Social Heterogeneity an its Ambiguous Effect on Preferences for Redistribution*

Dominik Duell
Institute for Advanced Study Toulouse

Draft, March 26, 2015

Abstract

Societal heterogeneity and conflicts between social groups are among the most influential social phenomena explaining both preference for redistribution at the individual level and cross-country variation in welfare state policies. It is commonly assumed that the higher the degree of social diversity and fractionalization and the larger the number of salient social cleavages, the lower the support for extensive redistribution. In this experiment, I induce artificial identities to simulate variation in group heterogeneity to explore the mechanism by which diversity and intergroup competition determine whether individuals are willing to share their resources with others. I find that preferences for redistribution do not necessarily decrease in group heterogeneity, but instead vary non-linearly as a function of whether group conflicts are primed and overshadow redistributive conflicts based on differences in income. In particular, independent of assigned income, subjects choose higher tax rates when the redistributive allocations benefit fellow in-group members, even in societies with a high degree of group heterogeneity.

*The research presented in this paper was partly supported by NSF Grant #SES-1124265 and the Wilf Family Department of Politics at New York University. Support through the ANR - Labex IAST is also gratefully acknowledged.

1 Introduction

Social identities[1] provide a key feature to explain political attitudes and behavior. In particular, scholars of political economy that try to explain preference for redistribution and voting behavior with respect to welfare state policies highlight societal heterogeneity as one of the most important factors explaining cross-country differences in individual citizens' support for redistribution. Previous literature ties social diversity to lower levels of redistribution and links preferences for low welfare spending to an unwillingness to help members of a different social group (Alesina, Glaeser and Sacerdote, 2001; Luttmer, 2001; Alesina and Glaeser, 2004).

To challenge this conclusion and to explore the pathways by which group heterogeneity, individual wealth, and the willingness to share with members of that group interact, I designed a laboratory experiment that allows individual choices to be driven by emotions towards others who either do or do not share social group membership. I induce artificial identities following standard protocols from social psychology (minimal group paradigm, Billig and Tajfel (1973)) to create heterogeneity in a group of people with whom the individual agent is asked to share some of their assigned resources. The existence of multiple social identities, variation in the importance of those identities for the individual, as well as the wide array of benefactors from the various welfare state policies make both observational data research on the matter and field and laboratory experiments that invoke social identities that exist in the real world problematic. A controlled laboratory experiment with group markers that are orthogonal to the behavior of interest are a valuable tool to give insights into human behavior. Experiments are a tool for advancing our understanding of the political economy of redistribution as demonstrated by a large research agenda in economics and political science. While preserving key incentives, I am able to control the existence and salience of social identities and thus isolate their effect on individual behavior. In this way, experiments can add significantly to what we have learned from using historical time-series or cross-sectional data.

My study is able to set the appropriate counterfactual to making allocation decisions in a heterogenous group: choosing redistributive allocations in a homogenous group in which gains for the subject's own group do not directly translate into losses for the other group, but where the individual is still aware of the fact that an in-group exists and feels attachment to this group. In

[1] Social identity may be defined as an emotionally heightened aspect of a person's sense of self that derives from perceived membership in a social group.

this paper, I ask, how much are subjects willing to share with others in a redistributive environment when sharing is costly to them? And, is the amount they are willing to share contingent on in-group status of welfare recipients and the level of group diversity?[2] Results suggest that preferences for redistribution do not necessarily decrease in group heterogeneity, but instead vary non-linearly as a function of whether group conflicts are primed and overshadow redistributive conflicts based on differences in income. Together, inducing weak identities and the mere existence of an out-group is enough to trigger other-regarding preferences that favor fellow in-group members and increase the level of redistribution. In particular, independent of assigned income, subjects choose higher tax rates when they are able to benefit fellow in-group members with such redistributive allocations. Also, I am able to replicate findings from previous experimental studies: subjects generally follow their monetarily induced self-interest but show concerns for the less well off and are responsive to inefficiencies associated with higher levels of redistribution.

2 Preference for redistribution, experimentation, and the willingness to share in diverse groups

The political economy literature derives various predictions about the determinants of preferences for redistribution in heterogenous societies. Given some critical shortcomings of the observational data used to study this phenomena, a vast experimental literature has taken up the call to aim for controlled identification of attitudes and behavior in the labor market and with respect to preferences for redistribution. My study is placed right at the intersection of these two fields of inquiry.

