same feature, namely that an individual's utility is not just influenced by his material payoff but also some term, that captures the equality of the whole distribution, there are situations in which ERC and Fehr and Schmidt's inequality aversion predict different choices for distributions of resources. Therefore the two theories can be compared with respect to performance in different situations. One possible critic of ERC is that the fairness element in the theory is satisfied, as long as an individual is as close as possible to the average of the whole distribution. The exact distribution of payoffs among players is not important as long as it does not affect the relative personal standing of the individual. With an ERC-utility function an individual (in this case player 1) is indifferent between a payoff vector (20, 80, 0, 0, 0) and (20, 20, 20, 20, 20). As long as the individual payoff is as close as possible to $\frac{1}{n}$, the disutility from the second term, accounting for inequality disappears[8]. While in Fehr and Schmidt's framework a person would prefer all subjects to get an equal amount of the pie, in ERC inequalities in the distribution among others do not matter. Correspondingly a middle class individual with preferences (2) would not tax the rich to transfer money to the poor in real life, while in (1) the individual would care about non-self oriented redistribution.

The paper "*Inequality Aversion, Efficiency, and Maximin Preferences in Simple Distribution Experiments*" by Engelmann and Strobel (2004) deals exactly with this discrepancy between the two theories and compares their performance in simple taxation games. They conduct class room experiments, in which they confront the students with three distribution options affecting the payoff of the whole group, consisting of 3 students (cf. 2002, Table 1). While the own payoff of the proband is fixed (to control for self-interest), the payoffs going to the other participants are varied to be in line with either Fehr and Schmidt or ERC. The variation of the alternatives implies that also the prosocial and maximin preferences yield a clear prediction for one of the choices. The crucial property of their taxation games is that the allocation that minimizes the differences between the median person (the actual subject) and the others, maximizes the distance of the median person to the average. Engelmann and Strobel find that in such taxation games, the Fehr and Schmidt theory clearly outperforms ERC. In four different treatments 60.2% of all subjects chose in line with Fehr and Schmidt, while only 22.8% decided for the allocation predicted by ERC. However this result is mainly driven by a treatment where Fehr and Schmidt are in line with the efficient prediction (i.e. moving

regression specification of Sauermann and Kaiser and finds that the explanatory power increases and the clear interpretation of stability of the core against fairness vanishes (Finke 2011, 24). Subsequently he applies Fehr and Schmidt's theory to the individual behavior in the majority decision situations and finds a pessimistic outcome for the significance of other-regarding preferences: Individuals highly dislike getting less than others, but like being ahead and exhibiting advantageous inequality (cf. Finke 2011).

[8] In their original paper Bolton and Ockenfels defend the irrelevance of an egalitarian distribution of payoffs, basically by the success of their own paper and some evidence that runs contrary to egalitarian preferences (cf. Bolton and Ockenfels 2000, 168). For example Güth and van Damme (1998) report on an ultimatum game experiment, with an additional person, who's payoff is dependent on the decisions of the proposer and responder. It is argued that in this case no egalitarian preferences were found, as proposers only allocated small amounts to the third person and no rejection by the responder can be clearly attributed to the small share of the third (cf. Güth and van Damme 1998).

further away from the average is achieved by an increase in the poorest individual's payoff, which is higher than the deduction for the rich class individual). When Fehr and Schmidt contradict efficiency preferences, there is no significant difference in the choices of their theory and ERC (cf. Engelmann and Strobel 2004, 5-9).

A second type of class room experiment, also conducted by Engelmann and Strobel tests the performance of the two theories, when they are both Pareto-dominated. In their envy games the payoff tables are constructed, such that the middle class has a possibility to take money from the poor in order to be able to take even more from the rich (cf. 2002, Table 2). In such a scenario the most efficient (Pareto- dominant) choice is to take nothing from each of the other players. Taking something from both such that the own payoff is exactly equal to the average (i.e. the ERC-prediction) is still Pareto- better than the Fehr and Schmidt prediction of minimizing the distance to both by bringing the rich closer to the middle class at the cost of the lowest payoff to the poor. The authors find that with the help of Pareto- dominance the ERC choice (26.7%) outperforms the Fehr and Schmidt prediction (3.3%). However the efficient allocation was chosen 70% of all times (cf. Engelmann and Strobel 2004, 9-11).

Engelmann and Strobel find that performance of inequality aversion theories was highly dependent on whether the theory was in line with or contradicting efficiency and maximin concerns. When not taking account of maximin preferences, Fehr and Schmidt's explanation outperforms Bolton and Ockenfels. However with the inclusion of maximin, Fehr and Schmidt explanatory power vanishs (cf. 2004, 17-19).

I conclude that there is sufficient evidence that the fairness properties of distributions (inequality, total payoff and minimum payoff) are often important for the decisions of persons. However the motives as well as the magnitude of fairness views are very heterogeneous across agents. Whether the self-interest or one of the fairness motives is dominant in a certain game highly depends on the rules, the framing and the whole context of a situation. It is furthermore still another question whether these individual level deviations from the self-interest hypothesis are affecting the aggregate outcomes of economic situation as well as the behavior of the other individuals. It might happen that economic situations induce self-interested persons to act in a fair way, while it is also possible that fair persons behave self-interested as they anticipate the others' reactions. During the last decade a lot of research has been accumulated studying the role of social preferences in different interactions and situations. Relevant papers in the context of redistribution are introduced in the next part of the chapter.

c. Social Preferences and Redistribution

A good starting point for an overview of the impact of social preferences on redistribution situations is given in Durante and Putterman's (2009) "*Preferences for Redistribution and Perception of Fairness: An Experimental Study*". In their experimental design, the authors varied a lot of seemingly

important parameters and determinants of social preferences for the redistribution decision and present findings of the effects in different design variations. They use relatively large group sizes of 20 individuals and a real country's income distribution (cf. 2009, 3).

Durante and Putterman (2009) make use of different methods for the elicitation of preferences for redistribution. Participants in the experiments had to decide once as an outside observer (impartial spectator), once as an actually affected individual with uncertainty about the standing in the group (resembling Rawls' veil of ignorance) and once as an affected individual when the distribution of pretax income was already known (an ex-post redistribution decision) such as in the experiment of this thesis. Their treatments also differed in a cost of taxation parameter, with four different realizations, to investigate the subject's willingness to pay for equalization of outcomes. The authors also checked for a tradeoff between efficiency and equality by using treatments with three different levels of efficiency loss. Further it was experimentally checked whether the task determining the income distribution is decisive for the level of redistribution by eliciting four choices for tax rates where the distribution was determined either randomly, based on the relative income in the participants' place of origin, a knowledge quiz or a computer skill- based Tetris game. They also controlled for the student pool by comparison with a non-student group, but found no significant differences (cf. Durante and Putterman 2009).

A main result is that in general people favor redistribution of pre-tax income. In the disinterested observer scenario 76.4% favor a tax- rate above 0, with the mean rate being 42.4%. As assumed a higher tax cost and an efficiency loss lead to significantly lower tax choices. Different methods of assessing the income distribution contain different perceptions of fairness and therefore lead to differing tax choices. Specifically the random and place of origin methods result in significantly higher mean tax rates (49.3% and 45.1%) than the performance based Tetris and Quiz (37.7% and 37.3%). This difference suggests that the demand for redistribution crucially depends on the process determining who is rich and poor. It follows that although there is a notion of deserving the pre-tax income, participants still desire a high equality in the distribution of payoffs[9]. When the decision maker was actually involved and affected by his own choice of an income distribution, subject's tax choices were about 6% higher, resulting from an effect of risk-aversion, as when faced with uncertainty subjects can use redistribution to insure themselves against the low ranks. However in this scenario also self-interest affects the tax choice (even more than equality preferences). In the place of origin, Tetris and quiz treatments, participants could form expectations about achieving a high (low) rank and, if confident enough, chose a low (high) tax rate corresponding to the expected rank. They find that the expected rank is an important predictor of tax rates chosen. In the third choice that subjects made in this experiment, where uncertainty was resolved, risk aversion and expectations played no further role. Any deviation from an optimal tax rate can be attributed either to inequality aversion, when subjects in the upper half of the distribution selected a tax different

[9] Clearly one major argument against the redistribution of earned income, namely the disincentive effect from taxation is not taken into account in this one shot experiment.

from 0%, or a belief that higher earnings are rightfully earned, when subjects in the lower half of the distribution selected a tax different from 100%. Durante and Putterman find that about one third of choices (34,2%) were not in line with individual payoff maximization and the sizes and numbers of deviations from an optimal rate of 0% and 100% respectively were similar. They find that the defections are mostly explained by heterogeneous costs of taxation, while also the attitude towards equality influences the tax choice significantly[10] (cf. Durante and Putterman 2009).

This paper points out that the way and the information that individuals have when deciding about redistribution, are crucial in the detection of social preferences. When being unaffected by their own decision most favor at least some equality, while when being involved in the situation the same redistribution preferences are still existing, but mostly made up by self-interest and risk aversion. In the experimental part of the present thesis it should therefore be kept in mind that the way to elicit preferences is to a considerable degree determining the impact of social preferences.

d. The Structural Parameters

Also the group structure and the method of decision making is decisive in whether other-regarding preferences will play a role in the redistribution choice of a society. For the present experiment I will concentrate on majority decision making, as it is arguably one of the most prominent decision methods (see Mueller 2003 for an extensive review of the majority rule), moreover the majority voting rule is regarded as the "decision rule for democratic government, [which] comes closest to satisfying all criteria of a fair procedure" (Finke 2011, 2). The most important feature of this decision rule is that the median voter is decisive in the choice on a redistribution plan.

Besides the decision rule, also the relative size and impact of income classes is important. One paper focusing on the issue of structural parameters in a group is Höchtl, Sausgruber and Tyran's (2011) "*Inequality Aversion and Voting on Redistribution*". They experimentally study whether fair minded voters are pivotal in a majority vote on redistribution with two different sized income classes. They conduct experiments with groups of five participants and two main treatments with either a rich majority (i.e. three rich and two poor individuals) or a poor majority (i.e. three poor and two rich individuals). After being assigned a role the participants could, using majority vote, decide on a redistribution scheme, where the self-interested rich vote for a low tax and the self-interested poor vote for a high tax[11]. Höchtl et al. find that inequality aversion has a disproportionally large effect when there is a rich majority. One rich and inequality averse individual suffices to move the group outcome above the self-interest prediction. The median group tax rate over all periods under a rich majority is 3.7% and thereby clearly higher than the 1% prediction. However when the majority is

[10] The cost of taxation is heterogeneous across agents, as the same deviation from a 0% optimal tax rate yields a higher material loss for someone having a higher rank in the income distribution. The same holds for ranks in the lower half of the income distribution and deviations from a 100% tax rate. The attitude towards equality was determined by the tax choices in the first part of the experiment as an impartial spectator (cf. Durante and Putterman 2009).

[11] Höchtl et al. include an additional tradeoff between efficiency and equality, meaning that a higher tax results in more equality but a lower sum of payoffs (cf. 2011). An inequality avers and rich individual therefore also has to be sufficiently little efficiency loving to vote for a higher tax rate.

poor the average group tax is exactly in line with the prediction (8%). This result is mainly driven by the uniqueness of the design, specifically in this case the least inequality averse poor participant determines the result and it would take the whole poor income class to deviate from the optimal tax rate (cf. Höchtl et al. 2011)[12].

So clearly economic outcomes do not just depend on the size and number of people which are influenced by fairness views, but also on the group structure and on whether these people can be pivotal in a redistribution decision. Höchtl et al.'s (2011) contribution is novel in the sense that it shows an asymmetric effect of inequality aversion depending on the income class being in majority.

A similar paper making use of the same group structure when determining the role of social preferences on voting is Paetzel, Sausgruber and Tyran (2012) "*Social Preferences and Voting on Reform- An Experimental Study*". However they study a redistribution option (in their paper termed as a reform) that is socially beneficial but comes at a cost of increasing inequality in the group. They find that although 81.4% of votes are consistent with material payoff maximization, there are deviations which largely influence the group outcome. Maximizing the own payoff explains only 32.9% of aggregate voting outcomes. In particular sociotropic[13] behavior among reform losers drives the result more than inequality averse concerns from reform gainers. For the dimension of the experimental design, where the reform losers are in a majority and the prediction is that the reform will not be passed, in 65.4% of group permutation an inequality increasing social reform is implemented (cf. Paetzel et al. 2012)[14]. This result again highlights the importance of structural parameters for the impact of social preferences. But contrary to the study of Höchtl et al. it also shows that inequality aversion has not necessarily a high impact on the group outcome, but also efficiency-enhancing or altruistic behavior can be observed to be crucial for group outcomes.

Another issue that is worth mentioning with relation to this thesis is the opportunity for the rich majority to redistribute the earnings of the reform towards the poor studied in additional treatments. In this scenario an implicit social contract could be achieved in which the reform losers (which are in one treatment still uncertain about their role) could be in favor of the reform, if they expect the reform winners to compensate them afterwards. Such voluntary compensation by reform gainers is observed as tax rates are higher when the losers are needed to pass the reform, however the level of reciprocity is far too low and not sufficient to compensate the losers fully. Consequently an implicit social contract is not observed (cf. Paetzel 2012). This result is important for my study as it shows that even when reform gainers depend on the grace of the reform losers, they do not

[12] The effect of the group structure is particularly emphasized as the share of rich individuals who vote for an equality increasing tax (16%) in the rich majority is similar to the share of poor individuals who vote an equality increasing tax (13%) in the poor majority (cf. Höchtl et al. 2011).

[13] By sociotropic behavior the authors refer to a tendency of individuals to care about the group's payoff more than about the individual (cf. Paetzel et al. 2012, 2).

[14] As a decision mode the authors use the strategy method, where the subjects are asked to make decisions in a scenario conditional on being in each of the relevant roles. One advantage of this method is that the authors are able to make more than 200.000 possible group permutation per round and thereby create an enormous amount of data (cf. Paetzel et al. 2012, 10).

voluntarily compensate them sufficiently. Similarly in my experiment those being unlucky in the effort task depend on the grace of those being rewarded with a rich type after the effort task. However the compensation cannot be denoted to reciprocity as the rich types do not profit from the effort of the unlucky.

e. The Role of Effort

There is a large amount of literature on the question whether the source of poverty is conditional for the role of social preferences in redistribution. People may favor a compensation of the poor if they believe that their bad standing in the economy is caused by circumstances beyond their control. Conditional on this believe the preference for equality may be far more pronounced. On the other hand when people think that each individual is for himself responsible for his economic outcome a preference for equality may be less dominant.

Fong's (2000) "*Social Preferences, Self –Interest and Demand for Redistribution*" deals exactly with this distinction. She departs from the hypothesis that financial self-interest is insufficient in explaining demand for redistribution. According to her study the redistributive preferences are determined by the belief about the extent to which individuals do or do not have control over their earnings and by the belief about the existence of opportunities to get ahead. This distinction is captured by the major question whether the cause of poverty and wealth is self or exogenously determined. Fong's results provide motivation for the relevance of the research question in this thesis. Making use of the 1998 Gallup Poll Social Audit Survey "Haves and Have-Nots: perceptions of fairness and opportunity", Fong runs a probit regression on the support for redistribution. Therein she includes explanatory dummies on the belief of self and exogenous determination of income, which enter the regression jointly and individually significant at the one percent level. Those who believe that performance depends on good or bad luck show significantly higher support for redistribution than those relating economic performance to effort. Also self-interest variables explain attitudes towards redistribution: Those with annual family income above 150.000$ and between 100.000$ and 150.000$ show less support than those with an income below 10.000$[15] (cf. Fong 2000).

The observation in Fong's (2000) study is central to the social insurance literature. The social welfare state, as a centralized institution administering and executing obligatory redistribution from rich to poor, in industrialized countries is often seen as a remarkable achievement of today's societies. On the one hand the welfare state reduces the vulnerability of negative shocks on income, like health shocks making individuals unable to work or structural shocks which cause unemployment by letting workers' skills be outdated and thereby redundant to nowadays economy. On the other hand it clearly creates negative incentive effects by the way of moral hazard. Individuals anticipating to be

[15] Fong uses dummy variables of income classes for determining the effect of self-interest on support for redistribution. Those dummies with annual family income below 100.000$ do not significantly differ from the reference category of those below 10.000$ (cf. Fong 2000, 15).

socially insured against private backlashes might engage in extensively risky situations or might face reduced individual incentives to avoid unemployment. This effect of redistribution is clearly in coexistence to a taste for equality of a resource distribution. However the way that individuals think about the source of inequality is important for the extent to which social preferences and self-interest influence the redistribution choice. The following experimental studies include the role of effort in the question about social preferences in redistribution and deliver experimental evidence which serves as motivation for the second research question in my own study.

Esarey, Salmon and Barrilleaux (2012) study in laboratory experiments how individual's responses to redistribution are determined by self-expressed political ideology and self-interest. In their paper "*Social Insurance and Income Redistribution in a Laboratory Experiment*" they let experiment participants conduct production tasks with real effort, in the form of a spelling test. After this production task there was the possibility of a random shock, destroying 80 percent of the produced income[16], followed by a possibility for voting on redistribution of earned income after 5 rounds and again after 3 other rounds. They furthermore asked general questions about the participants' attitudes on redistribution and in that way constructed their main explanatory variable economic ideology, categorized as either liberal or conservative. Their main result is that economic ideology is associated with preferences for redistribution, but only in cases where there is a moderate probability for a loss. In the treatment with a 20% loss probability, conservatives want substantially less taxes and redistribution compared to liberals. In cases where individual losses are either excluded or nearly certain (the 0% and 80%- treatments respectively) economic ideology is not a good explanation for redistribution preferences. This suggests that the economic ideology is not that much about the desired degree of redistribution but more about how individuals deal with individual luck of others: liberals want to protect others from bad luck by socially insuring them, while people who consider themselves conservatives tend to think of bad luck as something to be endured by those who experience it (cf. Esarey et al. 2012).
This study shows how heterogeneous peoples' attitudes towards redistribution are. They look at negative economic shocks which are beyond individual control and observe whether the group is willing to compensate the unfortunate individuals. The difference to the current study however is that individuals cannot choose whether they want to expose themselves to the risk, therefore the study by Esarey et al. does not capture fairness towards risk-taking behavior.

One paper taking account of exactly this issue experimentally is Cappelen, Konow, Sørensen and Tungodden's (2013) "*Just Luck: An Experimental Study of Risk Taking and Fairness*". This study sheds light at how people think about fairness concerning risk taking under equal opportunities. In their laboratory experiments participants make a decision involving an uncertain outcome and can distribute the gains afterwards. After a risk taking stage, where individuals could choose between a

[16] The treatments differed with respect to the probability for the occurrence of a random shock, 0%, 20% or 80% (cf. Esarey et al. 2012, 6).

risky and a save alternative, they were anonymously paired with a series of other participants and could decide how to split the common earnings in the form of a dictator game. Cappelen et al. find that although most people consider fairness from an ex-ante view, meaning that before the risky decision the participants had equal opportunities, there is a lot of redistribution also ex post. The redistribution is considerably higher if the inequality stems from luck rather than from choice (cf. Cappelen et al. 2013).

The findings of this study are a motivation for the research question of the present thesis. It shows that how people care about redistribution is to a great deal depending on how the inequality was created. In line with previous papers presented it also shows that there is a desire for ex post redistribution, in contraction to standard theory. However the findings of the study by Cappelen et al. (2013) are for pairs. It is questionable whether the same pattern of behavior will also be observable in bigger groups, especially when the rich cannot discriminate between redistribution towards "deserving" poor and "lazy" poor individuals.

Cabrales, Nagel and Mora (2012) deliver contradicting evidence. In "*It is Hobbes, no Rousseau: an experiment on voting and redistribution*" they conduct experiments, mimicking some basic features of a modern welfare state. Each individual can therein decide whether to exert costly effort and the groups of nine afterwards vote on whether the individual gains will be redistributed among the group later on[17]. The group composition stays the same for all of 50 rounds and their dynamic design has equilibria in line with the ideas of the two moral philosophers mentioned in the title. Anticipating that rich individuals (those being lucky in the risky effort task) will vote against redistribution, while poor individuals (those either being unlucky, or those not taking the risky decision) will vote in favor, there are two equilibria which correspond to Thomas Hobbes view of a war of all against all: Either no one will exert effort and everyone will be poor, such that the majority supports redistribution and no one has an incentive to deviate by exerting effort, as his gain will be redistributed to the others; Or everyone exerts effort and a rich majority votes against redistribution such that no one has a possibility to deviate and to free ride on the effort of the others[18]. However the authors show that in a dynamic setting a third equilibrium (in line with a Rousseaunian social contract) exists, where everyone exerts effort and all gains are redistributed. This equilibrium in sustained by a threat of conversion to the inferior of the two Hobbes equilibria, in case of a single deviation[19]. The authors find that there are some groups in line with the superior Hobbes equilibrium, while most are corresponding to the inferior Hobbes equilibrium. A social contract did not establish in any of the 28 observed groups. The reason for this is in a direct contraction to the study by Cappelen et al. (2013):

[17] The effort decision in Cabrales et al. (2012) is designed such that unlucky individuals are worse off than those refraining from exerting effort. The redistribution choice is an all-or-nothing choice, which leaves those exerting effort worse off than the others irrespective of their luck, i.e. redistribution in this case is revolutionary.