2.1 Political economy of redistribution in heterogenous societies

Alesina, Glaeser and Sacerdote (2001) and Alesina and Glaeser (2004) famously argue that high social fractionalization, particularly rooted in religious or ethnic diversity, correlates with lower levels of societal redistribution than observed in homogenous societies. There are obvious shortcomings with the cross-country regression-approach used in these studies. Besides concerns with endogeneity and causality, the fact that the authors base their main claim on one significant coefficient coming

[2] In-group is the social group to which a person psychologically identifies as being a member.

out of this regression – racial fractionalization – is problematic. More specifically, the comparability of measurement of public spending and fractionalization is contested. The size of welfare state spending in the U.S. may be underestimated when earned income tax credit and affirmative action policies are not accounted for. Furthermore, measures of fractionalization typically rely on an indicator compiled in the 1960s while measures of public spending are collected decades later. Inferences drawn from the correlation between these measures rely on the assumption that ethnic, linguistic, and religious identities are sticky and are one-dimensional; this assumption has been widely criticized (Posner, 2004; Chandra, 2012).

Despite the flagrant problems with data and measurement, the underlying argument of Alesina and co-authors cannot be dismissed as easily. Various studies have shown a negative correlation between social diversity – mainly ethnic diversity – and lower provision of public goods by state entities (Mueller and Murrell, 1986; James, 1993; Kuijs, 2000; Soroka, Banting and Johnston, 2006). Such a relationship varies substantially by the type of public spending. The larger the share of social services and income maintenance, the more pronounced the negative relationship between social diversity and welfare expenditure (Cutler, Elmendorf and Zeckhauser, 1993). Hopkins (2011) qualifies findings with respect to the relationship between variation in public spending and variation in social fractionalization; he argues that only spending on criminal justice was affected by changes in ethnic and racial composition of neighborhoods throughout, from 1950 to today. Gerdes (2011) finds no evidence of a relationship in Denmark, neither at the national nor the sub-national level. Lind (2007) shows that income inequality between (racial) groups reduces welfare spending by U.S. states, but within-group inequality increases spending. Also, an increase in fractionalization seems to shift public spending on public goods to public spending on private goods (Alesina, Baqir and Easterly, 1999, 2000). Such a shift is interesting because it illustrates the value of public funds to target particular ethnic groups. In fact, the results of my experiment indicate that the willingness to share in diverse groups is contingent on the ability to direct benefits to in-group members.

Gilens (1995, 1996, 2009), using self-reported measures, demonstrates a link between racial stereotypes and support for welfare spending among White Americans that crucially rests on Whites' overestimation of the number of poor Blacks. Similarly, Luttmer (2001) finds that those who live in neighborhoods with a large share of welfare recipients of their own race report higher levels of support for redistribution; he concludes that "interpersonal preferences seem to transform difference

in racial composition into differences in redistribution within the United States" (502). Studies that focus on Canada and Europe only report a very weak relationship, if they find one at all, between social diversity, who is target of welfare state benefits, and support for public spending on redistributive policies (Soroka, Banting and Johnston, 2006; Senik, Stichnoth and Van der Straeten, 2009; Stichnoth, 2012). Nonetheless there is some evidence from observational data of an *anti-solidarity effect* for certain sub-populations (higher levels of social diversity decreases welfare state spending) and a *compensation effect* (higher levels of social diversity increase the risk of income loss and thus trigger a stronger preference for redistribution; Finseraas (2008)).

2.2 Experimental evidence on taxation and preference for redistribution

A vast literature, mainly employing the dictator game, studies subjects' willingness to share and therefore individuals' trade-off between self-interest and fairness (Forsythe et al., 1994), abstracting away from efficiency concerns. My experimental design follows Bolton and Ockenfels (2006), Tyran and Sausgruber (2006), and Höchtl, Sausgruber and Tyran (2012) in exogenously assigning income and income-distributions and investigating subjects' allocation decision while exogenously varying costs and inefficiencies associated with different levels of taxation. Those studies all find that inequality aversion drives individuals' preference for redistribution even at the cost of an inefficient level of taxation. However, Engelmann and Strobel (2004) and Ackert, Martinez-Vazquez and Rider (2007) find that inequality aversion increases support for redistributive taxes when taxation is efficient but are more inclined to vote selfishly otherwise. And, also modeling the labor market, Durante, Putterman and van der Weele (2013) illustrate how the source of pre-tax income affects allocation decision in the laboratory; they find that income generated from a tedious task (approximating earned income in the real world) induces more self-interested, income-driven choices than when income is randomly assigned. Unlike this study and Agranov and Palfrey (2014), I abstract away from modeling the labor market to get a grasp on the efficiency-equity trade-off individuals' face when considering their labor market and allocation decisions jointly. My study is more concerned with relative allocation choices contingent on the level of heterogeneity in the group of people with whom subjects interact; the relative level should not be affected by the method by which income-based interests are induced. There is likely a strong link between social heterogeneity and labor market outcomes (e.g., discrimination driven education and employment choices, pay

discrimination, etc.), but I leave this relationship unmodeled for the presented study.[3]

With respect to society-wide and societal sub-group-related characteristics, Höchtl, Sausgruber and Tyran (2012) elaborate on the conditions under which fairness concerns are prevalent in such allocation games. They find that subjects who are assigned low incomes choose selfishly independent of holding a majority but subjects assigned a high income demonstrate social preference in that case. A few studies argue voters choose instrumentally, meaning their decisions adheres to a social norm or displays social preferences whenever they believe not to be pivotal in determining outcomes (Tyran, 2004; Feddersen, Gailmard and Sandroni, 2009; Shayo and Harel, 2012). In this study, I abstract away from such driving forces behind the display of social preferences by randomly choosing an allocation rule to be implemented from the set of tax rates the subjects indicated they would prefer (random dictator rule).

In general, seem to aim to maximize their own income in controlled laboratory experiments, but also demonstrate "Rawlsian" concerns for the less well off and inequality amongst them (Durante, Putterman and van der Weele, 2013). Additionally, most subjects are willing to make sacrifices for the sake of efficiency. Similar to most studies mentioned in this section, I am interested in how a particular factor – group diversity – factors into individuals' willingness to share wealth. My experiment attempts to elicit individuals' willingness to share with others in a group of people while exogenously varying the degree of diversity in that group. What is novel is the factor I manipulate – group heterogeneity – as well as the combination of setting strict monetary incentives and non-monetarized weak primes to trigger deviation for reasons related to concerns for members of one's social group.

2.3 Experimental evidence on willingness to share in heterogenous groups

Glaeser et al. (2000) provide one of the first accounts of the effect of shared or unshared group identity in an allocation game; implementing a trust game, they demonstrate that subjects are more likely to return money to the sender when the sender shares the same racial or national background. In a similar study by Fershtman and Gneezy (2001), subjects are engaged in a trust and dictator game and are able to infer the ethnic background by the names of the subjects. The study reveals

[3] As discussed in more detail in Section 4 on research design, I gain some control over such real-world influences on the decision I do model in the laboratory by inducing artificial identities.

that a shared stereotype – specifically, that non-Ashkenazi Jews are less trust-worthy and more easily to be infuriated when being treated badly – drives discrimination among all participants of members of this social group. Habyarimana et al. (2007) link the effects of shared or unshared ethnic identity to adherence to within-group norms to facilitate and sustain current and future collective endeavors, arguing against an influence due to differences in preferences or technology across groups. In effect, they argue against discrimination as driven by a preference to be more altruistic towards members of one's own group and less friendly towards other groups – a conclusion that is frequently made based on evidence from experimental (Lind, 2007) or observational-data research (Alesina, Baqir and Easterly, 1999).

Various studies report opposing results that counter the finding of wide-spread discrimination and instead suggest that neither race nor ethnicity provide a sizable effect on the amounts transferred in such games (Bouckaert and Dhaene, 2004; Haile, Sadrieh and Verbon, 2008). In particular, Fong and Luttmer (2009) use a field experiment to manipulate the deservingness, income, and race of charity recipients and find no predictive power of race with respect to how much money individuals are willing to share. However, they do find effects on the propensity to give to co-racials for those who strongly identify with their race group. Measuring social identity by recording race alone may not be sufficient to capture whether such identity is salient in determining behavior. In the same study, the authors establish a clear link between attitudes towards redistribution and race with notable insight that such a strong relationship is primarily explained by attitudes towards public assistance and not by giving to private charity, which was the behavioral measure employed. The group identity of the recipient matters when individuals are uncertain about the extent of the ability to target redistribution to deserving victims. In general, the influence of social diversity on attitudes towards redistribution and the welfare state is much weaker than other factors such as one's own income and beliefs about welfare recipients deservingness (Stichnoth and Straeten, 2011).[4]