[18] It should be noted that this second equilibrium is superior to the former in terms of total payoff.

[19] The Rousseaunian equilibrium is also to be expected if individuals are sufficiently motivated by social preferences for the payoffs of others (cf. Cabrales et al. 2012).

the rich did not condition their vote for redistribution on the number of individuals exerting effort in their group (cf. Cabrales et al. 2012).

The results of this study are completely in line with standard theory, as individuals do not care about any payoff irrelevant factors when they decide about redistribution. The implication is that rich will vote for - and poor against redistribution. However this in not in line with behavior observed in other previously mentioned studies (e.g. Höchtl et al. 2011). One possible point of critique is that individuals in this study faced a redistribution choice with which they could either redistribute all post-effort earnings or nothing at all. This redistribution option required a relatively high level of inequality aversion. There was no possibility for rich individuals to make the poor just a little bit better off by allowing for further redistribution options in between. The present study takes account of exactly this limitation. However the comparability is limited as the thesis at hand refrains from a dynamic interpretation and applies stranger matching. The two experiments also differ in the group size and in the feature of fixed income classes.

This section tried to given an insight to a vast amount of literature dealing with social preferences in particular in redistribution decisions. The studies described were picked to give an overview of the current discussion about the impact of social preferences, with a focus set on studies explicitly dealing with questions addressed in this thesis. Concluding one might say that individuals exhibit heterogeneous social preferences in voting on redistribution and whether these preferences are important in the determination of the outcome depends to a great extent on structural parameters. When effort (in the form of risky decisions) determines the pre-redistribution outcome, views to what constitutes a fair distribution change, again being highly dependent on context, group size and composition, available redistribution options and further structural details.

This thesis tries to combine several aspects of above mentioned papers to investigate hypothesis mentioned in the fourth section. The exact experimental design is to my knowledge novel, with important details mainly taken from Höchtl et al. (2011) and Cabrales et al. (2012).

3. The Experiment

In this section of the thesis I will briefly describe the experimental design and write about technicalities of the implementation of the experiment. Afterwards I will comment on why I use an economic experiment in the context of my research and specify assumptions about the behavior of participants in economic experiments in general and with respect to my thesis in particular.

a. The Experimental Design

In the experiment participants are randomly allocated to groups of five individuals. I use stranger matching which means that the group composition changes after each round and individuals cannot trace the decisions of other participants over consecutive rounds. The experiment consists of 16 rounds and at the end of the experiment two periods are chosen randomly for payment. This

payment method prevents insurance across time, meaning that participants had to face every round knowing that half of the total payment might depend on their current decision. Each round consists of two stages in which subjects face decisions and are informed about the relevant outcomes afterwards.

In the first stage each subject can independently choose whether to exert effort. This is simplified by a risky choice between high and low. After the effort choice three of five individuals in a group are denoted type X (corresponding to rich) and the remaining two are type Y (the poor)[20]. Being type X an individual has a better chance to earn a high profit in the experiment, by having a superior standing in the second stage. The allocation of individuals to groups is contingent on the effort choice of participants in the same group. The X types are filled up with those exerting high effort, however if more than three individuals chose high effort a random draw among them determines exactly three which are denoted type X, the remaining subjects together with those exerting low effort are sorted to type Y. Also the opposite holds, if less than three individuals pick high effort, a random draw among those choosing low effort fills up the remaining X types[21]. High effort is associated with a cost of 20 points, while low effort is costless. These costs are not taken into account in the following redistribution stage, but are simply deducted from the final profit at the end of the period. After the first stage the participants observe their effort choice, their denoted type and the number of individuals in the group exerting high effort in an additional screen. From this information they can deduce whether the allocation of effort choices to types was a result of luck.

In the second stage the subjects decide upon the distribution of resources among the group members by voting on 1 of 16 predefined allocation options. Table 3 shows the possible redistribution options and is roughly in line with Höchtl et al. (2012), however the parameters differ as the cost of effort is also taken into account and the number of allocation possibilities is reduced. The payoffs are different for type X and type Y and the individual payoff is therefore depending upon the effort choice from the first stage. The allocation table contains clear predictions for voting behavior under pure self-interest as well as under inequality aversion, which are discussed in chapter 3. The predictions for voting behavior also differ with respect to the two different types of group members.

The allocation numbers can be thought of as a compound of tax and per-capita redistribution. The table contains a tradeoff between efficiency and equity. As the allocation number increases (corresponding to the higher taxes) the redistribution becomes less efficient[22], however the equality between the types increases.

[20] In order to avoid loaded language I used the neutral expressions type X and type Y instead of rich and poor.

[21] The exact probabilities for being type X and type Y conditional on the own effort choice and the possible effort choice of the other group participants are included in the instructions in Appendix D. The way how effort influenced type allocation was sufficiently explained to participants in the instructions through examples and tables and by control questions.

[22] This is for example in line with the classical redistributive model of Meltzer and Richards 1981. Therein higher redistribution levels cause disincentive effects for effort, resulting in lower levels of aggregate output. The present

Allocation number	Type X	Type Y
0	117	25
1	120	30
2	117	32
3	113	34
4	109	36
5	104	38
6	100	40
7	95	43
8	90	46
9	84	45
10	78	42
11	72	39
12	65	36
13	58	33
14	50	26
15	42	22

Table 3: Redistribution levels and associated payoffs

The X types have a higher payoff than the Y types for all allocation alternatives, given they chose the same effort level. The payoffs are common information and there is no uncertainty over the income class for this round once the participants are in the redistribution stage. Therefore the results are mostly comparable to papers studying the ex-post redistribution behavior (like Höchtl et al. 2012, Engelmann and Strobl 2004 or the third part of Durante and Putterman 2009) and differ from papers using a Rawlsian "veil of ignorance" (like Frohlich et al. 1987 or the second part of Durante and Putterman 2009).

The members of a group can decide upon an allocation by voting. The effective allocation is determined by majority voting, meaning that the decisive vote is the one by the median voter. The concept of majority voting was sufficiently explained to participants in the written instructions and control questions.

After each individual selected an allocation number and the effective distribution of incomes was decided, the subjects were informed about the collective allocation choice, their payoff from this round minus the effort costs, if relevant. At the end of each round the computer screen also displays a history of earlier outcomes in the experiment such that individuals can reflect upon their earlier decisions and the associated success.

After eight rounds, the treatment changed and new instructions were handed out. From round nine onwards, the subjects played in groups with two X types and three Y types. This structural change is also in line with Höchtl et al. (2012). It changes the prediction for the group allocation decision and if

experiment however is not able to capture disincentive effects, as the group does not profit from an individual's effort choice.

individuals anticipate a new group outcome, also the individual voting decisions. The two treatments were conducted by a within-subjects design, meaning that each subject participated in both treatments. Although several similar papers used a between-subjects design (e.g. Cabrales et al. 2012, Höchtl et al. 2012) for the comparison between treatment conditions, I used within-subjects due to relatively large group sizes, stranger matching and a limited budget for incentivation of experimental participants[23].

The instructions for both treatments as well as screenshots from the experiment are contained in the Appendix B and C.

b. Implementation of the Experiment

The experiment was run and funded by the Vienna Center of Experimental Economics (VCEE). A total of 15 subjects participated over 16 rounds. Two random rounds were paid and the average payment of individuals was 11.6€. During the experiment the participants could earn points through their actions. At the end of the experiment these were converted to real money by the exchange rate 10 points= 1€. The participants heard and registered for the experiment via an online recruiting system. The sample consisted of students of various fields. The experiment was programmed and conducted with the software z-Tree (Fischbacher 2007).

In total the experiment lasted one hour. After subjects were randomly allocated to cubicles, they had to get acquainted with written instructions (see Appendix C). Afterwards they had to answer three control questions. The control questions were meant to give the individuals the chance to reflect on the rules of the game and not to exclude those individuals that got the answer wrong[24]. After every individual was finished with the instructions individuals played for 8 rounds in the rich majority treatment. After period 8 they were informed that the group composition has changed and new instructions (see also Appendix C) gave an outline about the rules for the remaining 8 rounds. After the experiment, participants were informed about the realized rounds for payment and were asked to fill out a short questionnaire, which contained self-assessments on risk aversion and questions on the attitude towards redistribution (see Appendix D). Before leaving the laboratory of the VCEE the participants were called up individually for payment.

c. Why use an Economic Experiment?

The decisions made in the experimental groups should mirror the decisions of individuals in a society's welfare state. One of the main responsibilities of today's welfare state is the redistribution of resources among individuals. The reason for redistribution is on the one hand to reduce inequality among the members of the state and on the other hand to insure individuals (irrespective of their

[23] It is not controlled for order effects, but in the analysis of experimental results, this should of course be kept in mind.
[24] The control questions were actually posed in a multiple choice format and a subject had a chance to change the answer, in case they got it wrong.

income level) across time[25]. There are however negative incentive effects for members of a welfare state. Anticipating to be helped out, individuals may reduce their effort and free ride on society's benevolence. My experiment tries to model these features of a welfare state and deduces from the behavior of experimental subjects to actual attitudes within the society. It is true that designing an actual welfare state is difficult and the exact chosen features, parameters and simplifications are to some extent a result of the experimenter's arbitrariness, however the exact design was chosen on the one hand for quantitative comparison with similar studies and on the other hand for a qualitative interpretation of participants' behavior[26].

Nevertheless implementing an economic experiment for the research questions at hand, seems a reasonable approach also due to the apparent limitations of other methods. Observing preferences for redistribution in the field is indeed tricky. Data from surveys, like the General Social Survey (GSS) or the World Values Survey (WVS), usually consists of peoples' views about for example redistribution, effort or social preferences. However these views are non consequential, in the sense that participants' replies do not affect the outcome for the replier himself or any other individual participating in the survey. Laboratory experiments on the contrary offer the possibility for proper incentivation of subjects, as the actions undertaken in a laboratory have real consequences for real people. By additional anonymity of participants the experimenter can get rid of a bias from socially desired answers[27]. In laboratory experiments money serves as the medium of payment. By using monetary payment of experimental subjects it is assumed that the experimenter has control over the preferences of individuals. This idea about experimental control of human behavior is based on the induced value theory (cf. Smith 1976). In this sense money is the preferred medium of incentivzation as it best fulfills the criteria of monotonicity, i.e. earning more money is always better, salience, in the sense that the additional payment depends on the actions undertaken by the subjects, and dominance, i.e. the subject cares sufficiently about the monetary payoff such that differences in unobservable characteristics can be neglected.

Another advantage of a laboratory experiment over observations in the field is that it can be controlled for many distortionary factors. Falk and Heckman (2009) point out that the lab offers possibilities to control the decision environment in ways which are hard to duplicate with natural occurring settings. The experimenter has the opportunity to control the material payoffs, the information that goes to the participants and several other details (cf. Falk and Heckmann 2009, 536). In this way statements about predictions from economic theory can be precisely tested and changes in the design offer the experimenter a chance to study the causal effect of an experimental

[25] It should be noted that my experiment does not offer participants the opportunity to insure themselves across time by redistribution as the group composition changes every period. However the attitude of subjects towards different sources of poverty resembles an individual's willingness to insure others against bad times.

[26] As already suggested above when testing economic predictions an experimenter faces a tradeoff between simplicity and accuracy of the design.

[27] Corneo and Gruner claim that the desire to increase the own social standing plays a critical role in the determination of preferences for redistribution (cf. 2002, 101).

feature[28]. For example in this experiment the causal effect of a change of the group composition on the individual voting behavior and the collective decision can be isolated.

A further reason for using an economic experiment for the investigation of my research questions is the role of effort. In a natural setting it is basically impossible to measure and compare effort produced by citizens. The main reason is that an individual's ability to exert a certain level of effort is not observable and the disutility from exerting effort is not comparable across subjects[29]. The experimental approach has made use of two ways to induce effort. Experimental studies let subjects operate effort either through a real effort task or by a costly effort choice through a simple mouse click. While real effort tasks are closer to real life situations, for example on labor markets, the application in line with a simple cost function has the advantage that effort is not distorted by personal variables, such as ability and experience. Brüggen and Strobel (2007) analyze and compare the two different ways of operationalizing effort in gift-exchange games and find equivalence of results between the two methods (cf. Brüggen and Strobel 2007). In this thesis comparability of results has a higher priority than adequately mirroring a realistic task, therefore I stick with the effort choice as in Cabrales et al. 2012. Cabrales et al. argue that this operationalization of effort has the advantage of easily disentangling whether increasing or decreasing redistribution levels can be attributed to changes of effort levels of others as well as the incentives set by the group structure (cf. 2012). Also the emphasis of the present study is not about effort levels and the disincentive effects, but about voting conditional on effort choices taken. Therefore the approach of effort as a costly mouse-click suits this specific experimental design better than a real effort task.

With experimental results there is always the question of external validity, that is, do results generalize from the lab to the field. With regard to external validity I also argue in line with Cabrales et al. (2012), who cite Schram, saying that "external validity is relatively more important for experiments searching for empirical regularities than for theory-testing experiments (2005, 225)" and Plott, claiming that "experiments do not need to be realistic so long as they closely implement the theory being tested" (1982, 1521-1522). As the goal of this paper is to precisely test which economic explanation performs well in the present setting and it is therefore a theory-testing paper, external validity is not a main issue. A laboratory experiment is hence seen as a good guideline for interpretation of economic behavior and contributes to the created knowledge about preferences for redistribution. The regularities observed in an economic experiment however should not be seen in isolation but in addition to results from the field.

[28] Falk and Heckman notice that field methods are equally able to obtain a causal effect if the outcome function is separable in X_1, that is it is possible to vary X_1, holding all other determinants of the outcome fixed (cf. Falk and Heckman 2009, 326).
[29] For a short overview of papers studying the effect of an independent variable on effort in the field see Levitt and List 2007, 168.

4. Theory and Hypotheses

This section offers the theoretical predictions for the experimental design presented in the previous chapter. Based on theory hypotheses are derived about voting on the individual level, the effort choice, voting based on the group's effort and voting on the level of group decisions.

a. Individual Voting

The general assumption about economic behavior made by standard theory is that individuals have preferences over their lifetime consumption and maximize their utility according to these preferences and a set of constraints. This principle is also reflected in the preferences for redistribution. The homo oeconomicus, the rational individual motivated only by self-interest, maximizes in a standard political economic model, like Meltzer and Richards 1981, his utility from consumption and leisure according to his individual preferences.

Applying the behavior of a homo oeconomicus to the present experiment yields clear predictions about voting decisions. A rich agent he will try to avoid expropriation and vote for a low tax and redistribution. Members of the poor income class on the other hand will try to get as many resources as possible to maximize their own payoff. Applied to Figure 1, which shows the allocation alternatives and the associated payoffs in the experiment, these assumptions translate into the first two hypotheses.

H_1: *The rich individuals, i.e. those allocated to type X after the effort decision will vote for allocation number 1, as it maximizes their possible payment from the experiment.*

H_2: *The poor individuals, i.e. those allocated to type Y after the effort decision will vote for allocation number 8, as it maximizes their possible payment from the experiment.*

Allocation number	Type X (rich)	Type Y (poor)
0	117	25
1	120	30
2	117	32
3	113	34
4	109	36
5	104	38
6	100	40
7	95	43
8	90	46
9	84	45
10	78	42
11	72	39
12	65	36
13	58	33
14	50	26
15	42	22

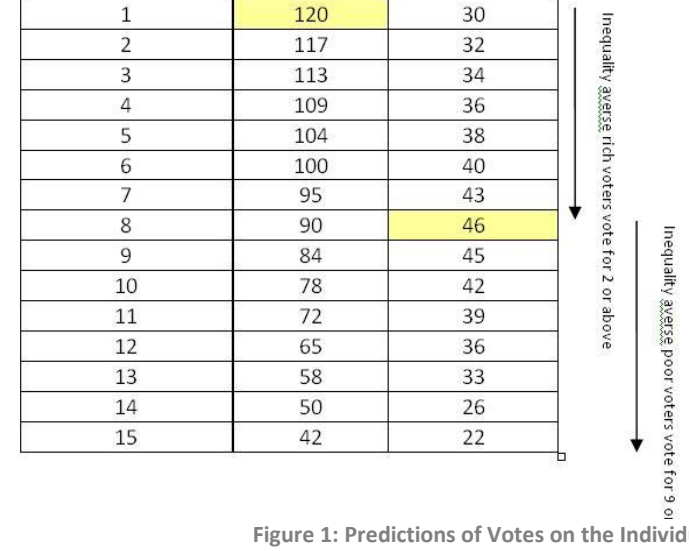

Figure 1: Predictions of Votes on the Individual Level

It should be noted that in general deviations from choosing the individual maximum in a redistribution decision are possible if the model allows for social mobility, like Benabou and Ok (2001). The idea behind including social mobility is that the poor may not support high redistribution levels, as they hope that they or their offspring may make it up the income ladder. Benabou and Ok show that by including prospects of upwards mobility (POUM) the demand for redistribution reduces relative to the basic political economy model even with full rationality (cf. 2001). This downwards effect on redistribution is to some extent counterbalanced by a

prospect of downwards mobility among the rich and a desire to insure themselves against future losses. Which effect dominates the other in the collective redistribution depends on the exact parameters in the population, like the degree of risk aversion and the skewness of the distribution of random shocks to income[30]. However there are also other explanations for a limited level of redistribution, leaving the assumption of full rationality behind. Over-optimism is one factor, driven by the fact that more people belief to be richer in the future than under full rationality. This could be a result of indoctrination, either self induced to convince yourself to work hard or socially induced, to prevent the adoption of excessive redistribution policies (cf. Alesina and Giuliano 2010, 98-99). The issue of social mobility, as a rise or decline in the income distribution, is however not taken into account in the present experiment, as the participants' decisions are of one-shot nature and hence the payoff in one round does not depend on redistribution choices or the expected standing in the income distribution in former or future rounds.

The role of inequality aversion on the other hand is central to this thesis. If inequality enters the individual utility function directly, the voting decisions will deviate from the self-interest prediction. The payoff structure is arranged such that higher allocation numbers (i.e. taxes and transfers) increase equality among income classes. The hypotheses in line with inequality aversion, which are represented by the arrows in Figure 1, are:

H_3: *If the rich individuals, i.e. those allocated to type X after the effort decision, are sufficiently motivated by inequality aversion the average allocation choice will be bigger than 1.*

H_4: *If the poor individuals, i.e. those allocated to type Y after the effort decision, are sufficiently motivated by inequality aversion the average allocation choice will be bigger than 8.*

Although predictions of voting behavior are possible under both inequality aversion theories introduced in the first chapter, I abstain from giving quantitative statements about vote outcomes. Tyran and Sausgruber (2006) follow this approach, however they test one redistribution option which creates a clear tradeoff between the Fehr and Schmidt theory and the self-interest prediction. In contrast in this experiment subjects have to choose among 16 possible alternatives and the payoffs are not created to reflect the tradeoff between different inequality aversion theories. It is therefore not conclusive to use values for the parameters α and β or a and b in order to give quantitative statements about the performance of inequality aversion theories[31]. The goal of this experiment is to observe deviations in a particular direction suggested by the existing body of literature on social preferences.

[30] Using data from the U.S. Benabou and Ok find that the POUM effect is probably dominated by the demand for social insurance (cf. Benabou and Ok 2001).

[31] The allocation alternatives however are in line with utility predictions for specific parameters. For example assuming type X exerted effort and the group is in the rich majority treatment, the ERC- theory by Bolton and Ockenfels (2000) predicts the following: Keeping a_i fixed at 1, an individual with b_i between 0 and around 4000, will vote for allocation 1 in line with standard theory. Increasing the value of b_i, increases the allocation number yielding the highest utility. If b_i goes to infinity, the optimal choice is allocation number 15.

Making use of the experimental approach can only account for inequality aversion which enters the utility function directly. Hence when testing for inequality aversion the question is whether individuals have a certain view about social justice, beyond how inequality aversion affects their own income. People can also care about equality as a result of self-interest, if the inequality in the society has an impact on current or future consumption flows. This can happen for example by the way of reducing crime and the necessity for property rights. If, as often stated a higher level of inequality leads to more crime, the rich might agree to a higher level of redistribution as they have to spend less on private security to increase safety of their property. Also externalities in education are a possible explanation: If more inequality implies that a higher share of citizens cannot afford costly education, and as reasonably assumed a higher average level of education increases the aggregate productivity, the rich may favor some redistribution anticipating to benefit from a higher average education. However one could also think of an argument in the opposite direction, as inequality creates incentives to work hard and exercise more effort for people below the top. These effects of inequality are important for many peoples' maximization of consumption, however an economic experiment as performed in this thesis cannot deal with such arguments.

As Table 3, containing the relevant payoffs for the redistribution alternative, features a tradeoff between efficiency and equality, also statements about social welfare can be made. For the rich the social welfare choice is the same as the self-interest prediction from H_1. For the poor the tendencies for social welfare and inequality aversion go into conflicting directions. Another reason for a deviation of the poor towards a lower redistribution level might be that individuals accept the determination of income classes by effort and feel that the relative advantage of the rich is deserved.

H_{4a}: *If the poor individuals, i.e. those allocated to type Y after the effort decision, are motivated by efficiency concerns or consider the relative advantage of the X types as justly deserved, the average allocation choice will be smaller than 8.*

It should also be noted that maximin preferences suggest the allocation 8 and are hence in line with inequality aversion for the rich and with self-interest for the poor. Deviating towards tax rate 0 is not explained by social preferences or self-interest in the way presented above, however this allocation alternative maximizes the distance between the payoffs of the income classes. That means votes for tax rate 0 could be explained by rich individuals who consider their superior standing as deserved and therefore try to maximize their relative advantage against the other income class. This however comes at the cost of reducing the own payoff as well as the payoff of the others[32].

Individual vote choices can also depend on the pivotality of the voters, which in turn depends on the sizes of the income classes. The reason for possible asymmetry of votes across treatments is insincere voting. In line with the finding by Höchtl et al. the intuition is the following. Anticipating that their vote might not be decisive under majority rule participants respond to differential pivot

[32] The deviation is actually also in line with sadomasochistic behavior, which is however rarely observed (cf. Murphy and Ackermann 2012).

probabilities by voting insincere. The rich are anticipating that their vote is not pivotal under a poor majority and therefore face a lower cost by deviating from the income-maximizing choice. The result is that rich might vote more carelessly under a poor majority, expressing their support for redistribution as it is seen a morally worthy cause (cf. Höchtl et al. 2012, 1414-1415) [33]. The same holds for the poor, who are far more likely to be pivotal in the poor majority than in the rich majority. The following hypotheses are based on these considerations:

H_5: *The average vote of the rich is different under a poor majority than under a rich majority as a result of expressive voting.*

H_6: *The average vote of the poor is different under a rich majority than under a poor majority as a result of expressive voting*[34].

H_7: *The noise, i.e. the variance of the distribution of votes increases if the group members are not pivotal, i.e. are in a minority.*

b. The Effort Choice

In the first stage of the experiment participants take risky effort choices. Depending on the number of individuals exerting high effort, the choice task resembles a lottery with a risky and a safe alternative.

In the rich majority treatment, the lottery payoffs are constructed such that an individual will always have a higher expected payoff independent of the number of people exerting high effort in the group. Given risk neutrality a participant will therefore always choose to exert effort. If an individual anticipates that three or four other players will also exert effort, the risky choice corresponds to exerting effort and has a higher expected payoff than the safe choice, exerting low effort. It follows that if individuals are sufficiently risk averse they will deviate towards the safe option[35]. However if an individual anticipates that besides himself none, one or two agents exert effort, the high effort choice is also the safe choice yielding a higher expected utility than the low effort choice. Only risk-loving individuals would pick low effort in these situations. There are however very few observations with groups in which only two or less individuals took high effort such that it can be claimed that agents did not anticipate such a low number of high effort decisions in their group. Therefore in the

[33] Höchtl et al. 2012 find that the average vote of the rich under PMV is higher than under RMV, while there is no difference in the average vote for the poor across treatments. Deviations from poor and rich however mainly increase noise when pivotality is unlikely (cf. Höchtl et al. 2012, 1415).

[34] The direction of the difference is not specified in the hypothesis as both inequality aversion and social welfare predict different directions. For the rich the direction is also not specified as they can either express their view that their relative advantage was deserved or that the income of the other class should be equalized.

[35] With references to risk aversion I stick to Cabrales et al. (2012), who claim that "most estimates of risk aversion coefficients available in the literature point to values of *r* [the Arrow-Pratt risk aversion coefficient] well in excess of 0.2" (cf. 2012). Attanasio et al. (2002) for example find a GMM point estimate of *r*= 1.2 with a standard deviation of 0.5. The corresponding lotteries for rich and poor majorities, given the vote outcome from pocketbook voting, are in the appendix A. Appendix A also includes a calculation of the corresponding Arrow-Pratt relative risk aversion coefficient (*r*) in line with choosing the safe and risky alternatives.

following I will treat the high effort choice as risky and the low effort choice as the safe alternative although also the opposite is possible.

Assuming that individuals behave risk neutral, they will not choose low effort independent of how many others choose effort, i.e. high effort is a dominant strategy and a group outcome with five high effort choices is an equilibrium as there are no incentives to deviate[36].

H_8: *In the rich majority treatment individuals, given they are sufficiently risk neutral will always chose high effort.*

However the equilibrium is not very stable when accounting for possible distributions of risk aversion. Appendix A deals with risk aversion coefficients and finds that individuals with an Arrow-Pratt relative risk aversion coefficient of more than 0.658 will not take the risky effort choice given all others also exerted effort. This coefficient is at the lower bound of the standard deviation of Attanasio et al. (2002). Hence the equilibrium from hypothesis H_8 will therefore not hold if individuals are too risk averse according to the Arrow-Pratt relative risk aversion coefficient. The questionnaire used a self-assessment of risk aversion in which participants had to specify how risk averse they are on a level of 1-7 (see Appendix D). The results indicate that individuals in the experiment were on average risk loving (4.9), however the validity of such self-assessments is obviously limited.

In the poor majority treatment there is an asymmetric equilibrium in which four individuals exert high effort and one individual exerts no effort. An individual will, if none to three others exert effort, pick high effort as a best reply given the expected utility of the two alternatives. If however all four other players choose to exert high effort it is best for the individual to switch to low effort. As the group composition changes after each round and participants do not stay in a group with the same individuals, cooperation on this equilibrium is however basically impossible. There is nevertheless a mixed strategy equilibrium in which every player randomizes between high and low effort.

The two treatments differ in the chances of being rich given a subject exerted high effort and everything else (risk aversion, behavior of other group members) is kept constant. Hence it is more likely to get rich through effort in the rich majority treatment. H_9 tries to capture the difference in incentives for effort across treatments.

H_9: *In the rich majority treatment there will be more high effort choices than in the poor majority treatment.*

[36] It should be mentioned that this equilibrium is dominated (in terms of social welfare) by the coordination on the outcome where no one exerts effort. This outcome has the same probabilities for each group member to end up as type X, but no one has to pay effort costs contrary to the equilibrium with full effort. This superior group choice is however highly unlikely as deviations are not associated with high costs to individuals and stranger matching and a lack of communication makes coordination basically impossible.

c. Voting conditional on the Group's Effort Choice

The experimental design features another parameter on which participants can condition their vote on redistribution. In the first stage subjects make effort decisions which determine their standing in the later income classes. With the feedback from this stage the participants in the experiment can deduce whether and how much luck was involved in the determination of their type. When sharp decisions are determined according to luck participants feel their income is less deserved than under income distributions which are a result of individual choices. The choice and luck component in H_{10} and H_{11} are self-centered in the sense that they relate to how the own type was determined. The following hypothesis can be derived from the conditionality:

H_{10}: *If an individual exerted effort, the allocation number increases with the number of group members exerting effort in the same round.*

The intuition behind this hypothesis is the following: If an individual chose high effort (in a rich majority treatment) and one or two other group members made the same choice, the individual will be rewarded with type X and knows that his type was denoted according to his choice and the corresponding choices of the other group members. Being type X or type Y, when three or four other group member made the costly effort choice is a result of luck[37]. According to existing literature (Cappelen et al. 2013, Fong 2001, Esarey et al. 2011) the demand for redistribution should be higher in this case.

H_{11}: *If an individual did not exert effort, the allocation number decreases with the number of group members exerting effort in the same round.*

The intuition is the same as for hypothesis H_{10}, but the statement goes in the opposite direction. In the rich majority treatment, if an individual refrained from exerting effort, being denoted type X or Y and none, one or two others exerted effort is a result of luck. If the individual is denoted type Y as three or four group members made effort the participant can conclude that choice was responsible for his/her standing in the group[38].

Behind these hypotheses is the assumption that participants will take the own income in line with the type as deserved if it is a result of choice rather than luck. These assumptions are however in contrast with Cabrales et al. 2012, who find that rich agents do not condition their vote on the number of poor who made effort. They find no hint of a non-Markov voting behavior, meaning that subjects did not condition their vote on payoff irrelevant information. However the authors therein use an all-or-nothing redistribution decision, meaning either the whole aggregate income was split equally or every group member kept the pre-redistribution income (cf. Cabrales et al. 2012). By

[37] The probabilities of being type X when exerting effort, and thereby the self-centered luck component, decrease if the total number of individuals exerting effort in the group goes from 3 to 4 and from 4 to 5. There is no difference if it goes from 1 to 3.

[38] Parallel to the argument above, the probabilities of being type X when not exerting effort, and thereby the luck component decreases if the total number of individuals exerting effort in the group goes from 0 to 1, from 1 to 2 and from 2 to 3.

allowing for several redistribution options I expect to find a higher conditionality for the vote choice on the group's effort than Cabrales et al. 2012. One drawback of the present experimental design is however that an individual effort does not increase the output going to the collective. If a subject therefore wants to compensate others who made effort and were unlucky it has to do so out of pity and not by some reciprocal feeling, as the subject actually did not benefit from the other's effort choice.

It is important to point out that a general statement of the voting behavior of the rich/ poor conditional on the number of group members exerting effort can also be made. The following hypothesis concentrates on how individual votes are depending on the number of group members who exerted effort irrespective of how the own type was determined. The idea behind this hypothesis is that it matters for the voting behavior of individuals within a class how the types in the opposite class were determined.

H_{12}: *The rich (given they exerted effort) prefer a higher level of redistribution if the number of poor who exerted effort is higher.*[39]

There is also the argument of deserved income behind the motivation for this hypothesis. The rich will vote for higher redistribution if the poor types also actually deserved to be rich. The poor will find their optimal redistribution level unfair given that the rich had worked hard for their wealth.

d. Group Outcomes

The two treatments in the experiment differ in the structural parameters of the group composition. The rich majority treatment consists of 3 rich and 2 poor individuals and the poor majority treatment consists of 2 rich and 3 poor individuals. The payoff tables are designed such that rich and poor types have clear voting predictions (allocation 1 and 8) under the self-interest hypothesis. However if individuals are sufficiently inequality averse their voting pattern can deviate from the prediction. Whether these individual level deviations caused by social preferences can influence the group choice depends on the pivotality of voters in the treatment. However which voters are pivotal differs across treatments and therefore also the effect of inequality aversion on group outcomes is asymmetric. Höchtl et al. (2012) referred to this as the asymmetry effect. The below Figure 2 illustrates the intuition behind the asymmetry effect.

[39] The opposite statement cannot be tested, as there are too few observations in which the number of rich exerting effort deviates from 3.

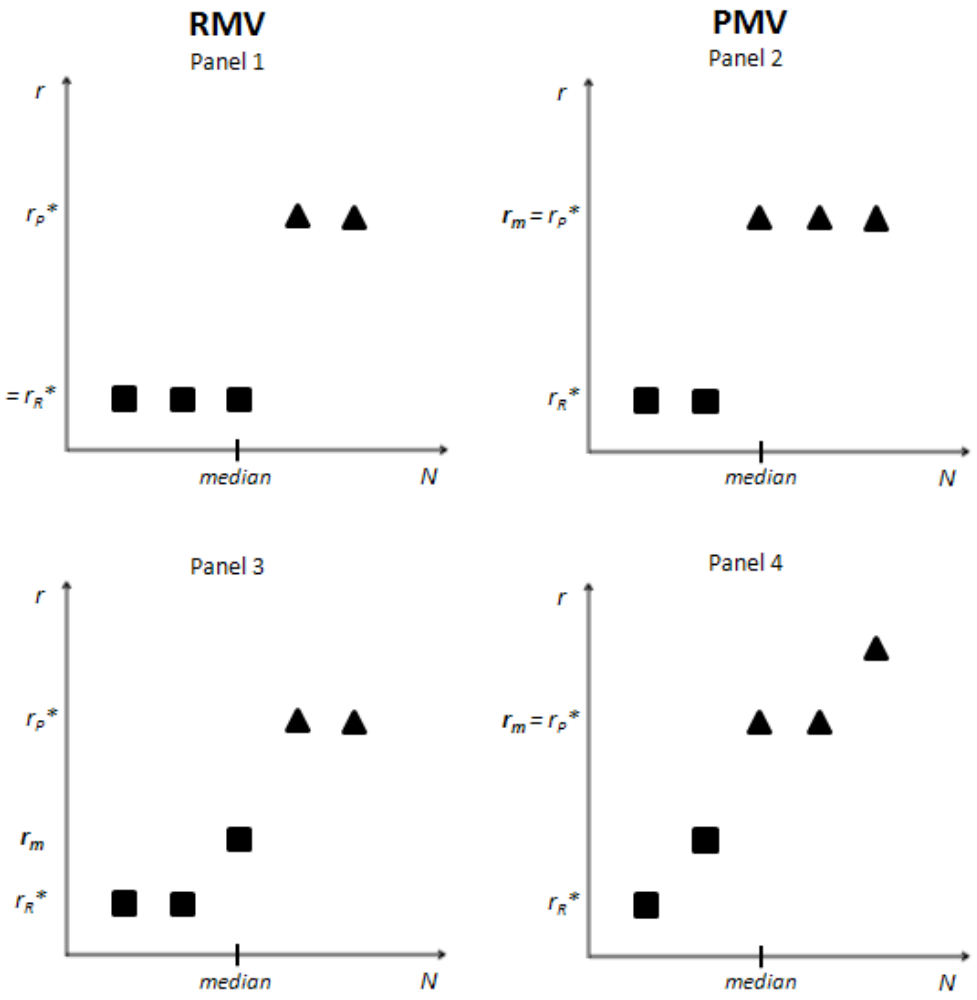

Figure 2: Redistribution outcomes for a rich and a poor majority, with and without inequality aversion (Höchtl et al. 2012, 1409).

The left side of the graph illustrates the voting decisions under a rich majority treatment (RMV) and the right side stands for decisions under a poor majority treatment (PMV). The squares represent the votes of the rich voters and the triangles stand for the poor voters. Each panel shows the level of redistribution on the vertical axis. Panel 1 and panel 2 reflect the group decisions under pure self-interest. The rich all vote for low taxes while the poor are in favor of a higher redistribution level. The group outcome depends on the type which is pivotal, which in turn depends on the majority. Therefore H_{13} and H_{14} are the self-interest hypotheses for the group outcomes in Table 3.

H_{13}: *In the rich majority treatment, the group outcome will be allocation number 1.*

H_{14}: *In the poor majority treatment, the group outcome will be allocation number 8.*

The lower panels assume the existence of a systematic deviation from self-interest. In particular some voters are motivated by inequality aversion, while others are purely interested in their pocketbook. Panel 3 illustrates the outcome when a rich individual is inequality averse. One of three rich types suffices to increase the median and thereby the group outcome to a level above the self-interest prediction. The opposite situation is depicted in panel 4. One out of three poor individuals is

inequality averse and opts for a higher tax rate. However the median does not change when accounting for inequality averse preferences. The median outcome is still the same as with purely self-interested individuals. The group's tax rate is driven by the least inequality averse individual in panel 4, while in panel 3, with a rich majority the group outcome is driven by the most inequality averse individual[40]. Hence it takes all three poor individuals to be inequality averse to change the group outcome in a poor majority. Inequality aversion will have a higher impact in the rich majority treatment than in the poor majority treatment.

H_{15}: *Deviations from the self-interest hypothesis on the group level are more likely in the rich majority treatment than in the poor majority treatment.*

5. Results

The following section gives an overview of the results of the economic experiment. As 15 participants played for 16 rounds I have observations for 240 individual voting and effort decisions. But as the actions from round 2 onwards were not independent of the previous outcomes, I only have one statistically independent sample. Therefore I also cannot deal with the two treatments as two independent samples. This has consequences for the validity of the applied statistical tests, which will be pointed out in this section. I start with giving a summary of the data by presenting descriptive statistics and graphs for effort and voting decisions. In the latter part of the chapter I run regressions and try to explain voting and effort choices with data from the experiment and the questionnaire. I also directly test the hypotheses stated in the third section.

5.1. Descriptive Statistics

a. Individual Voting

Individual voting decisions were made when the subjects already knew their types. It therefore makes sense to look at voting decisions of X and Y types separately, as the two types faced different incentives and tradeoffs for voting. Figure 3 displays the distribution of individual votes for the poor (left) and the rich (right).

[40] The poor and the rich are assumed to be equally likely to be inequality averse. A reasonable share of inequality averse voters is 20% as in Höchtl et al. (2012, 1410).

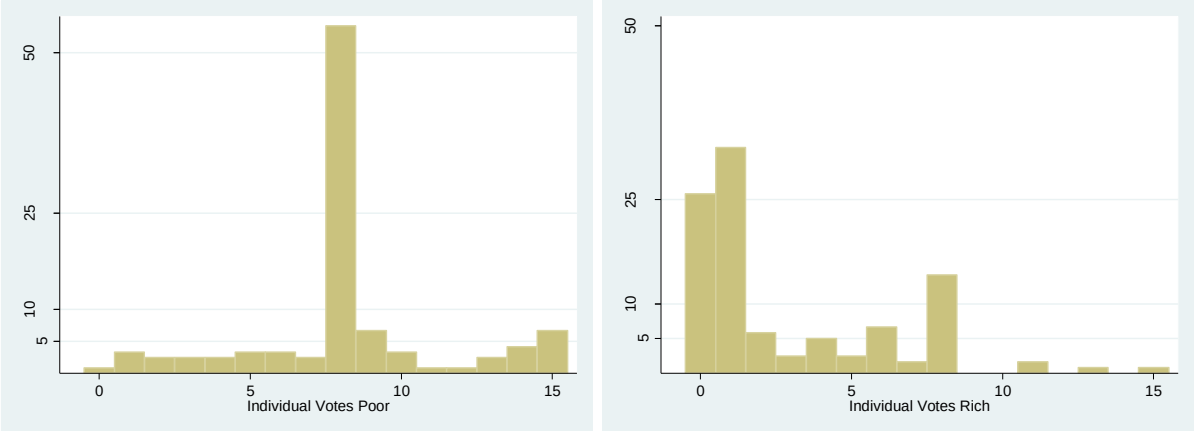

Figure 3: Distribution of Individual Votes

The poor individuals overwhelmingly voted in line with their self-interest prediction, allocation number 8. More than 50% of all individual choices were for the redistribution level 8, when denoted type Y. The deviations to higher and lower voting choices are similar in frequency, as the distribution has a positive but low skewness (0.12). 20.8% of all poor individuals voted lower than the self-interest prediction and 25% voted for an allocation number higher than 8. The average vote of all the 120 observations for the poor was 8.16.

The rich individuals voted on average for a lower allocation number, namely 2.91. However only 32.6% vote in line with the self-interest prediction. 25.8% of all votes by the rich are for the lowest allocation number 0, which decreases the own as well as the others' payoff. The basic explanations for this are either confusion by subjects or sadomasochistic preferences, i.e. a tendency to harm others even if it comes at personal cost[41]. In any case I checked whether these deviations are only observable for a few subjects or whether they occur through the whole set. In particular three subjects almost always chose 0, when being type X, while the others mostly took 1, when voting for a low redistribution level. Whether these subjects made their decisions due to confusion or due to a tendency to induce harm is not clear, as these subjects followed their choice during the whole experiment and there was no learning process observable in the sense that the subjects figured out their payoff maximizing choice after a couple of rounds. There is also a further explanation for these choices, namely that subjects understood that they are unlikely to be pivotal when they deviated towards allocation choice 0. In fact it would have taken all three rich individuals to bring the group choice to allocation number 0 in the rich majority. Therefore these deviations could be explained by the fact that individuals knew that their vote will not be the deciding one, regardless of whether they voted for 0 or 1. Indeed no group outcome was 0, so these votes were really not able to change the actual payoff of participants.

Rich individuals, to 14.2%, also voted for the payoff-maximizing redistribution level of the poor. Deviations above allocation number 8 were very seldom and only account for 3.3% of all votes.