The complexity of the mechanism by which shared group membership translates into individuals' willingness to share wealth with others is obvious in the presented research. The shortcomings of field experiments and laboratory experiments that invoke real social identities, where multiple

[4]Social capital and trust also affect the level of welfare state spending because of its effect on the trade-off between private charities and publicly provided safety nets, as well as moral hazard problems for public insurance systems. Citizens in more homogenous countries tend to exhibit higher levels of trust in one another and in the public welfare state institutions, both factors that inhibit attitudes against redistribution (Knack and Keefer, 1997).

social identities, variation in salience of those group affiliations, and clarity of who will benefit from redistribution is hard to control, makes a study inducing artificial identities and complete information about losses and gains from allocation choices valuable.

My experiment varies group heterogeneity and implicitly induces intergroup competition by making group payoffs of a subject's own group and the other group salient. Intergroup competition affects in-group bias indirectly by increasing the salience of the division between in- and out-groups (Brewer, 1979). The key to set the correct baseline – no heterogeneity and no intergroup competition – is to create a decision-situation for each individual subject in which gains for that subject's group do not directly translate into losses for the other group, but where that subject is still aware of the fact that an in-group exists and feels attachment to this group. In essence, the correct counterfactual is not a non-identity baseline – i.e., a world without group identities – but is, instead, a world where an individual can allocate wealth to the entire population that shares the same group identity.

3 A simple model of redistributive allocations

This section describes a simple model of redistributive allocation decisions in a complete information environment and makes predictions about the behavior of agents that are purely driven by self-interest.

Consider a society of N agents where agent i is characterized by a level of income $\omega_i \in \Omega$, where Ω follows some distribution $F(\omega_i)$. Agent i's utility over tax rates, $\tau \in [0, 1]$ is given by

$$u_i(\tau) = (1 - \tau)\omega_i + \tau(1 - e)\frac{\sum_j^N \omega_j}{N}$$

where e is the deadweight loss associated with collecting taxes and $j \in N$ is an indicator for agents in the society.

Prediction 1: It follows that i's utility maximizing choice of τ, τ^* is given by

$$\tau_i^* = \begin{cases} 0 & \text{if} \quad \omega_i > \overline{\omega} \\ 1 & \text{otherwise} \end{cases}$$

where

$$\overline{\omega} = \frac{(1-e)\sum_j \omega_j}{N}$$

is the cut-point in the ω_i-space separating the agents for which $\tau = 0$ is optimal from those for which $\tau = 1$ is optimal.

From the term expressing the cut-point it becomes obvious that:

(i.) τ^* decreases with an increase in deadweight loss.

(ii.) τ^* increases with an increase in the income of all other agents $-i$, ω_{-i} in relation to the income of agent i, ω_i.

Prediction 2: From (i.) it follows that, all else equal, the level of redistribution decreases with rising inefficiency of the tax intake allocation mechanism.

Prediction 3: The result in (ii.) indicates an increase in the level of redistribution when the income inequality – the spread of income across society – climbs.

4 Research design

The primary objective of this research is to elicit individuals' willingness to share with other people in a group by inducing various levels of preferences for redistribution in an allocation game. Secondly, the aim is to account for the salience of group concerns induced in a way that is orthogonal to the induced preferences for redistribution. This study employs a laboratory experiment to set clear and easily understandable baseline incentives which should guide subjects to make decisions exclusively based on their assigned resources, while concurrently priming group identities and the existence of different groups in a way that allows the researcher to measure subjects' deviations from the monetarily induced incentives.

Subjects are placed in a decision environment in which they have to choose between allocations that differ in their level of redistribution (different tax rates). The experiment also varies the degree of efficiency of the mechanism by which taxes are collected and allocated across other subjects and the level of inequality in random income assignment. The implemented allocation game does not model what produces the income, i.e., a labor market, but incorporates inefficiency effects from expected taxation in subjects' payoffs from choosing one level of redistribution over another.