[41] Höchtl et al. find similar deviations towards the allocation number 0, which in their experimental design is also pareto-dominated by the next higher allocation number (cf. 2012, 1417).

Individual Votes

	Type X		Type Y		Total	
	N	%	N	%	N	%
0	31	25.8%	1	0.8%	32	13.3%
1	39	32.6%	4	3.4%	43	17.9%
2	7	5.8%	3	2.6%	10	4.2%
3	3	2.6%	3	2.6%	6	2.5%
4	6	5.0%	3	2.6%	9	3.8%
5	3	2.6%	4	3.4%	7	2.9%
6	8	6.6%	4	3.4%	12	5.0%
7	2	1.6%	3	2.6%	5	2.1%
8	17	14.2%	65	54.2%	82	34.2%
9	0	0.0%	8	6.6%	8	3.3%
10	0	0.0%	4	3.4%	4	1.7%
11	2	1.6%	1	0.8%	3	1.3%
12	0	0.0%	1	0.8%	1	0.4%
13	1	0.8%	3	2.6%	4	1.7%
14	0	0.0%	5	4.2%	5	2.1%
15	1	0.8%	8	6.6%	9	3.8%
Total	120	100.0%	120	100.0%	240	100.0%

Table 4: Individual Votes

As can be seen from Figure 3, both distributions are far from being normally distributed (Shapiro-Wilk-Test: p=0.0000 for rich, p=0.0001 for poor).

The distribution of votes for the different types can provide a distorted view, as some individuals were maybe overrepresented in type X or Y due to their effort strategy. Hence I also looked at the averages of the votes of each subject, depending on the type. Table 1 and Table 2 in the Appendix E show very heterogeneous subjects with respect to the voting behavior as rich individual. The averages of subject's votes under type X range from 0 to 8.3. Under type Y the averages range only from 6.5 to 9.3 (with the exception of one individual with an average of 14.3).

For future analysis of the data it is also interesting to look whether individuals of a certain type voted different given they exerted effort before. The effort choices in the data set however are such that this comparison is only reasonable for type Y. For type X 118 out of 120 exerted effort. Comparing these votes with the votes of the other subgroup, which only consists of 2 observations, does not yield interpretable results. However there are sufficient observations for poor individuals who exerted high effort and for poor individuals who exerted low effort. Figure 1 in the Appendix E shows distributions of both cases, which look rather similar (Wilcoxon rank sum test on equality of distributions: p=0.5335) . The average votes of the poor individuals are 8.39 and 7.98 in case of high and low effort respectively. The difference in means is in line with intuition: Those who exerted high effort and were unlucky wanted more compensation, i.e. redistribution, than those who exerted low effort. However the difference is not significant. Former own effort choices do not seem to be correlated directly with the voting decision. They are of course indirectly correlated in the sense that they increase the probability of being type X, which itself results in a lower redistribution choice.

I am also able to compare individual votes of particular types across treatments. The two treatments change the probability of being pivotal for the two types. Votes might therefore differ as one can

assume that if a voter is very unlikely to be pivotal, she is more likely to express her opinion through the voting option.

Figure 4 shows the distribution of individual votes of the poor for treatment 1 (left graph) and treatment 2 (right graph)[42]. Given type Y individuals are more likely to be pivotal, the frequency with which the payoff-maximizing choice is taken is above 60%. While in the rich majority the redistribution level in line with pocketbook interest is chosen in less than 40% of all cases.

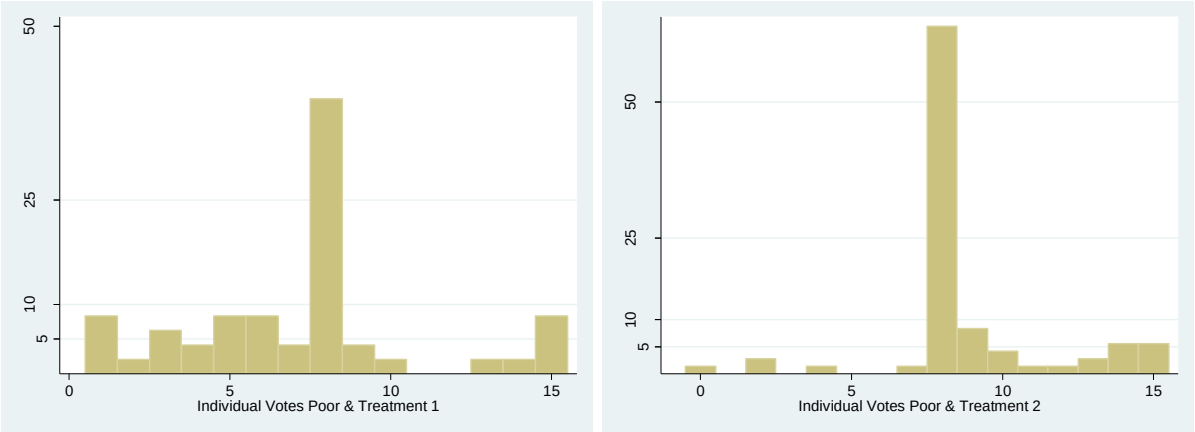

Figure 4: Distribution of Individual Votes by Treatment

Only very seldom do poor individuals deviate towards a lower redistribution level if they are in the poor majority treatment. 7% of all votes were below 8 in treatment 2, compared to 42% in treatment 1, where the vote of the poor was less likely to play a role. The distributions of votes in the two treatments support the notion that individuals vote more in line with self-interest if their vote can actually affect the outcome. The average vote of the poor is 7.25 and 8.78 in treatment 1 and 2 respectively.

However the interpretation of the impact of pivotality on self-interested voting does not hold for the rich individuals. Figure 5 illustrates the same tendency as Figure 4, although in line with the above suggestion of expressive voting the opposite should hold. The rich are also more in line with pocketbook voting in the second treatment. However they are more likely to be pivotal in treatment 1. In particular 66.7% vote for allocation 1 or lower in treatment 2, compared to 52.3% in treatment 1. Even more striking is the fact that no one voted above allocation 8 in the poor majority treatment, while there were still some deviation in this direction in the rich majority treatment. The average vote of the rich is 3.56 and 1.94 in treatment 1 and 2 respectively.

[42] The detailed distributions are contained in the Appendix E Table 3 and 4.

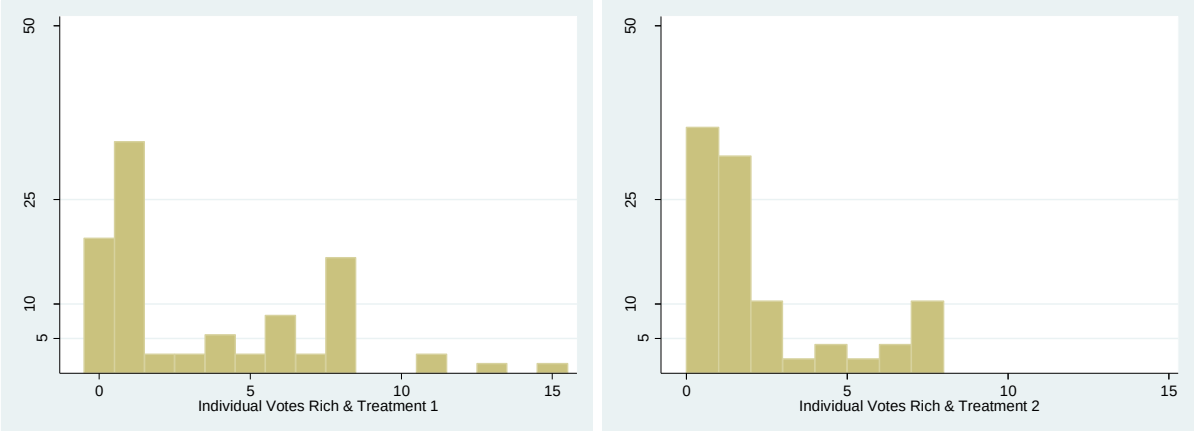

Figure 5: Distribution of Individual Votes by Treatment

b. Individual Effort Choice

The participants faced effort choices even before they were asked to vote on a redistribution scheme. Effort is a binary choice, leaving the participants only the options of low and high. In total more than 70% of all choices are for high. The participants' effort decisions between treatments are mostly similar. In the rich majority there are slightly more high effort choices, however the differences is not statistically significant (see the second part of this chapter). The slightly higher proportion of high effort choices in the rich majority is also in line with theory, as in the first treatment, effort yields a more promising gamble.

Effort

	Rich Majority		Poor Majority		Total	
	N	%	N	%	N	%
low	31	25,8%	38	31,7%	69	28,7%
high	89	74,2%	82	68,3%	171	71,3%
Total	120	100,0%	120	100,0%	240	100,0%

Table 5: Individual Effort Choices by Treatment

As for the voting decisions also the effort choices were very heterogeneous across subjects. Table 33 in the Appendix E shows the average effort choice for all 15 subjects individually. Some subjects exerted high effort in all 16 decisions, while one subjects chose never to exert high effort. The remaining subjects played a mixture of both choices.

As treatments do not show a different pattern of effort choices at least in quantity, one can also look at the effort of individuals over time. Figure 6 gives an overview of effort strategies over all 16 periods. For subjects 1, 7, 8 and 12 the choice was the same throughout the experiment and the graph is therefore a horizontal line. An interesting case is subject 3, who exerted high effort in the first treatment and changed to low effort in the second treatment. This subject was apparently disincentivized by the change in the group structure. Many subjects also applied a strategy of switching after each period. In particular subjects 5, 9 and 14 switched between options over the whole duration of the experiment and subject 13 only in the second treatment. Whether these alterations were a result of boredom or intention cannot be said from these graphs. Figure 2 and Figure 3 in the Appendix E show the effort pattern with the feedback of their profit for two of these subjects. The thought behind this graph is that these individuals reacted to low profits by changing the effort strategy. The behavior of subject 9 to some extent confirms this intuition. From period 5 onwards the participant constantly changes her strategy between high and low effort as she observes rather low profits. At period 12 the profit is back to a higher level and the participant holds on to the strategy which resulted in the high profit (in this case high effort). Such a pattern cannot be found in the reaction of subject 5. Subject 5 switched between high and low effort also after observing high profits. There is no apparent reaction in effort choices to profits or type allocation for this subject[43]. This shows that some individuals actually tried to react to feedback from the experiment while others seemed to behave randomly in the effort task.

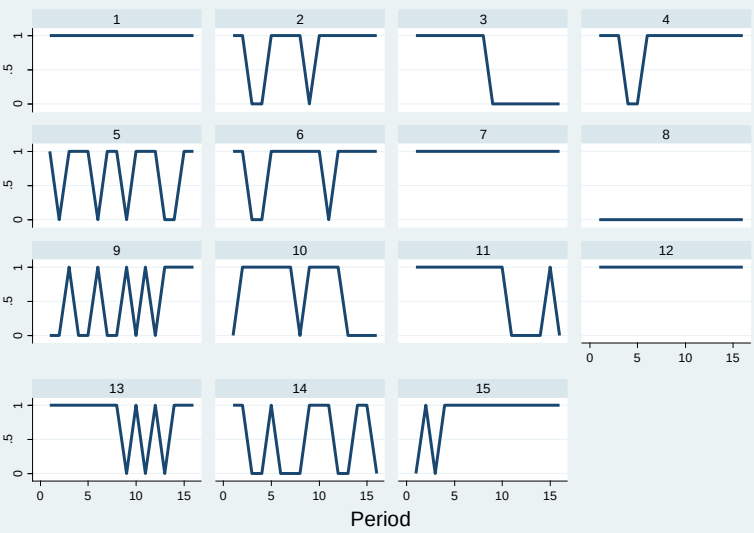

Figure 6: Effort Decisions over Time on Subject Level

c. Group Votes

For group votes, i.e. the implemented redistribution levels, voted for by the median, the relevant data consists of 48 observations. Presenting descriptive statistics on the distribution of group votes in the different treatments gives a first hint on the validity of hypothesis H_{13}, H_{14} and H_{15}.

[43] For the interpretation of these graphs one has to keep in mind that in the same period individuals made their effort choice and only observed their profit afterwards. The disincentive effect is therefore captured by the effort choice in relation to the profit of the previous round.

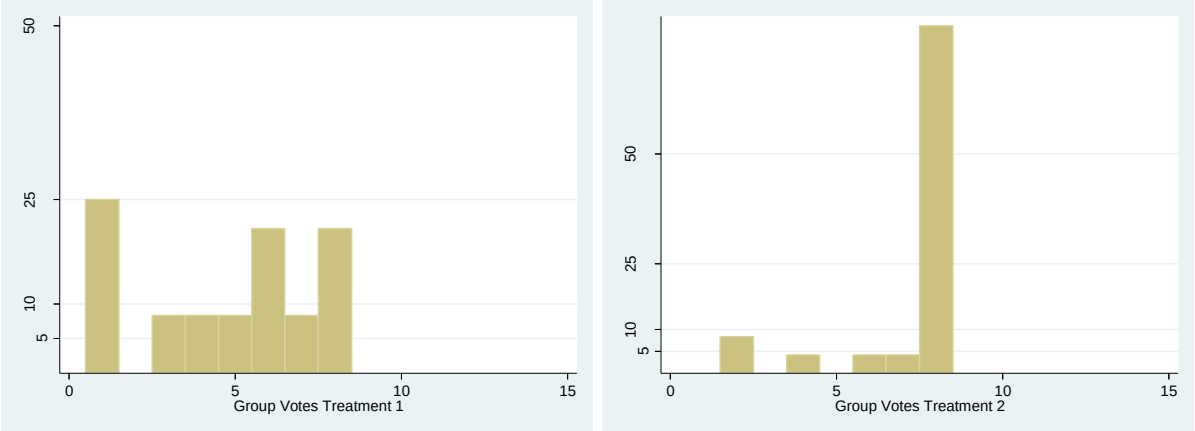

Figure 7: Distribution of Group Votes by Treatment

Figure 7 shows the distribution of votes under the two treatments (Table 6 in Appendix E contains the exact distributions). The asymmetric effect is apparent. In the second treatment no inequality averse individual was able to influence the group outcome towards a higher level although there are numerous deviations as can be seen from the right panel in Figure 4. In fact nearly 80% of all outcomes are exactly at the self-interest prediction. The distribution looks different in the rich majority treatment. Only 25% of all group outcomes were at the pocketbook prediction of redistribution level 1. The remaining 75% are above and led to a higher redistribution than predicted under H_{13}. Figure 7 indicates that there is an asymmetric effect of inequality aversion. In the rich majority the most inequality averse individual drives the group outcome, therefore the majority of group votes lies above prediction. In the poor majority the least inequality averse individual decides the group choice. The consequence is that not a single observation is above the prediction.

But the data also shows an asymmetric in the other direction. As some voters took into account that the distribution of types was determined by a risky effort task, they also voted for a lower redistribution level than optimal to express their view that the relative advantage of the rich was justly deserved. But also voting for a deserved advantage of the rich has an asymmetric effect on group outcomes. In the poor majority these votes were able to influence 20% of all group outcomes and brought the implemented redistribution option to a lower level. In the rich majority none of the 20% individual votes for redistribution level 0 were able to affect the group outcome[44].

By letting participants play in treatments with different majorities, I was able to find an asymmetric effect of inequality averse voters as proposed by Höchtl et al. (2012) and could by further modifications also detect an asymmetric effect for those voters, which have a tendency to keep deserved relative advantages. The statistical significance of these statements is shown in the latter section of the results.

[44] This argument can, as already mentioned above, also work the other way around. Maybe rich individuals voted for allocation 0 as they knew that their vote will not have an impact on the group outcome.

Group votes differ by treatment, but also the number of individuals in the group which chose high effort might be correlated with the selected redistribution alternative of the group. If more than three individuals in a group exerted effort, group members might have a higher willingness to compensate those which were unlucky in the allocation of types. Table 6 shows average group outcomes for each possible number of individuals exerting effort.

Average Group Vote by Number of Individuals exerting high effort

Number Effort	N	mean	sd
1	1	8	0.00
2	2	5.5	2.63
3	21	6.62	2.88
4	17	5.47	2.85
5	7	5.14	2.19
Total	48	5.98	2.55

Table 6: Average Group Vote by Number of Individuals exerting Effort

Dropping the values 1 and 2 due to a low number of observations, the table shows a certain tendency which is in the opposite direction as suggested by theory. When going from 3 to 5 individuals in a group exerting high effort, the average vote on redistribution decreases. This actually means that the more individuals exerted effort the less willing they were to compensate the unlucky. Table 7 in the Appendix E shows the distribution of group votes for the two treatments separately, the relation across treatments is however similar. The tendency although it is found in the data on group votes, need not be the same on the individual level. It may be affected by the voting behavior of types and the different pivot probabilities. A more detailed investigation of this relation is given in the latter section, when I look at the voting conditional on the group's effort choice.

5.2. Statistical Tests & Regressions

In the following statistical analysis of the experiment, the generated data set is treated as a single sample, unless stated otherwise if there is no other test without the additional assumption of independent samples.

a. Individual Voting

At first I look at the individual voting behavior of types and compare it to the predictions as well as with each other. I perform the Wilcoxon rank sum test (1945) to compare the distribution of votes of rich and poor types and can reject the hypothesis that the rich vote similar to the poor on a 1% level ($p=.0000$)[45]. As with the Wilcoxon rank sum test one cannot infer anything about the underlying means (cf. Schlag 2012, 26), I construct confidence intervals for the means in line with Schlag (2008) and make statements about the difference of means across samples based on these confidence intervals. In particular the mean of the rich, 2.91 is in the 95%-confidence interval [2.15: 3.85] and the mean of the poor, 8.17 is in the 95%-confidence interval [7.38: 8.96]. As these confidence

[45] Under the assumption that the votes of rich and poor are two independent samples.

intervals do not overlap I can claim that the average voting of the rich is statistically different from the average voting of the poor.

I can reject hypothesis H_1 on a significance level of α=0.05, as the voting prediction for rich individuals, namely 1 is not contained in the confidence interval [2.15: 3.85]. This means that rich individuals did on average not vote according to self-interest.

However I fail to reject H_2 on a significance level of α=0.05, as the voting prediction for poor individuals, namely 8 is contained in the confidence interval [7.38: 8.96]. Hence the poor vote is on average in line with prediction from standard theory.

With the same procedure I am also able to construct lower and upper bounds on the α=0.05 significance level to make statements about whether the average is above or below prediction. Thereby I can deal with further hypotheses about inequality aversion and prosocial behavior stated in section 3.

I cannot reject the hypothesis H_3 on a significance level of α=0.05, as the lower bound for the voting of the rich is 2.22 and hence the average vote is significantly bigger than 1. Therefore due to the design of the experiment I can suggest that rich individuals do behave inequality averse in redistribution decisions.

I reject hypothesis H_4 on a significance level of α=0.05, as the lower bound for the voting of the rich is 7.47 and hence the average vote is not significantly bigger than 8. Poor individuals did not vote inequality averse.

Making use of the same data I can also make statements about the impact of other social preferences which might influence the voting decision in the experiment and would point into the opposite direction. However I do not find any statistical influence of prosocial behavior or acknowledging the deserved relative advantage of the rich among the poor.

In particular I can reject H_{4a} on a significance level of α=0.05, as the upper bound for voting of the poor is 8.87 and hence the average vote is not significantly lower than 8[46].

Another interesting difference to test for individual votes is if votes for particular types differ according to whether they are likely to be pivotal or not. This can be done by testing whether the votes of each type in treatment 1 and treatment 2 are different. In the first treatment with a rich majority the poor on average voted for a redistribution level of 7.25. The constructed confidence interval is [5.87: 8.69]. In treatment 2 with a poor majority, poor types were pivotal and voted on average for a higher redistribution level, namely 8.78. The constructed confidence interval is [7.90: 9.74]. The confidence intervals overlap and hence I cannot claim on a 95% level of confidence that

[46] The values of the upper and lower bounds do not correspond to the confidence interval as the hypotheses H_3, H_4 and H_{4a} are tests on a specific relation (i.e. bigger or smaller) on a α=0.05 significance level and the hypotheses H_1 and H_2 feature tests on equality on a α=0.05 significance level.

the two parameters are different. However as the confidence intervals are not included in each other I can also not make the statement that they are not significantly different. To receive a higher clarity about the relation between treatment and individual votes of the poor I use a t-test with clustered standard errors on the subject level[47]. The t-test (1.61) rejects an impact of the treatment variable on the individual vote of the poor on all relevant significance levels (p=0.129).

Therefore I can reject the hypothesis H_6, that the voting behavior of poor individuals is different across treatments as a result of the pivotality of poor types.

The same procedure can be applied for the rich types. The average vote of the rich in treatment 1 is 3.56 with a 95%-confidence interval of [2.44: 4.83]. On average the rich types voted for a lower redistribution level in the second treatment, namely 1.94 with a 95%-confidence interval of [1.08: 3.40]. Again the confidence intervals overlap however they are not included in each other. Therefore I use a t-test with clustered standard errors on the subject level. The t-test (2.10) rejects a significant impact on the treatment variable on the voting behavior of the rich types on a 5%-significance level, however I am able to make the statement on the 10% significance level. The difference between the average votes of the rich across treatments is marginally significant (p=0.056).

With regard to H_5, I fail to reject the hypothesis that voting of the rich is different under a poor majority and a rich majority. However the tendency is not as stated in theory and also the findings of Höchtl et al. (2012) suggest the opposite direction. The rich vote is actually more in line with self-interest when rich individuals are not pivotal. Expressive voting, in the sense that if an individual is unlikely to count he will vote in line with his subjective opinion and not his self-interest, cannot explain this result. Further speculation would explain this result simply by order effects. Maybe the participants of the experiment learned that they had a higher payoff if they deviate less from self-interest and as the poor majority treatment was implemented after the rich majority treatment, the difference could be explained by the order of treatments in the experiment.

In section 3 I derived hypothesis H_7 from the existing literature and claim that the noise of votes is smaller given the individual is not pivotal. A statement which can be tested by comparing the standard deviations of votes across treatments. For the poor according to this hypothesis the distribution of votes in treatment 2 should have a lower standard deviation. Indeed, as can be seen in Table 8 in the Appendix E this is the case. A test for the ratio of standard deviations rejects the null-hypothesis of equal variances across treatments (p=0.0095) and I find that the standard deviation in the first treatment is significantly higher than the standard deviation of votes in the second treatment (p=0.0048, two-group variance-comparison test).

According to hypothesis H_7 the distribution of votes by rich individuals should have a higher standard deviation in the second treatment than in the first. But the statistics from Table 9 in Appendix E show

[47] The author of the thesis is aware that for exactness of the t-test in this case the assumptions of normally distributed data, independent samples and equal variances of the two variables are needed. None of these are fulfilled.

the opposite. A test for equality of standard deviations again rejects the null-hypothesis of equality (p=0.032) and I actually find that the standard deviation of votes is significantly higher in the first treatment (p=0.016).

With regard to H_7 I would fail to reject the hypothesis for the poor individuals, however for the rich I actually find the contrary effect. Therefore I reject the notion that votes have a higher variance when the type is in minority, i.e. not pivotal. Nevertheless I find that in treatment 2 in general for both types the noise in the distribution of votes decreases.

For comparison of votes across effort choices, I constructed a t-test with clustered subject errors and conclude that the difference in averages across the poor who exerted high effort and low effort is not significant (p=0.426). Performing the same test for rich types does not provide further insight due to the composition of the data.

b. Individual Voting Conditional on the Group's Effort Choice.

Central to the present study is the idea that when voting on redistribution, individuals take into account how the others behaved. In particular in this experiment they get feedback on their own effort and type as well as on the number of individuals exerting effort in their group. I can therefore find out which of these variables determines the voting behavior by running a regression on individual votes with clustered standard errors on the subject level.

VARIABLES	(1) Individual Vote	(2) Individual Vote w. Interaction Effects	(3) Individual Vote if Treatment = 1	(4) Individual Vote if Treatment = 2	(5) Individual Vote if Type = X	(6) Individual Vote if Type = Y
Type	6.001*** (0.0000)	4.029* (0.0843)	5.269*** (0.0005)	6.950*** (0.0000)		
Effort	1.330** (0.0152)	3.768*** (0.0003)	2.577** (0.023)	0.222 (0.672)	3.545*** (0.0035)	1.137** (0.0302)
Number Effort	-0.708*** (0.0063)	-0.706*** (0.0067)	-1.101** (0.0255)	-0.378** (0.0432)	-0.600* (0.0695)	-0.847** (0.0260)
Treatment	-0.321 (0.6360)	-1.798** (0.0337)			-1.768** (0.0407)	1.155 (0.213)
Type*Effort		-2.779*** (0.0017)				
Type*Treatment		3.010** (0.0363)				
Constant	4.593** (0.0108)	4.256*** (0.0052)	5.099*** (0.0027)	3.012*** (0.0043)	4.052** (0.0123)	8.809*** (0.0006)
Observations	240	240	120	120	120	120
R-squared	0.408	0.442	0.241	0.617	0.083	0.089
F-Test	21.34	99.55	7.80	32.85	4.95	2.74

Robust p-values in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Regression Individual Vote

The regression results of specification (1) mostly reflect the results from the tests implemented in the previous subsection. The first specification tries to explain the individual behavior as a combination of the own type, effort choice, the effort choice of the other individuals in the group and the treatment. The type has, as shown above, a highly significant impact. Switching from type X to type Y increases the vote of an individual by 6 redistribution levels, keeping everything else fixed. The Effort variable is also significant on a level of α=0.05 in the first specification. The variable Number Effort captures the number of individuals in the group choosing high effort. Contrary to the motivation for this variable and all results presented in the literature section the variable has a negative impact. The treatment variable enters the regressions on individual votes insignificantly. The regression (1) has an R-squared of 0.408 and the F-test rejects the null-hypothesis that all regression parameters are equal to zero.

Summarizing the regression specification (1), I can say that my explanatory variables capture differences in voting behavior quite well, while the Type variable has clearly the highest impact. The most striking result is that the number of individuals exerting high effort in the same group reduces the participants' willingness to redistribute[48]. However one shortcoming of the first regression specification is that the explanatory variables interact with each other. The effort and the treatment are important in the determination of the type and the hence the type influences voting through several channels. Indeed regression (3) in the Appendix E Table 11, shows that the remaining independent variables achieve to explain a great part of the variation in the type variable[49]. Hence it is reasonable to assume that the impact of the type variable is different across treatments as well as across effort choices made before the determination of the type. Therefore regression specification (2) includes interaction variables to control for different effects across values of the Type, Treatment and Effort variable. Both interaction variables enter significantly. They show that the Type variable has a different effect across treatments and effort choices.

In addition regressions (3)-(6) help interpreting the coefficients of the interaction effects. Due to the positive impact of Type*Treatment, the effect of the Type variable on individual voting is higher in the second treatment than in the first. Given the individual is in the first treatment the poor types vote on average 5.269 redistribution levels higher than the rich types. This difference increases to 6.950 in the second treatment. The effort choice has a significant impact only in the first treatment, in the second treatment the effect vanishes. The Number Effort variable has a negative and significant impact in both treatments, although the quantitative effect is reduced in the second treatment. Looking at differences across types, the effort choice has a higher impact on the individual vote for rich types. The coefficient means that given the individual is rich, the vote on redistribution was on average 3.55 redistribution levels higher if the individual exerted high effort

[48] The variable was found to have a positive and significant effect on the α=0.1 level in a classroom pilot session with non-incentivized subjects.

[49] Regression specification (3) in the Appendix E Table 11 suggests that independent variables are highly correlated and as a result the estimates might be highly biased due to multicollinearity, however VIF and tolerance level for regression (1) do not suggest to drop any of the regressors (see Table 10 in Appendix E).

compared to low effort, keeping everything else fixed. This parameter reduces to 1.14 if the individual was in the poor income class. This difference states that the effort choice had a higher impact on the individual voting decision given the individual was rich compared to poor. The quantitative difference between the coefficients is similar in size to the interaction effect of regression (2), the small difference being due to a change in the sample size as the regressions (5) and (6) focus on a subsample. The coefficient for the Number Effort variable is again significant and negative with similar size of the coefficients across types. The Treatment variable is only significant for the rich types, suggesting that only for X types the individual vote depends on the treatment. This is in line with the test results from hypotheses H_5 and H_6.

The regressions from Table 7 show that individual voting behavior is indeed different across treatments as well as effort choices and types. The interaction variables capture the different effects for the type variable across effort choices and treatments. The central variable Number Effort however has a negative and significant sign in all of the above specifications. At this point the impact of the Number Effort variable can also be seen from another angle: The Number Effort variable captures part of the impact of the Type variable. If the number of individuals exerting effort increases, the chances of being poor increase as well[50], as can be seen in Appendix E Table 11, therefore the vote of the individual will be higher. If more individuals exert effort, those who end up rich feel threatened due to the structure of reward from the effort task and will be less willing to compensate the poor. The game seems more competitive in this case and this decreases the willingness to denote resources to the unlucky ones. This effect holds also for the poor who feel like the losers from the tournament and will therefore vote for a higher redistribution level. Given only three and therefore less individuals exerted high effort the group outcome seems like a successful coordination without rivalry for the rich types. In this case rich individuals do not feel threatened and are more willing to compensate the other group members. On the contrary these three are actually rewarded with a place in the upper income class precisely because the other individuals chose low effort. Therefore the low effort choice of others is regarded as niceness and will therefore get a higher compensation than in a scenario with high competition for the upper ranks.

Hence the number of individuals exerting high effort has two channels to affect the individual voting decision. Once by decreasing the probability of getting rich and thereby increasing the rivalry in the group, an effect which is found significantly in the data[51], and once by sympathizing with those who took the same gamble but failed, an effect for which I found no proof in my experiment. Therefore I can reject the hypothesis H_{10} and H_{11} and conclude that individuals do not condition their vote positively on the effort decisions of other participants, as they do not differentiate whether the source of poverty is luck or effort. The exact regressions for the hypotheses H_{10}- H_{11} are in the Appendix E Table 11, however the variables of interest, Number Effort and Number Poor Effort, do

[50] The type variable is a dummy with 1 for poor and 0 for rich.
[51] This effect is not taken account of in the study by Cabrales et al. (2012) because in their experiment the promotion to the high income class is independently made for each individual.

not enter significantly and with the correct sign in all of the specifications. For those exerting low effort, the variable is actually insignificant. H_{12} is rejected due to the negative sign of the Number Effort variable in regression (5) in the above Table 7. With regard to the study of Cabrales et al. (2012), I can confirm their finding that individuals do not care about non-payoff relevant information, like the effort behavior of others, in the way suggested by theory. On the contrary, individuals were less willing to redistribute when others chose high effort as a result of increased competitiveness. The type variable (through the payoff structure) has the highest impact on voting and the other variables only enter significantly as a result of their impact on the determination of the type.

One further objection on the above regression analysis might be that I capture the total number of individuals exerting effort instead of accounting only for the poor who exerted effort. The regressions in the Appendix E Table 12 take account of this shortcoming, by using the newly constructed variable Number Effort Poor. However the analysis comes to the same conclusion. Variables from the questionnaire do not enter the regression significantly (see also Appendix E Table 12 (2)).

c. Individual Effort Choice

Incentives of the effort choice were designed such that in the rich majority treatment, given risk neutrality, participants should always pick high effort. In the 120 effort decisions during the rich majority treatment 89 times high effort was picked. As the variable effort is binary I can construct a binominal test and reject H_8 that the effort choice in the first treatment will always be high (p=0.000).

A consequence of this result is that individuals were on average too risk averse to always go for the high effort gamble. Risk aversion is nevertheless heterogeneous across participants as can be seen from very different effort strategies across individuals. In the questionnaire which took place after the experiment the subjects had to self assess their own level of risk aversion on a scale from 1 to 7. Unfortunately the self-assessment was not adequate enough and the correlation between effort choices and risk aversion, as measured by the questionnaire is only 0.0213. Furthermore the variable Risk Aversion enters insignificantly in the regression specifications for individual effort (see Table 8). Also at this point it should be mentioned that the argument that participants were not able to look through the expected payoffs associated with the gamble of the effort choice, cannot be excluded.

It was nevertheless apparent to the participants that chances of getting rich by exerting high effort decreased after 8 periods, i.e. in the poor majority treatment. With a binominal test I am able to construct confidence intervals for the percentage of high effort choices in the first treatment [0.65: 0.82] and the second treatment [0.59: 0.77], where 82 out of 120 picked high effort. As the confidence intervals overlap, but do not include each other I use the z-test and the Boschloo test to check on the equality of success probabilities and find that I fail to reject the null-hypothesis of equal

effort choices across treatments on a significance level of α=0.05 for both tests[52]. Hence the subjects were not disincentivized in terms of effort after they entered the second treatment and I reject H_9.

Similar to the individual votes, I can also try to explain what drove the effort decisions of participants by running a regression. In particular I use a probit analysis as the outcome variable, effort, is binary and again cluster standard errors on the subject level.

VARIABLES	(1) Effort	(2) Effort if Effort(lag)=high	(3) Effort
Type (lag)	-0.277	-0.460*	-0.367
	(0.690)	(0.0901)	(0.597)
Profit (lag)	0.0010		-0.00171
	(0.934)		(0.890)
Effort (lag)	1.073***		1.017***
	(0.00339)		(0.0081)
Treatment	-0.0937		-0.111
	(0.682)		(0.622)
Gender (Q)			0.395*
			(0.0991)
Risk Aversion (Q)			-0.0461
			(0.802)
Constant	0.0932	1.150***	0.312
	(0.939)	(0)	(0.806)
MARGINAL EFFECTS			
Type (lag)	-0.0779	-0.1098	-0.1013
	(0.685)	(0.114)	(0.590)
Effort (lag)	0.3014***		0.2809***
	(0.000)		(0.002)
Profit (lag)	0.0029		-0.0005
	(0.935)		(0.890)
Treatment	-0.0263		-0.0305
	(0.679)		(0.620)
Gender (Q)			0.1091*
			(0.096)
Risk Aversion (Q)			-0.0127
			(0.802)
Observations	225	161	225
Pseudo R-squared	0.166	0.024	0.177

Table 8: Regression Individual Effort

As the effort choice is the first decision in each period, the explanatory variables on which individuals might base their behavior are the lagged variables from the previous round. In particular the significance of the variable Effort (lag) indicates that the current effort choice is best described by the former effort choice, i.e. participants more or less just repeated the choice from the last round. For the probit regression the marginal effect says that given a person exerted effort in the previous round, he is 30% more likely to choose effort again. Neither the feedback of the profit nor the realized type from the earlier period enters significantly. The treatment variable is also insignificant,

[52] The exact test statistics and procedures are in Appendix E Table 13.

as was already suggested by the z-test and Boschloo test above. Interestingly the gender variable from the questionnaire is also marginal significant in specification (3). Given the subject is male it is 10% more likely that he will exert high effort compared to females.

Individuals might not be smart enough to look through the exact gamble which is represented by the effort choice. Instead they may just try and react to the feedback they get from choosing high and low effort, i.e. they may base their decisions on past experiences made in the experiment. Following Erev and Haruvy (2012) the "very recent effect" seems appealing in this context. It states that decision makers are more likely to select the alternative that led to the best outcome in recent trials. As a consequence one could also base effort choices on the payoff from the previous round. With regard to this intuition I can also check whether individuals were disincentivized by the feedback from the former round, i.e. whether they changed the strategy after observing an unsuccessful outcome, either through a low profit or a poor type, with a particular effort decision. For this purpose, regression (2) checks for a dependence on the type given a high effort choice in the previous round[53]. Indeed I find a disincentive effect, in the sense that given the individual exerted high effort in the previous round those who were rewarded with a rich type are more likely to exert effort again. Therefore a negative feedback, in the form of a low type, leads to a change of strategy from exerting high effort towards low effort. However the coefficient is only marginal significant and the marginal effect turns out insignificant. The lagged profit and treatment variable enter the specification insignificantly and are therefore not reported.

d. Group Votes

I also test the group outcomes against their predictions and whether deviations are asymmetric due to the different treatments.

For analysis of group outcomes I again perform the Wilcoxon rank sum test (1945) to compare the distributions of group votes across treatments[54]. I can reject the null hypothesis that the distribution of group outcomes is the same across treatments (p=0.0001). To make statements about the mean I construct 95%-confidence intervals around the means in line with Schlag 2008. The average distribution level in treatment 1 is 4.75 in the confidence interval [3.15: 6.54] and the average distribution level in treatment 2 is 7.21 contained in the 95%-interval [5.48: 8.52]. The confidence intervals overlap but are again not contained in each other hence based on comparing confidence intervals I am not able to infer anything with regard to the difference of means. To receive a higher clarity on the difference of group outcomes I use a t-test with robust standard errors. The t-test statistic is 3.72 and hence there is a difference in group votes across treatments (p=0.001).

[53] Unfortunately I cannot make a statement about the change of strategy given the person has made low effort in the previous round, as the feedback from the type variable was nearly almost an allocation towards the poor type.
[54] Again under the assumption that treatment 1 and 2 are independent samples, which they are not as I applied a within-subjects design.

With regard to H_{13} I can reject the hypothesis, as the self-interest prediction 1 is not contained in the 95%-confidence interval for group outcomes.

On the contrary I fail to reject hypothesis H_{14}, as the self-interest prediction for the poor majority, i.e. redistribution level 8, is in the 95%-confidence interval for the group outcome in treatment 2.

As a result I find an asymmetric effect of inequality aversion in redistribution on the group outcome. I fail to reject H_{15} as there are more and higher deviations from the prediction on the group level in the rich majority than in the poor majority. However when comparing this result with the asymmetric effect found in Höchtl et al. (2012), it should be kept in mind that the inequality aversion was already asymmetric on the individual level. Therefore the asymmetric effect caused by the specific group structure in the experimental design is amplified by unequal deviations from the prediction across types on the individual level.

e. Profits

Finally it also makes sense to look at the average profits across variables. The X types apparently had a higher profit than the Y types as a result of the design of the experiment. A higher effort choice is associated with a higher chance of being a rich type, but comes at a risk of ending up at the lowest step of the income ladder (in case the individual has to pay effort costs and is poor). From Table 9 one can see that high effort yields on average a higher profit, but the high effort choice also has a higher standard deviation (due to the risk). The constructed 95%-confidence intervals do not overlap, [39.1: 49.6] for low effort and [55.6: 67.7] for high effort and hence the average profit is higher for those cases where the person exerted high effort, but the higher average profit comes at the cost of a higher uncertainty.

Average Profit by Effort Choice

	N	mean	sd
low	69	43.67	11.75
high	171	61.95	29.15
Total	240	56.69	26.69

Table 9: Average Effort across Effort Choice

The average profit also differs across treatments (see Appendix E Table 14). The profit in the first treatment is on average 63.2 with the 95% confidence interval of [55.5: 70.2], the profit in the second treatment is 50.2 on average, contained in the interval [44.2: 56.7]. As the intervals slightly overlap I further performed a t-test with standard clustered errors on the subject level and find a t-statistic of -2.66 and hence can confirm that the average profit was higher during the rich majority treatment than under the poor majority (p=0.019). This is of course not surprising as simply by design the first treatment has more rich types than the second treatment.

f. Summarized Results and Relevance for the existing Literature

With my experiment I can confirm what has come up in the last two decades of research on social preferences: Some people vote inequality averse when they have a chance to decide about the

distribution of resources among a group of individuals. Inequality aversion exists on the individual level, however these preferences are heterogeneous across agents and highly depending on how the decision situation is structured and framed. My findings therefore suggest that standard economic theory can improve its predictions for the demand for redistribution by accounting for a certain share of inequality averse individuals.

I find that 45% of all votes are not in line with self-interest when the subject is poor and deviations exist in both directions, i.e. there are some that want an even higher equality than optimal and some who grant the rich individuals a higher relative advantage at the cost of their own payoff. When considering votes taken by rich individuals, only little more than 30% are in line with the pocketbook prediction. More than 40% of rich types votes are in line with inequality aversion. In terms of individual votes across treatments, I find that both types vote more according to self-interest when the poor are in majority. However this could very well be an order effect as a result of the within-subjects design. This findings are partly in line with the similar experiment of Höchtl et al. who also find more deviations from material self-interest from the rich individuals. However they have differences in the voting behavior across treatments, as a result of expressive voting by the rich, a finding which is not support in the present experiment (cf. Höchtl et al. 2012, 1412-1413).

When looking for determinants of individual voting I find that the most important explanatory variable is the type. The interesting variable capturing the effort decisions of the others, enters with an unexpected negative sign. However this is explained through the way the others' effort decisions affect the type determination and thereby also the individual vote. As more individuals choose high effort, those ending up in the upper income class feel threatened and are less willing to compensate the unlucky poor. Reciprocity towards the lower income class is more likely to arise if fewer individuals pick high effort, as this seems like coordination on a clear distribution of types and includes no threat of rivalry. The lesson is that individuals in my experiment did not show empathy towards those who exerted effort, but only voted according to what is optimal for their type. This is in line with Cabrales et al. (2012), who show that the rich do not condition their vote on the source of poverty of the other types. In the same sense this result does not support Cappelen et al. (2013), as they find such a tendency in pairs of two. However the type determination in both of these studies was independent of the other individuals' decisions and hence these papers do not account for rivalry.