In a nutshell, subjects are characterized by two distinct attributes. The first attribute is her level of income (resembling ω_i in the simple model of redistributive allocations from Section 3). The second attribute is a binary social identity attribute (e.g., social group membership), which induces a division of citizens into two social identity groups, orthogonal to the distribution of income. In some groups of decision makers (resembling the society of N agents) all subjects share the same social identity, in others there are two social identity groups of different size. A subject may sometimes be either a member of the *majority identity group* or of the *minority identity group*. Throughout the paper, I will refer to the full group of decision-makers as either *decision group* or *society*, to the sub-group of subjects in each decision group that share a group identity as *identity groups*, to the majority identity group sometimes as *majority group* and to the minority identity group interchangeably as *minority group*.

Income changes from round to round and subjects are asked to select the tax rate they prefer. Subjects are given their payoffs, the payoffs to all other subjects in their choice group, overall welfare, and welfare of the identity groups as function of their choice of a preferred tax rate. Then, one of the preferred tax rates of subjects in the group is randomly selected to determine round payoffs and subjects are informed about those payoffs.

I record the choices of the preferred tax rate by subject while varying randomly assigned income, income distribution, efficiency of tax allocation, and distribution of identity groups in society; the experiment follows a within-subject design.

4.1 Experimental sessions

Experimental sessions were carried out in an experimental social science lab at a large German university. Participants signed up via a web-based recruitment system that draws on a large, pre-existing pool of potential subjects. Subjects were not recruited from the author's courses. The recruitment system contains a filter that blocked subjects from participating in more than one session of a given experiment. The subject pool consists almost entirely of students from around the university.

Subjects interacted anonymously via networked computers. The experiments were programmed and conducted with the software z-Tree (Fischbacher, 2007). After giving informed consent according to standard human subjects protocols, subjects received written instructions that were

subsequently read aloud in order to promote understanding and induce common knowledge of the experimental protocol. In accordance with the long-standing norms of the lab in which the experiment was carried out, no deception was employed at any point in the experiment. Before the allocation game stage commenced, subjects were asked two questions concerning their understanding of the payoff tables provided to them in the instructions. 93% of participating subjects (37 out of 40) answered both questions correctly. At the end of the experiment, an exit survey was conducted.[5] Subjects received a show-up fee of $7 (5 Euro) and performance-based payments of on average $18 (13 Euro) for an experiment that lasted about 1 hour. Payments from the voting game where taken from the higher round-payoff from two randomly selected rounds.

In 2 sessions, I collected observations on a total of 40 participating subjects. Each experimental session lasted 30 rounds with 20 participating subjects.[6]

4.2 Experimental design

4.2.1 Social identity inducement stage

At the beginning of each experimental session, subjects are shown 5 pairings of paintings, one by Paul Klee and one by Wassily Kandinsky, and are asked to choose their preferred painting in each pair. Based on which painter's work a subject prefers most of the time, he or she is assigned to be a *Klee* or a *Kandinsky*.[7] These painter preference-based groups create what I previously introduced as *identity groups*. Once identities are assigned, subjects participate in a quiz in which they are asked to identify the painter (Klee or Kandinsky) of five further paintings. In answering the question about each of those paintings, subjects give initial guesses which are made available to other subjects in the same identity group before everyone is asked for their final answer. Subjects within an identity group receive additional payoffs if the majority of members of their identity group name the correct painter in the final answer. In the subsequent voting game stage, the identities of all subjects with

[5] The questions try to grasp subjects' understanding of the how preferred tax rates translate into round payoffs. Question 1: Suppose you preferred a tax rate of 35% and the other participants in your decision group preferred 12%, 20%, 40%, and 65%, respectively. Which of those preferred tax rates will determine your round payoff? Question 2: Suppose in a particular round, not your preferred tax rate but the preferred tax rate of another participant in your decision group was randomly chosen to determine your round payoff and the round payoffs of all other participants in your decision group. Is it possible that your preferred tax rate will be randomly chosen to determine your round payoff and the round payoff of all other participants in your decision group?

[6] Instructions are provided in the Appendix Section B.2.

[7] See Tajfel et al. (1971); Chen and Li (2009); Landa and Duell (2014) for examples of the use of painter-preferences to induce identities.

whom individual subjects interact are displayed for them on the screen.