The individuals' effort choice was high in more than 70% of all cases and high effort led on average to a higher payoff. I do not observe a difference across treatments although the gamble for high effort was less attractive under a poor majority. The most important determinant of an individual's effort choice was the previous effort choice, i.e. the participants did not change strategy after receiving the feedback of the previous round. Nevertheless there is a marginal significant disincentive effect in case the risky effort choice was not rewarded with a role in the upper income class.

On the group level my findings support Höchtl et al. 2012, who find an asymmetric effect of inequality averse voters. The asymmetric effect, caused by the difference in the group structure is further amplified by higher deviations on the individual level for rich types. In fact nearly 80% of all group outcomes under a poor majority were in line with material self-interest, while this fraction is only 25% under a rich majority. This result supports the theoretical prediction of the previous chapter. Contributing beyond the findings of Höchtl et al., I also find an asymmetric effect for social preferences which point in the opposite direction. Prosocial behavior and the view of justly deserved relative advantages can only play a role when the poor income class is in majority although deviations in this direction are more or less similar in size and frequency across types and treatments.

6. Conclusion and Discussion

The present thesis deals with the topic of social preferences in redistribution decisions between income classes. I add to the existing literature by investigating my research question with an economic experiment. The exact features of the design are picked with the purpose to test hypotheses on inequality aversion on the individual and the group level, as well as whether the magnitude of inequality aversion is depending on how the income classes are constituted. The experimental design contains features and decision situations similar to other experiments reviewed in the chapter on existing literature, the exact design is however to my knowledge novel. A further goal of my study is to deal with shortcomings I found in the existing studies on similar research questions and look at changes in the outcome if these shortcomings are corrected.

In particular I use a similar group structure to Höchtl et al. (2012), however let participants be distributed to income classes by a risky effort choice instead of pure luck. The result is that the magnitude of inequality aversion for the rich is larger. However I find the same asymmetric effect of inequality averse voters depending on the income class in majority. I can conclude that behavior with reference to social preferences is mostly similar, independent of whether the income classes are made up randomly of by a risky choice.

I also use experimental features from Cabrales et al. (2012), who find that rich voters do not condition their vote on the source of poverty of the other income class. The authors however confront the participants with an all-or-nothing redistribution decision. I change this to a redistribution option where participants can vote among 16 redistribution levels, such that the rich can keep their superior standing in the income class but compensate the unlucky poor individuals to a certain degree. However I do not find that individuals take others' effort decisions into account. My experiment has limited comparability with the Cabrales et al. paper as the effort decisions did not offer independent outcomes for the subjects in a group. Therefore I actually find a negative coefficient for the variable of interest. The upside is that the fixed income classes allowed me to replicate Höchtl et al.'s (2012) asymmetric effect.

My experiment also allows for analysis of other effects not directly related to the topic such as disincentive effects in effort or expressive voting.

There are of course several limitations to my experiment. Some of these are a result of the small scale and budget with which I implemented the experiment, others stem from specific features in the design. Due to a small group of only 15 subjects I had to make use of a within-subject comparison for the treatments, although a between-subjects design would have been superior. I also do not have the possibility to control for order effects, i.e. I only know the difference in the treatments if individuals first play in a rich majority and only afterwards in a poor majority, but not the other way around. Further I applied stranger matching, i.e. the group composition changed after each period such that individuals could not track the behavior of their group over several rounds. On the other hand partner matching seems to be more realistic, which is of importance especially as I look at the group as a society with group members reflecting income classes. Also most of the related papers, presented in the literature review apply partner matching. Using the stranger matching method is however not necessarily a bad decision. For example I have shown that the social preferences found in Höchtl et al. (2012) also exist under stranger matching, i.e. they do not depend on a constant exchange among mutually known partners but also when the person knows nothing about the previous behavior of his fellow group members.

A shortcoming caused by the specific features of the design is the way that effort enters the experiment. Given that I had predetermined allocation alternatives, fixed group constellations and at the same time effort was costly, the group maximized the overall payoff if no one chose effort. This is highly unrealistic and most studies dealing with redistribution and exerted effort assume that the overall output can be increased by individual effort decisions. However I do not think that individuals considered coordination on the most beneficial outcome, given the incentive to deviate towards higher effort and stranger matching allowed for basically no collusion among participants. Also concerns about the efficiency in the society are captured by the different allocation options, which resemble a tax and therefore also influence the social welfare.

I also shortly deal with the issues related to using an economic experiment, i.e. realism and external validity. However I think (and my view is supported by a growing body of literature) that especially in the context of redistribution an experiment has important advantages over traditional research methods, such as surveys, because it confronts individuals with decisions which actually affect them, instead of being completely hypothetical.

Concluding I can claim that social preferences and in particular inequality aversion matter in the context of voting on redistribution. Preferences are found to be highly heterogeneous and not every individual in my experiment deviated from self-interest. On the aggregate inequality averse agents can have an impact on the outcome. But this is to a high degree depending on the group composition, context, information and further structural parameters.

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Appendix A: Expected Utility of Effort Choices

In a rich majority treatment an individual anticipates allocation 1. Independent of how many others exert effort the expected utility of high effort (e) is higher than the expected utility of low effort (ne):

Given four other group members pick effort:

$$E(Payoff|e) = \frac{3}{5}(120-20) + \frac{2}{5}(30-20) = 64 > 30 = E(Payoff|ne)$$

Given three other group members pick effort:

$$E(Payoff|e) = \frac{3}{4}(120-20) + \frac{1}{4}(30-20) = 77{,}5 > 30 = E(Payoff|ne)$$

Given two other group members pick effort:

$$E(Payoff|e) = 120-20 = 100 > 60 = \frac{1}{3}120 + \frac{2}{3}30 = E(Payoff|ne)$$

Given one other group member picks effort:

$$E(Payoff|e) = 120-20 = 100 > 75 = \frac{1}{2}120 + \frac{1}{2}30 = E(Payoff|ne)$$

Given no other group member picks effort:

$$E(Payoff|e) = 120-20 = 100 > 84 = \frac{3}{5}120 + \frac{2}{5}30 = E(Payoff|ne)$$

In a poor majority treatment an individual anticipates allocation 8. Depending on how many others exert effort the expected utility of high effort (e) is higher or lower than the expected utility of low effort (ne):

Given four other group members pick effort:

$$E(Payoff|e) = \frac{2}{5}(90-20) + \frac{3}{5}(46-20) = 43{,}6 < 46 = E(Payoff|ne)$$

Given three other group members pick effort:

$$E(Payoff|e) = \frac{1}{2}(90-20) + \frac{1}{2}(90-20) = 48 > 46 = E(Payoff|ne)$$

Given two other group members pick effort:

$$E(Payoff|e) = \frac{2}{3}(90-20) + \frac{1}{3}(46-20) = 55{,}3 > 46 = E(Payoff|ne)$$

Given one other group member picks effort:

$$E(Payoff|e) = 70 > 57 = \frac{1}{4}90 + \frac{3}{4}46 = E(Payoff|ne)$$

Given no other group member picks effort:

$$E(Payoff|e) = 70 > 63{,}6 = \frac{2}{5}90 + \frac{3}{5}46 = E(Payoff|ne)$$

Arrow-Pratt relative Risk Aversion Coefficient

The Arrow-Pratt relative risk aversion coefficient is a measure of risk aversion. It can be derived from a lottery by a procedure similar to Hartog et al. (2000). The authors use expected utility theory to deduce the Arrow-Pratt measure from survey questions on the maximum price an individual would pay for a lottery. Similar to Hartog et al. (2000) I derive the relative risk aversion coefficient for an individual which is indifferent between the safe and the risky alternative in my experiment and show which assumptions on the risk aversion parameter are needed for the actual behavior to be in line with expected utility theory.

The Arrow-Pratt measure of absolute risk aversion is $\frac{-U"(W)}{U'(W)}$. Taking the first example of the lottery between the risky choice of 100 (with probability $\alpha = \frac{3}{5}$) and 10 (with probability $1 - \alpha = \frac{2}{5}$) or the safe choice of 30 for sure translates in the following formula:

$$U(W) = (1-\alpha)U(W-\mu) + \alpha U(W+Z-\mu)$$

$$U(30) = \frac{3}{5}U(30-20) + \frac{2}{5}U(30+90-20)$$

Hence the wealth $W = 30$, the price of the lottery is $Z = 90$ and the willingness to pay for an individual with Arrow-Pratt coefficient is $\mu = 20$. By developing a Taylor expansion of $U(W-\mu)$ and $U(W+Z-\mu)$ around $U(W)$, one can rewrite and solve for ρ as

$$\rho = \frac{\alpha Z - \mu}{\frac{\mu^2}{2} + \frac{\alpha Z^2}{2} - \alpha\mu Z},$$

Which corresponds to

$$\rho = \frac{0.6 \cdot 90 - 20}{\frac{20^2}{2} + \frac{0.6 \cdot 90^2}{2} - 0.6 \cdot 20 \cdot 90} = 0.021.$$

Evaluated at the level of wealth, the Arrow-Pratt relative risk aversion coefficient $r = \rho \cdot 30 = 0.658$.

This suggests that individuals with a relative risk aversion coefficient of $r = 0.658$ or higher will not take the risky effort choice. The relative risk aversion coefficient for the effort choice, if the individual assumes three others will pick effort is $r = 0.757$, hence the equilibrium from hypothesis H_8 will sustain given individuals are less risk averse than 0.658 according to the Arrow-Pratt relative risk aversion coefficient[55]. For all other constellations only risk loving individuals would take the gamble, which is in the remaining cases to refrain from effort, as the safe choice has a higher expected value than the risky choice.

[55] For the poor majority treatment risk aversion coefficients of 0,755 and 0,377 make individuals indifferent between the safe and the risky choice given three or two other players choose effort.

Appendix B: Screenshots from the Experiment

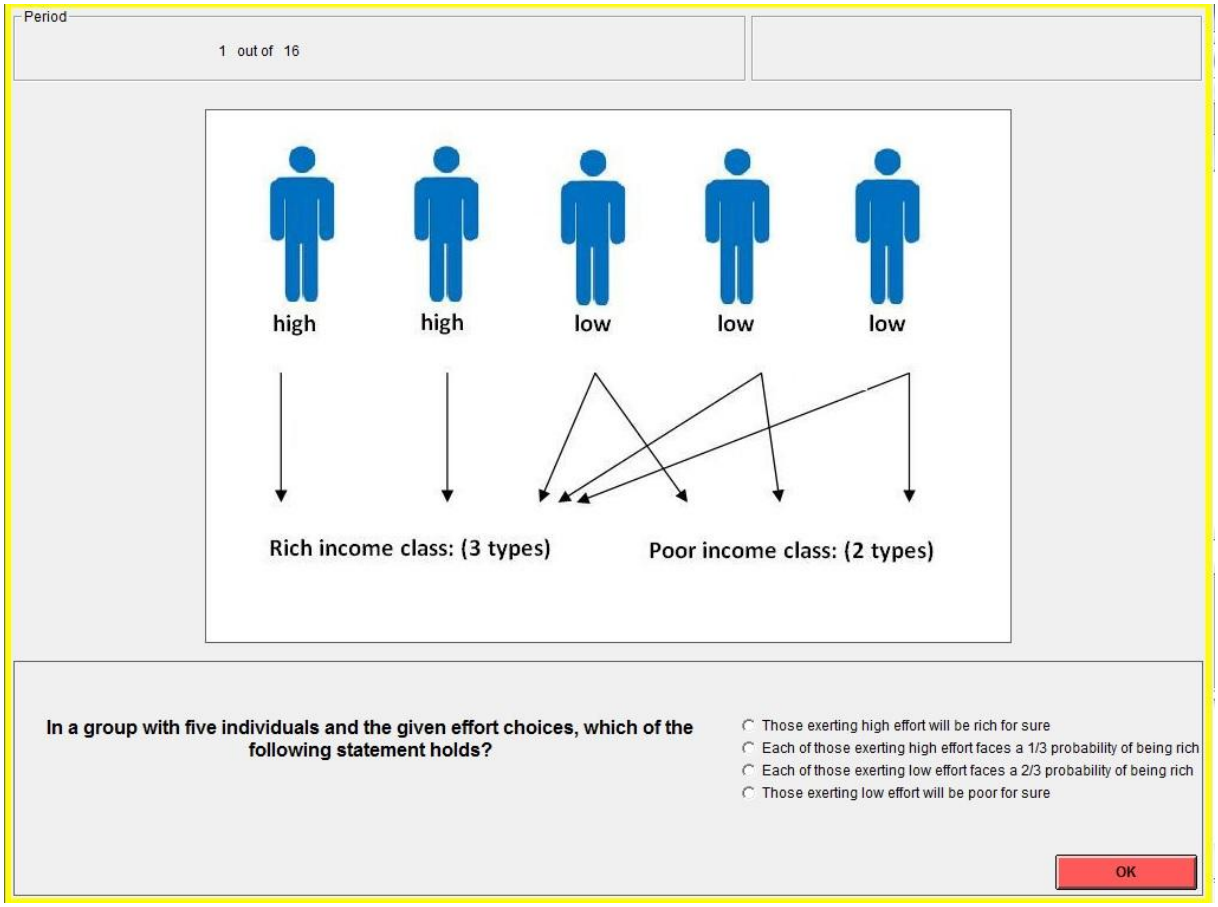


Figure 1: Control Question 1

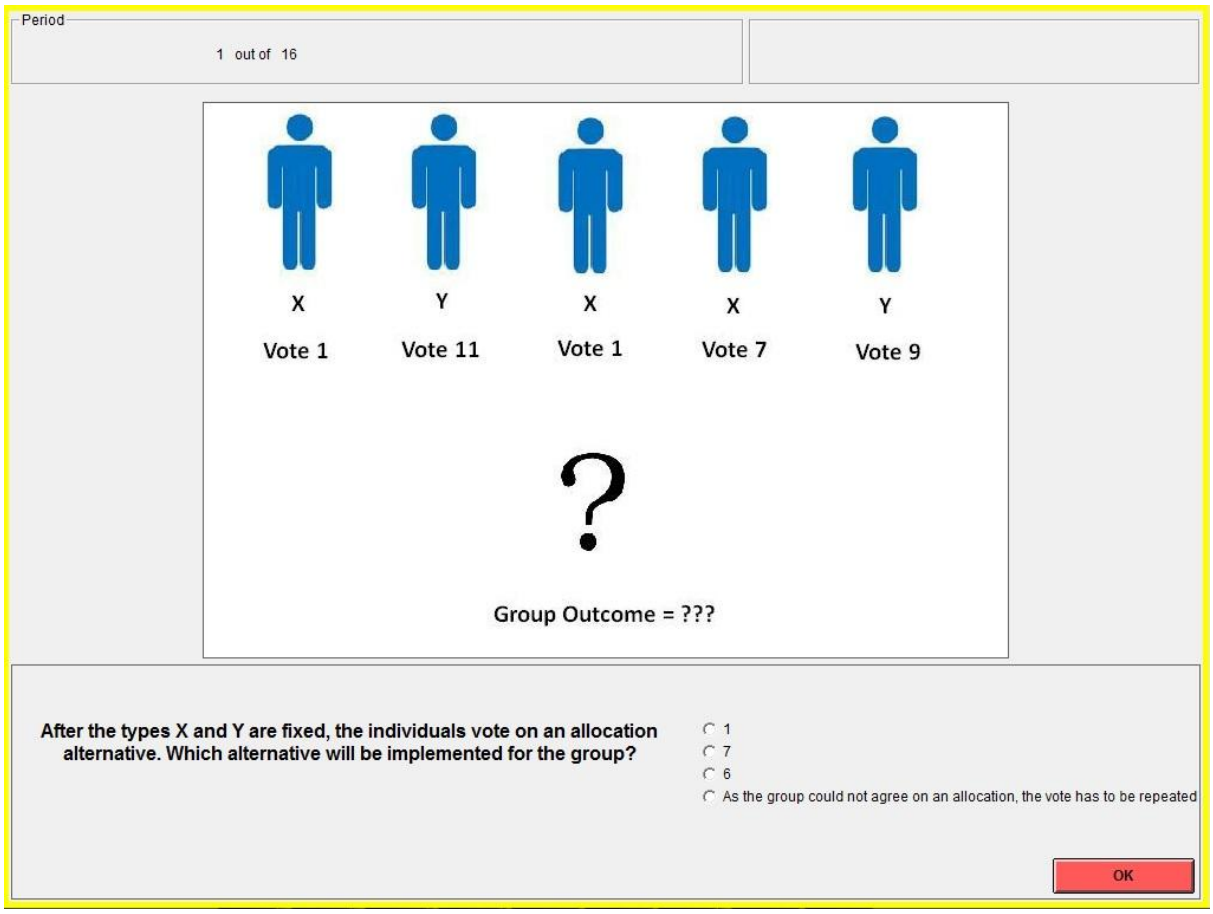


Figure 2: Control Question 3

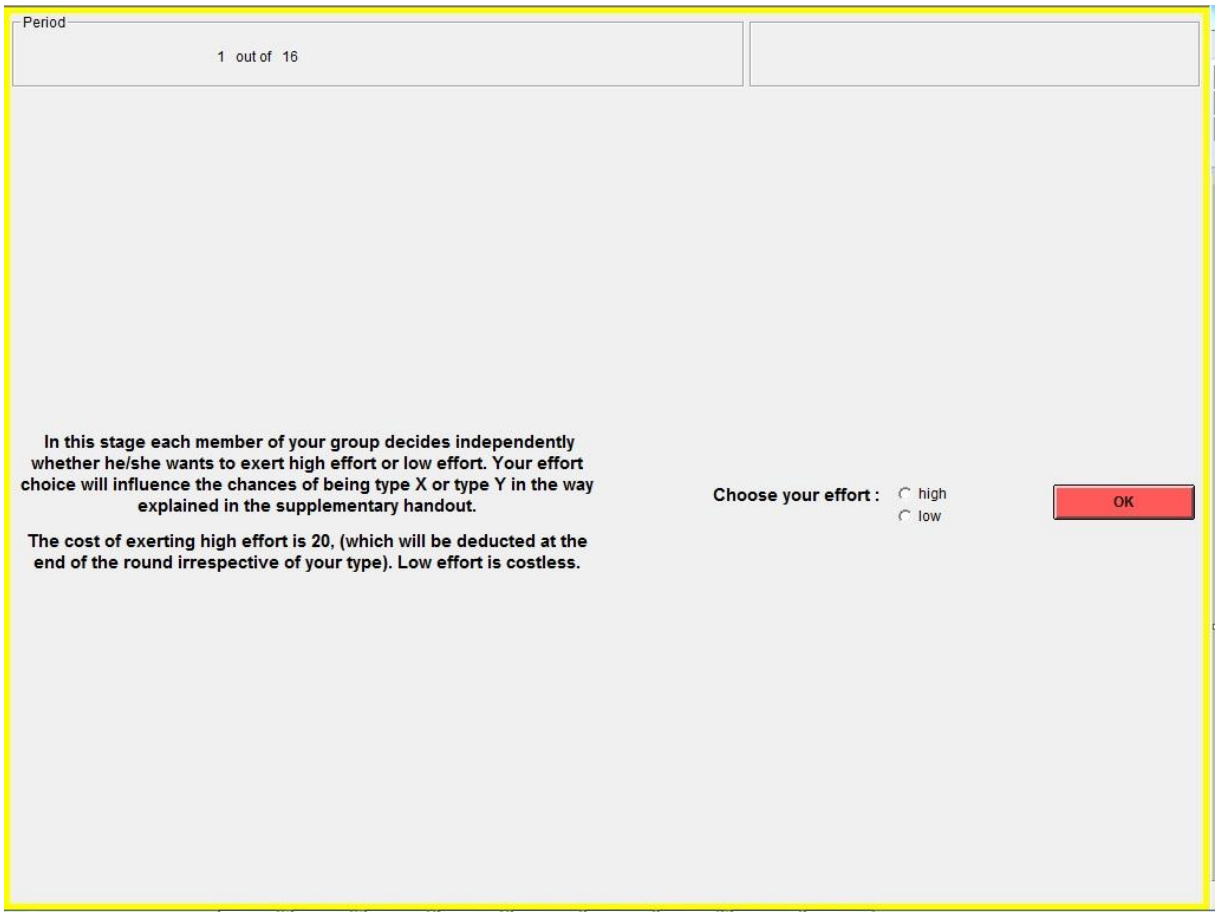


Figure 3: The Effort Choice

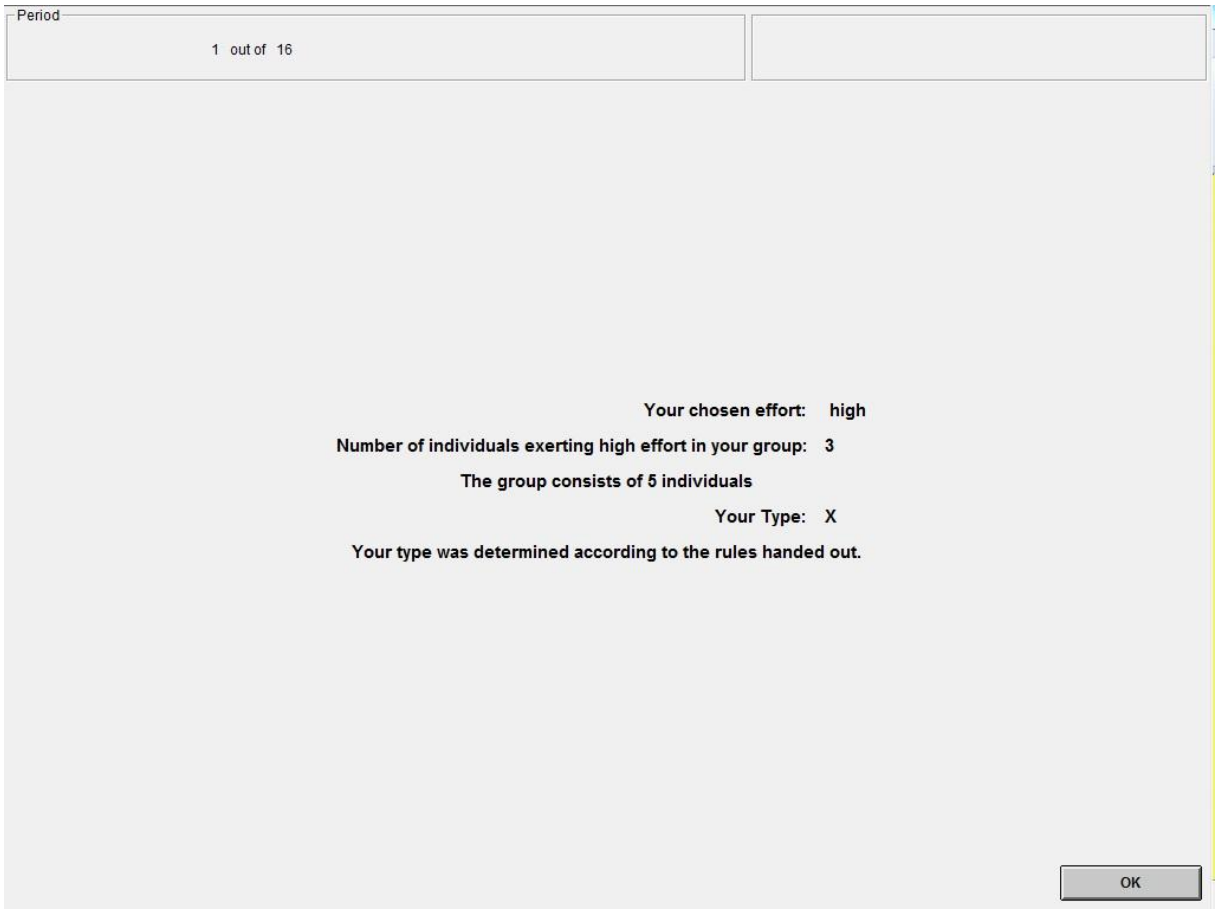


Figure 4: Feedback after the Effort Choice

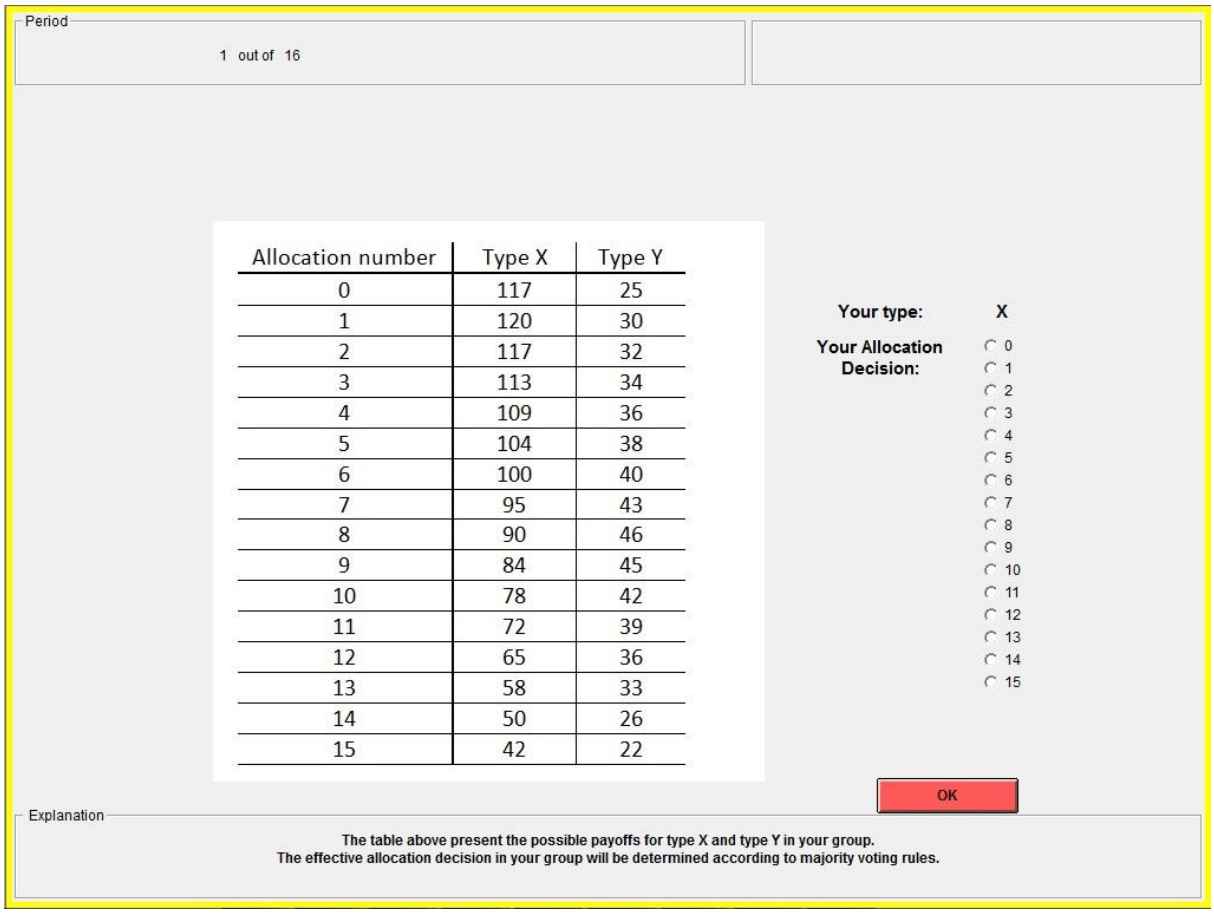
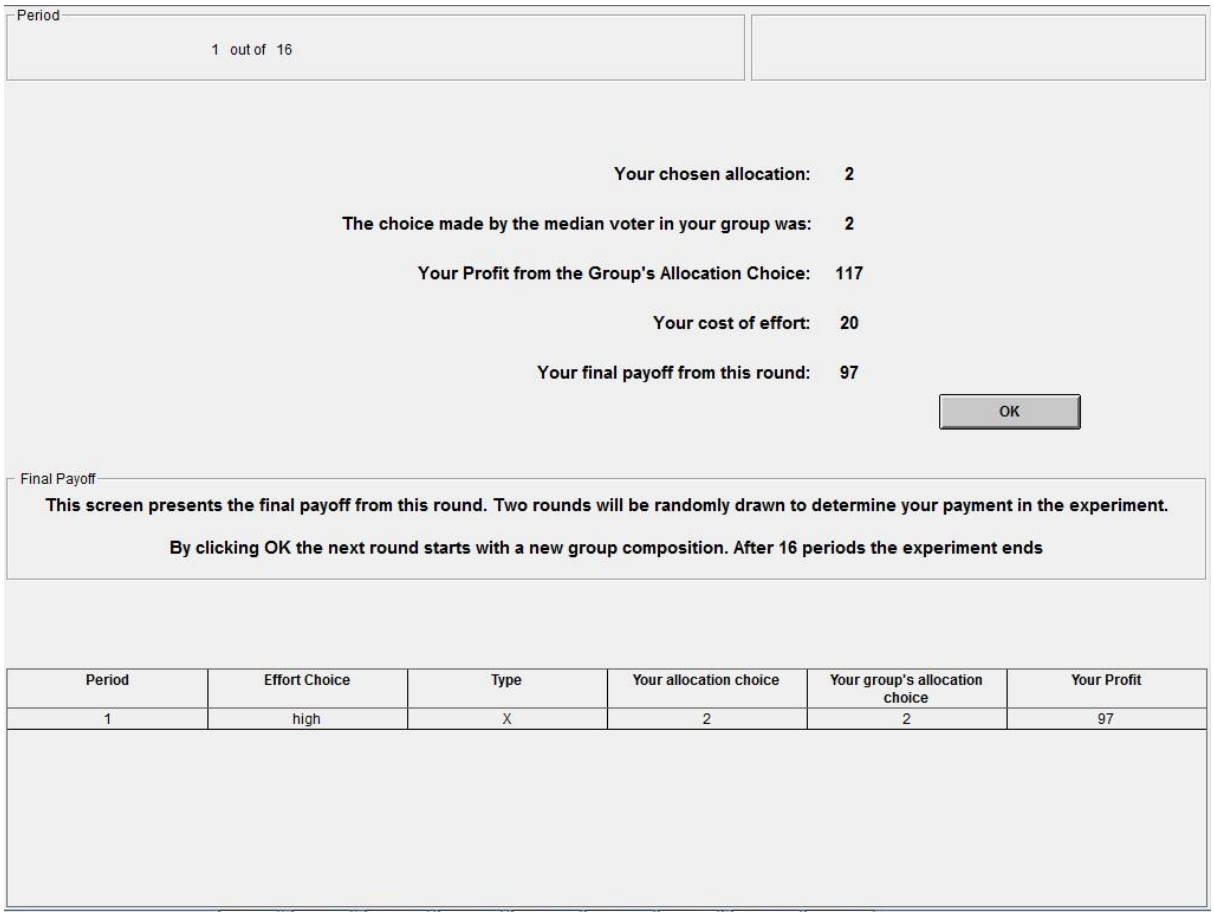


Figure 5: The Redistribution Decision



Period	Effort Choice	Type	Your allocation choice	Your group's allocation choice	Your Profit
1	high	X	2	2	97

Figure 6: Outcome from the Period

Appendix C: Instructions

a. Instructions Part I (Rich Majority)

Welcome to the experiment. If you read these instructions carefully and follow the rules you can earn money in this experiment. The money will be paid out in cash right after the experiment. During the experiment we denote earnings in points which are converted to EURO as follows:

1 point = 10 cent (€)

You are not allowed to communicate with other participants during the entire experiment. If you have a question, please raise your hand and we will answer your question individually. It is important that you follow this rule. Your final payment will be determined by **two periods randomly chosen** among all periods played.

In this experiment the participants are randomly sorted into **groups of 5** in each round. The groups will be reshuffled after each round, such that the group composition will be different in each of the **16 rounds**. Each of your decisions will be anonymous and your decisions are not traceable over following rounds. There are two different types, namely type X and type Y. In each group there will be 3 individuals with type X and 2 with type Y. Being type X, you have a higher chance of earning more in this experiment.

Each round consists of two stages (stage 1 and stage 2).

Stage 1 (Effort Stage): In stage 1 each member of your group will have to decide independently whether he/she wants to exert high effort or low effort by choosing the corresponding button in the decision screen. Your choice will influence your chance of being type X or type Y in the following sense:

There are always 3 X types in your group. Individuals choosing high effort will be allocated to type X, however if there are more than 3 individuals which have chosen high effort then a random draw among these individuals will pick exactly 3 players and allocate them to type X. The remaining individuals exerting high effort will be of type Y, as are those choosing low effort. If there are less than 3 individuals choosing high effort, a random draw from the individuals choosing low effort will fill up the remaining X types, such that there are always 3 type X and 2 type Y individuals in each group.

Choosing high effort costs 20 points, which will be deducted of your payoff from this round. Low effort is costless, i.e. 0 points will be deducted.

Examples: Suppose Player 1 and Player 2 chose high effort, while Player 3, Player 4 and Player 5 chose low effort. Player 1 and Player 2 can be sure to be allocated to a type X however 20 points will be deducted as effort cost after the end of the round. Player 3, Player 4 and Player 5 all face an equal chance (of 1/3 probability) to be in a type X without effort costs being deducted. However 2 of them will end up a type Y (again without effort costs deducted).

	Pl 1	Pl 2	Pl 3	Pl 4	Pl 5
Chosen effort	High	High	Low	Low	Low
Type in game	X	X	P(X)=1/3 P(Y)=2/3	P(X)= 1/3 P(Y)=2/3	P(X)=1/3 P(Y)=2/3

Imaging instead Player 3 and Player 4 also exerted effort. In this case Player 5 is a type Y for sure. All other players pay their effort costs of 20, however one of them will also end up being type Y, with each of them facing the same chance. The other players end up as type X.

	Pl 1	Pl 2	Pl 3	Pl 4	Pl 5
Chosen effort	High	High	High	High	Low
Type in game	P(X)= 3/4 P(Y)= 1/4	P(X)= 3/4 P(Y)= 1/4	P(X)= 3/4 P(Y)= 1/4	P(X)= 3/4 P(Y)= 1/4	Y

Tables of all six possible situations are at the last page of the handout.

After your choice of effort and the allocation of players to the two types you get displayed the chosen effort level, your corresponding type and the number of individuals choosing effort in your group.

Stage 2 (Allocation Stage): In this stage you are asked to choose your desired allocation out of the given table.

Allocation number	Type X	Type Y
0	117	25
1	120	30
2	117	32
3	113	34
4	109	36
5	104	38
6	100	40
7	95	43
8	90	46
9	84	45
10	78	42
11	72	39
12	65	36
13	58	33
14	50	26
15	42	22

The allocation decision is made according to the following rules: You and the other group members each choose an allocation number from the 16 alternatives. The allocation numbers chosen by all group members are sorted from low to high. The number in the middle, i.e. the third number in this list is the median allocation. The median allocation determines the income of all group members in this period. The effort cost of 20 will be deducted from each individual who chooses high effort irrespective of his/her type.

Example: Suppose you have chosen allocation 12. The other 4 group members have chosen allocations: 11, 2, 14, 5. Sorted from low to high we have:

1.	2
2.	5
3.	11 median allocation
4.	12
5.	14

The median allocation and, thus, the groups allocation decision, in this example is 11 which means that X types earn 72 points and Y types earn 39 points. Those who exerted effort will be deducted 20 points.

After the allocation decision has been made you get the information about the chosen allocation number and your payoff minus effort costs.

At this point the current round of the experiment ends and a new round, with different group members will start.

The experiment ends after 16 rounds, two rounds will be randomly drawn to assess your payment.

Additional Tables:

	Pl 1	Pl 2	Pl 3	Pl 4	Pl 5
Chosen effort	Low	Low	Low	Low	Low
Type in game	P(X)= 3/5 P(Y)= 2/5	P(X)= 3/5 P(Y)= 2/5	P(X)= 3/5 P(Y)= 2/5	P(X)= 3/5 P(Y)= 2/5	P(X)= 3/5 P(Y)= 2/5

	Pl 1	Pl 2	Pl 3	Pl 4	Pl 5
Chosen effort	High	Low	Low	Low	Low
Type in game	X	P(X)= 1/2 P(Y)= 1/2	P(X)= 1/2 P(Y)= 1/2	P(X)= 1/2 P(Y)= 1/2	P(X)= 1/2 P(Y)= 1/2

	Pl 1	Pl 2	Pl 3	Pl 4	Pl 5
Chosen effort	High	High	Low	Low	Low
Type in game	X	X	P(X)= 1/3 P(Y)= 2/3	P(X)= 1/3 P(Y)= 2/3	P(X)= 1/3 P(Y)= 2/3

	Pl 1	Pl 2	Pl 3	Pl 4	Pl 5
Chosen effort	High	High	High	Low	Low
Type in game	X	X	X	Y	Y

	Pl 1	Pl 2	Pl 3	Pl 4	Pl 5
Chosen effort	High	High	High	High	Low
Type in game	P(X)= 3/4 P(Y)= 1/4	P(X)= 3/4 P(Y)= 1/4	P(X)= 3/4 P(Y)= 1/4	P(X)= 3/4 P(Y)= 1/4	Y

	Pl 1	Pl 2	Pl 3	Pl 4	Pl 5
Chosen effort	High	High	High	High	High
Type in game	P(X)= 3/5 P(Y)= 2/5	P(X)= 3/5 P(Y)= 2/5	P(X)= 3/5 P(Y)= 2/5	P(X)= 3/5 P(Y)= 2/5	P(X)= 3/5 P(Y)= 2/5

b. Instructions Part II (Poor Majority)

The group composition has changed. In each group there will now be **2 individuals with type X** and **3 with type Y**. Being type X, you still have a higher chance of earning more in this experiment. The consequences of this change are illustrated in the following tables, which are valid until the end of the experiment. For your final payment one period from periods 1-8 and one period from 9-16 will be randomly drawn to assess your payoffs.

	Pl 1	Pl 2	Pl 3	Pl 4	Pl 5
Chosen effort	Low	Low	Low	Low	Low
Type in game	P(X)= 2/5 P(Y)= 3/5	P(X)= 2/5 P(Y)= 3/5	P(X)= 2/5 P(Y)= 3/5	P(X)= 2/5 P(Y)= 3/5	P(X)= 2/5 P(Y)= 3/5

	Pl 1	Pl 2	Pl 3	Pl 4	Pl 5
Chosen effort	High	Low	Low	Low	Low
Type in game	X	P(X)= 1/4 P(Y)= 3/4	P(X)= 1/4 P(Y)= 3/4	P(X)= 1/4 P(Y)= 3/4	P(X)= 1/4 P(Y)= 3/4

	Pl 1	Pl 2	Pl 3	Pl 4	Pl 5
Chosen effort	High	High	Low	Low	Low
Type in game	X	X	Y	Y	Y

	Pl 1	Pl 2	Pl 3	Pl 4	Pl 5
Chosen effort	High	High	High	Low	Low
Type in game	P(X)= 2/3 P(Y)= 1/3	P(X)= 2/3 P(Y)= 1/3	P(X)= 2/3 P(Y)= 1/3	Y	Y

	Pl 1	Pl 2	Pl 3	Pl 4	Pl 5
Chosen effort	High	High	High	High	Low
Type in game	P(X)= 1/2 P(Y)= 1/2	P(X)= 1/2 P(Y)= 1/2	P(X)= 1/2 P(Y)= 1/2	P(X)= 1/2 P(Y)= 1/2	Y

	Pl 1	Pl 2	Pl 3	Pl 4	Pl 5
Chosen effort	High	High	High	High	High
Type in game	P(X)= 2/5 P(Y)= 3/5	P(X)= 2/5 P(Y)= 3/5	P(X)= 2/5 P(Y)= 3/5	P(X)= 2/5 P(Y)= 3/5	P(X)= 2/5 P(Y)= 3/5

Appendix D: Questionnaire

1) Gender:

- Male (*73%*)
- Female (*27%*)

2) How do you see yourself: Are you in general a person who takes risk or do you try to evade risks? Please self grade your choice (ranging between 1-7):

- 1 (not at all prepared to take risk) (*0%*)
- 2 (*0%*)
- 3 (*13%*)
- 4 (*20%*)
- 5 (*33%*)
- 6 (*27%*)
- 7 (very much prepared to take risk) (*7%*)

3) Some people say that there's not much opportunity in our society today - that the average person doesn't have much chance to really get ahead. Others say there's plenty of opportunity and anyone who works hard can go as far as they want. Which one comes closer to the way you feel about this?

- Not much opportunity (*47%*)
- Plenty of opportunity (*53%*)

4) Just in your opinion, which is more often to blame if a person is poor- lack of effort on his or her part, or circumstances beyond his or her control?

- Lack of effort (*13%*)
- Luck or circumstances beyond his/her control (*13%*)
- Both (*74%*)

5) Just in your opinion, which is more often to blame if a person is rich - effort on his or her part, or circumstances beyond his or her control?

- Effort (*0%*)
- Luck or circumstances beyond his/her control (*26%*)
- Both (*74%*)

6) People feel differently about how far a government should go. Here is a phrase which some people believe in and some don't. On a scale from 1 to 5, do you think our government should or should not redistribute wealth by heavy taxes on the rich? (1= should not; 5=should)

- 1 (*7%*)
- 2 (*27%*)
- 3 (*7%*)
- 4 (*33%*)
- 5 (*27%*)

Appendix E: Additional Outputs

Average Votes by Individual (Type X)

Subject	Mean (Vote)	N
7	0	10
10	0	9
6	0,9	9
3	1	6
5	1	7
11	2,3	7
14	2,5	4
4	2,6	10
15	2,8	10
13	3,3	9
12	4,4	11
2	4,8	10
1	6,4	14
9	8,3	4
Total	2,9	120

Table 1: Average Votes by Individual (Type X)

Average Votes by Individual (Type Y)

Subject	Mean (Vote)	N
2	6,5	6
7	6,7	6
9	6,8	12
8	7,1	16
13	7,3	7
1	8	2
3	8	10
6	8	7
12	8	5
5	8,3	9
14	8,3	12
11	8,6	9
4	9	6
15	9,3	6
10	14,3	7
Total	8,2	120

Table 2: Average Votes by Individual (Type Y)

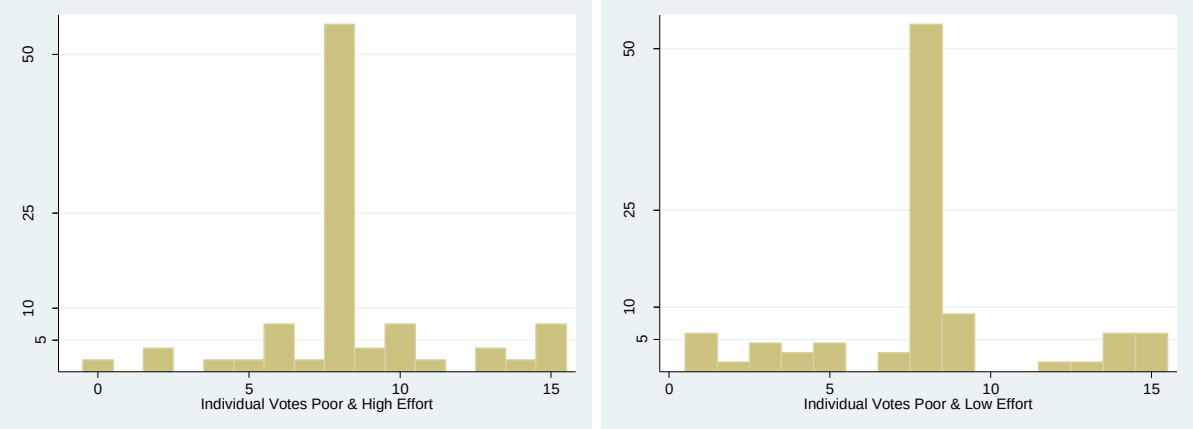


Figure 1: Individual Votes of the Poor conditional on the Effort Choice

Individual Votes (Type Y = Poor) by Treatment

Allocation Nr.	1		2		Total	
	N	%	N	%	N	%
0	0	0.0%	1	1.4%	1	0.8%
1	4	8.3%	0	0.0%	4	3.3%
2	1	2.1%	2	2.8%	3	2.5%
3	3	6.3%	0	0.0%	3	2.5%
4	2	4.2%	1	1.4%	3	2.5%
5	4	8.3%	0	0.0%	4	3.3%
6	4	8.3%	0	0.0%	4	3.3%
7	2	4.2%	1	1.4%	3	2.5%
8	19	39.6%	46	63.9%	65	54.2%
9	2	4.2%	6	8.3%	8	6.7%
10	1	2.1%	3	4.2%	4	3.3%
11	0	0.0%	1	1.4%	1	0.8%
12	0	0.0%	1	1.4%	1	0.8%
13	1	2.1%	2	2.8%	3	2.5%
14	1	2.1%	4	5.6%	5	4.2%
15	4	8.3%	4	5.6%	8	6.7%
Total	48	100.0%	72	100.0%	120	100.0%

Table 3: Individual Votes for the Poor by Treatment

Individual Votes (Type X = Rich) by Treatment

Allocation Nr.	1		2		Total	Total
	N	%	N	%	N	%
0	14	19.4%	17	35.4%	31	25.8%
1	24	33.3%	15	31.3%	39	32.5%
2	2	2.8%	5	10.4%	7	5.8%
3	2	2.8%	1	2.1%	3	2.5%
4	4	5.6%	2	4.2%	6	5.0%
5	2	2.8%	1	2.1%	3	2.5%
6	6	8.3%	2	4.2%	8	6.7%
7	2	2.8%	0	0.0%	2	1.7%
8	12	16.7%	5	10.4%	17	14.2%
11	2	2.8%	0	0.0%	2	1.7%
13	1	1.4%	0	0.0%	1	0.8%
15	1	1.4%	0	0.0%	1	0.8%
Total	72	100.0%	48	100.0%	120	100.0%

Table 4: Individual Votes for the Rich by Treatment

Effort		
Subject	low	high
1	0.0%	100.0%
7	0.0%	100.0%
12	0.0%	100.0%
4	12.5%	87.5%
15	12.5%	87.5%
2	18.8%	81.3%
6	18.8%	81.3%
13	18.8%	81.3%
5	31.3%	68.8%
11	31.3%	68.8%
10	37.5%	62.5%
3	50.0%	50.0%
9	50.0%	50.0%
14	50.0%	50.0%
8	100.0%	0.0%
Total	28.7%	71.3%

Table 5: Average Effort Choice for each Subject

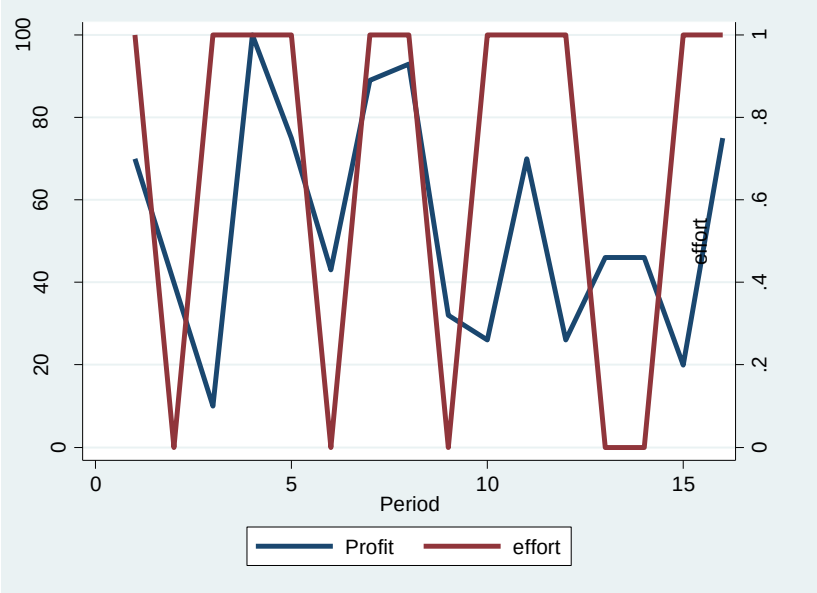


Figure 2: Profit and Effort over Time: Subject 5

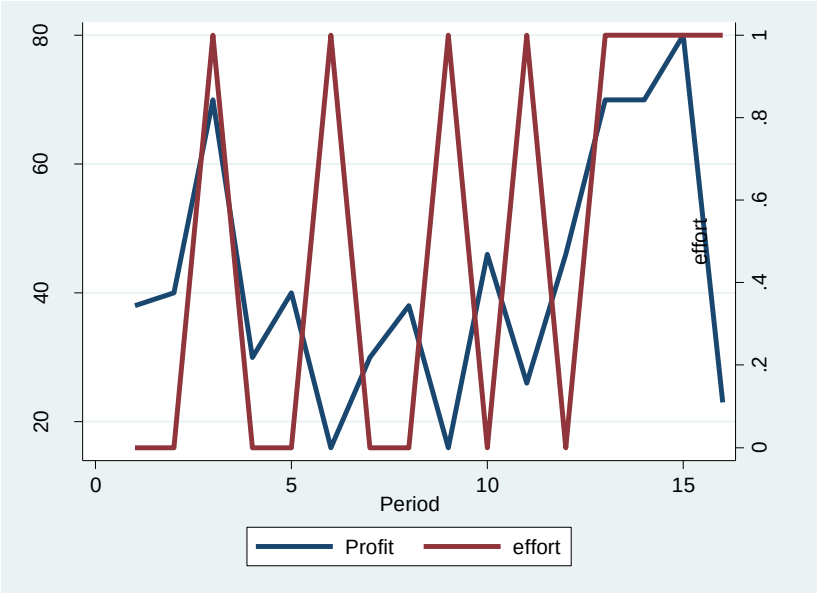


Figure 3: Profit and Effort over Time: Subject 9

Group Votes by Treatment

Allocation Nr.	Treatment 1		Treatment 2		Total	
	N	%	N	%	N	%
1	6	25.0%	0	0.0%	6	12.5%
2	0	0.0%	2	8.3%	2	4.2%
3	2	8.3%	0	0.0%	2	4.2%
4	2	8.3%	1	4.2%	3	6.3%
5	2	8.3%	0	0.0%	2	4.2%
6	5	20.8%	1	4.2%	6	12.5%
7	2	8.3%	1	4.2%	3	6.3%
8	5	20.8%	19	79.2%	24	50.0%
Total	24	100.0%	24	100.0%	48	100.0%

Table 6: Group Votes by Treatment

Average Group Vote by Number of Individual exerting high Effort

Number Effort	Treatment 1			Treatment 2		
	N	mean	sd	N	mean	sd
1	0	-	-	1	8	0
2	1	3	0	1	8	0
3	9	5.22	2.69	12	7.66	1.11
4	10	4.9	2.80	7	6.29	2.75
5	4	3.75	1.83	3	7	0.85
Total	24	4.75	2.61	24	7.21	1.81

Table 7: Average Group Vote by Number of Individual exerting high Effort

Standard Deviation of Individual Votes for Poor Types

Treatment	N	Mean	Standard Dev.
1	48	7,25	3,66
2	72	8,78	2,76
Total	120	8,16	3,22

Table 8: Standard Deviations of Individual Votes for Poor Types

Standard Deviation of Individual Votes for Rich Types

Treatment	N	Mean	Standard Dev.
1	72	3,56	3,69
2	48	1,93	2,58
Total	120	2,91	3,38

Table 9: Standard Deviations of Individual Votes for Rich Types

Variable	VIF	1/VIF
Effort	2,01	0,497203
Type	1,79	0,558714
Number effort	1,32	0,756223
Treatment	1,10	0,908319
Mean VIF	1,56	

Table 10: VIF and Tolerance for the regression specification (1)

VIF and Tolerance (=1/VIF) for regression specification (1). Several conventions suggest dropping the variable in case the VIF has values above 4 to 10, which is not the case in this regression (Backhaus et al. 2006).

VARIABLES	(1) H_{10} Individual Vote if Effort= low	(2) H_{11} Individual Vote if Effort=high	(3) Type
Type	8.578***	6.110***	
	(0.0021)	(0.0000)	
Number Effort	-0.745	-0.750**	0.151***
	(0.180)	(0.0121)	(0.0004)
Treatment	1.742	-1.190*	0.200***
	(0.112)	(0.0527)	(0.0043)
Effort			-0.757***
			(0.0000)
Constant	-0.996	7.335***	0.200
	(0.532)	(0.0018)	(0.1300)
Observations	69	171	240
R-squared	0.225	0.404	0.441
F-test	11.40	30.39	240.5

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11: Testing of Hypotheses H_{10} - H_{11}

VARIABLES	(1) Individual Vote	(2) Individual Vote (incl. question.)
Type	3.454	3.609
	(0.137)	(0.214)
Effort	3.203***	3.602***
	(0.0004)	(0.0067)
Number Poor Effort	-0.815***	-0.781***
	(0.0059)	(0.0073)
Treatment	-1.018	-1.012
	(0.191)	(0.197)
Type*Effort	-2.160***	-2.046**
	(0.0037)	(0.0473)
Type*Treatment	3.008**	2.900*
	(0.0357)	(0.0536)
Gender (Q)		0.412
		(0.655)
Risk Aversion (Q)		-0.345
		(0.373)
Opportunity (Q)		0.230
		(0.967)
Poverty (Q)		0.003
		(0.995)
Wealth (Q)		0.062
		(0.947)
Redistribution (Q)		0.288
		(0.206)
Constant	2.027*	2.307
	(0.0895)	(0.439)
Observations	240	240
R-squared	0.443	0.458
F-Test	80.95	46.86

Robust p-values in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 12: Regression with Number Poor Effort and Variables from the Questionnaire

Z-Test and Boschloo-Test

	Value		Cutoff	
Z-Test (120,120,89,82)	-0.9983	≤	1.684	Not rejected
Boschloo (120,120,89,82)	0.8731	≥	0.06	Not rejected

Table 13: Z-Test and Boschloo-Test on Equality of Effort Decisions across Treatments

Average Profit by Treatment

	N	mean	sd
1	120	63,16	29,24
2	120	50,23	22,18
Total	240	56,69	26,69

Table 14: Average Profits across Treatments

Abstract

The present study looks at social preferences in the context of redistribution situations. I conduct an economic experiment to test whether social preferences, in particular inequality aversion, lead individuals to deviate from predictions under the self-interest hypothesis, one of the main economic principles. Previous studies show that individuals have heterogeneous social preferences when voting on redistribution and their magnitude as well as impact is to a high degree depending on details such as group composition, information, context and further structural parameters.

My experiment consists of an effort stage, in which participants independently decide between exerting high or low effort. The high effort choice is associated with costs however offers a better chance to get into the upper income class. In the second stage five individuals are sorted into groups with two income classes, the rich and the poor. The allocation process of effort choices to income types involves an element of uncertainty as income classes are fixed in size. After the allocation of types is realized, the participants have the possibility to vote on redistribution of the denoted income, thereby revealing a tendency as to what they regard as a justly deserved income for the two classes. The voting mechanism is majority voting and subjects play for 8 rounds under a rich majority (3 rich, 2 poor) and a poor majority (3 poor, 2 rich).

In particular I find an impact of social preferences on the individual level as well as in the aggregate. More than 40% of individual votes taken by the poor deviate from self-interest and deviations exist in both directions (towards increased equality as well as in favor of a justly deserved relative advantage of the rich). For the rich more than 40% of all votes are in line with inequality aversion. Relating to existing literature I do not find a relation between the magnitude of inequality aversion expressed through voting and the effort choice of other group members. Hence participants do not show a tendency to compensate those who were unlucky in the effort task and consequently do not take account of non-payoff relevant information. Expressive voting as a result of different pivot probabilities of types across treatments is also not found significantly.

On the group level I find an asymmetric effect of social preferences depending on the pivotality of voters, which in turn depend on the relative size of the income classes. Inequality aversion among rich individuals can affect the aggregate outcome when the rich are in majority, while poor inequality averse voters can not affect the median vote, even in majority. For the view of a justly deserved relative advantage of rich individuals the opposed asymmetry holds.

Zusammenfassung

Die vorliegende Arbeit behandelt die Rolle von sozialen Präferenzen in Umverteilungsentscheidungen. Zentral dafür ist die Fragestellung ob sozialen Präferenzen, im Speziellen eine Abneigung gegenüber Ungleichverteilungen in der Gruppe, zu Abweichungen von dem Eigeninteresse- Postulat der ökonomischen Wissenschaft führen. Für meine Untersuchung führte ich ein ökonomisches Experiment durch.

In der ersten Phase des Experiments entscheiden TeilnehmerInnen unabhängig voneinander ob sie hohen oder niedrigen Arbeitsaufwand betreiben wollen. Die Entscheidung ist vereinfacht durch einen Mausklick, der bei hohem Arbeitsaufwand mit fixen Kosten verbunden ist. Hoher Arbeitsaufwand bietet allerdings auch bessere Chancen in der höheren Einkommensklasse zu landen. In der zweiten Phase einer Runde werden die Teilnehmenden zufällig in Gruppen zu fünf Personen eingeordnet. Jede Gruppe besteht aus zwei Einkommensklassen, den Reichen und den Armen. Die Zuteilung zu Einkommensklassen erfolgt nach den individuellen Entscheidungen zu Arbeitsaufwand, wobei der Zuteilungsprozess ein Element der Unsicherheit beinhaltet, da die Plätze in der obersten Einkommensklassen begrenzt sind und daher hoher Arbeitsaufwand keine Garantie für eine Zuordnung zu den Reichen bietet. Nachdem die Zugehörigkeit zu Einkommensklassen festgestellt wurde, stimmen die Probanden über die Aufteilung des Einkommens ab. Die 16 vordefinierten Abstimmungsmöglichkeiten enthalten Prognosen für das Umverteilungsverhalten unter gegensätzlichen Theorien (Eigeninteresse und sozialen Präferenzen). Die implementierte Umverteilungsalternative wird vom Medianwähler entschieden. Die TeilnehmerInnen spielen 8 Runden unter einer reichen Mehrheit (d.h. 3 Reiche, 2 Arme) und 8 Runden unter einer armen Mehrheit (3 Arme, 2 Reiche).

In der Auswertung des Experiments, zeigt sich ein Einfluss von sozialen Präferenzen auf das individuelle Wahlverhalten, sowie auf den Wahlausgang. Auf der individuellen Ebene weichen mehr als 40% der abgegebenen Stimmen der armen Einkommensklasse von der üblichen Erklärung durch Eigeninteresse ab. Abweichungen können durch eine Präferenz zu einer höheren Gleichheit in der Gruppe erklärt werden, sowie durch Anerkennung des Zuordnungsprozess zu Einkommensklassen über Arbeitsaufwand und dem folglich subjektiv gerechtfertigten relativen Vorteil der Reichen. In der höheren Einkommensklasse sind mehr als 40% der abgegebenen Stimmen für eine höhere Umverteilung von Einkommen als durch einfache Nutzenmaximierung erklärt werden kann. Bezogen auf Ergebnisse der existierenden Literatur, ergibt sich in diesem Experiment kein Einfluss des Arbeitsaufwandes anderer Individuen auf das individuelle Wahlverhalten. Das heißt, es zeigt sich keine Tendenz für eine steigende Kompensation der unteren Schichten, wenn die Ursache für Armut direkt auf Zufall, anstelle von freiwilligen Entscheidungen, zurückzuführen ist. Informationen die nicht direkt die Auszahlung der TeilnehmerInnen betreffen, verändern das Abstimmungsverhalten nicht.

Auf der Gruppenebene gibt es einen asymmetrischen Effekt für Individuen mit sozialen Präferenzen. Ob diese in der Gruppenwahl entscheidend sein können hängt von der relativen Größe der Einkommensklassen ab. Während für reiche Akteure eine Präferenz für steigende Gleichheit unter einer reichen Mehrheit einen Einfluss auf den Wahlausgang der Gruppe hat, können Individuen der armen Einkommensklasse den Wahlausgang nicht in diese Richtung beeinflussen, selbst wenn Sie in der Mehrheit sind. Für die Ansicht einer gerechtfertigten Überordnung aufgrund des höheren Arbeitsaufwands der Reichen, gilt die umgekehrte Asymmetrie.

Lebenslauf

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Ausbildung

1999 - 2007	Bundesgymnasium mit vertiefender Informatik und DG Goethegymnasium: 1140 Wien, Astgasse 3 Abschluss: Matura mit gutem Erfolg
2008 – 2011	Bakkalaureatsstudium der Volkswirtschaftslehre an der Universität Wien mit zusätzlichen Kursen aus Soziologie
Sep. 2010 - Jän. 2011	Auslandsaufenthalt an der University of Amsterdam, Department of Economics im Rahmen des ERASMUS-Programmes
2011 - 2013	Magisterstudium der Volkswirtschaftslehre an der Universität Wien
2012 - laufend	Masterstudium der Soziologie an der Universität Wien

Berufserfahrung

Okt. 2007- Jun. 2008	Zivildienst bei MA 11 (Amt für Jugend und Familie): Betreuung von sozial benachteiligten Kindern und Jugendlichen
Jul. 2010, 2011 & 2012	Freier Angestellter bei Steiner Family Entertainment
Apr. 2012- Sep. 2012	Freier Angestellter bei der Economics and Market Research Analysis Abteilung der Unicredit Bank Austria AG
Okt. 2012- Jul. 2013	Studentischer Mitarbeiter am Institut für Wirtschaftssoziologie (unterstützende Tätigkeiten in Lehre und Forschung)

Besondere Kenntnisse

EDV-Kenntnisse:	Microsoft Office, html, EViews, Stata, SPSS, z-Tree, moodle
Sprachkenntnisse:	Deutsch (Muttersprache), Englisch (Fließend; TOEFL-Testscore: 113 von 120; 05/2011), Französisch (Schulkenntnisse)
Weiters:	Wirtschaftspolitische Akademie (Jahrgang 2012/13)