As implemented, the identity treatment is related to the *minimal group paradigm* (Taijfel, 1970; Billig and Tajfel, 1973; Tajfel and Turner, 1986) – an approach to inducing a (weak) notion of identity that is seemingly unrelated to the behavior of interest. A key argument for this approach is that it allows the experimenter to avoid uncontrolled associations of identity with the particular choices available to the subjects. Considerable experimental literature using the minimal group paradigm has shown its effectiveness in inducing patterns of responses to identity, including in-group favoritism and intergroup competition, that resemble those usually observed outside the laboratory with naturally occurring group identities. Weak induced identities significantly affect subject behavior with respect to individual shirking and free-riding (Eckel and Grossman, 2005), cooperation, and willingness to reward or punish (Chen and Li, 2009; Goette, Huffman and Meier, 2006; Bernhard, Fehr and Fischbacher, 2006; McLeish and Oxoby, 2007). Eckel and Grossman (2005) and Goette, Huffman and Meier (2012) provide evidence that the effects of identity being induced are monotone in the strength of that identity, i.e., the weakness of identity inducement does not bias results in the wrong direction. Importantly, the effects of artificially induced weak identities increase with the salience of identities (Eckel and Grossman, 2005; Charness, Rigotti and Rustichini, 2007; Chen and Chen, 2011). Operationally, a key factor that raises this salience stems from interactions with fellow group members in performing joint tasks such as the group quizzes I administer as part of the identity treatment.

This experiment makes salient whether or not a subject shares a group identity with the other subjects with whom it interacts in a given round. It does not, however, explicitly prime that those group identities will matter; they only matter when the subjects choose to care about their own group identity and the in- or out-group status of other subjects in their decision group. The main manipulation – variation in group composition – is intentionally subtle to tap into underlying attitudes towards in- and out-group members and does not tie behavior to identity-based payoffs. The attitudes and behaviors observed, then, may be induced by the history of play from the interaction experienced in the laboratory, or it may represent past, outside-the-lab experiences simply activated by having induced weak, artificial identities.

4.2.2 Allocation game

The allocation game proceeds as follows:

1. Subjects are randomly assigned to a *decision group* of 5 at the beginning of each round of the session.
2. Subjects are randomly assigned their income from the underlying set of fixed income distributions without replacement.

Table 1: Income distributions

Low Inequality	High Inequality
11	11
22	22
30	30
45	45
60	90

3. Subjects are informed about income and identity group membership of all subjects in their decision group.
4. Subjects are asked to choose their *preferred tax rate* from the interval between 0 and 100 employing a slider and are shown the payoff consequences should that level of taxation be implemented as the *applied tax rate*. Hypothetical payoff consequences are displayed for the subject and all other members of the decision group as total round payoffs after the preferred tax rate is applied as well as as average payoffs for the group of Klees and the group of Kandinskys (See Appendix Section B.3).
5. One of the five preferred tax rates in each decision group is randomly chosen and becomes the *applied tax rate* for that decision group; round payoffs based on the applied tax rate are announced to subjects in each decision group.

The interaction is repeated 30 times, 15 times for each level of income inequality. Subjects are assigned each level of income at least once and experience every level of efficiency multiple times. However, not all subjects face every possible (income,efficiency)-pair.

4.3 Treatments

The experiment follows a within-subject design where the level of *decision group- heterogeneity* is randomly varied from one round to the next. Subjects face a decision group composed of either: (1) members of their identity group only (*homogenous group*), (2) four members of their identity group and one member of the other group (*small minority, majority status*), (3) three members of their identity group and two members of the other group (*large minority, majority status*), (4) two members of their identity group and three members of the other group (*large minority, minority status*), or, (5) one member of their identity group and four members of the other group (*small minority, minority status*).

When reporting average treatment effects, I use the resulting 3-item treatment-variable (*group composition*) indicating a

homogenous group (5 to 0, *homogenous*)

group with a small minority (4 to 1, *small minority*)

group with a large majority (3 to 2, *large minority*).

Within-subjects variation by round in income, income distribution, and inefficiency follows a fixed schedule (See Section B.1) where the order of sets of parameters is picked randomly. For subject-level results, I also control for majority/minority-status and income characteristics of the two groups.

4.4 Objective of experimental setup and manipulations

Identification of patterns of interest in subjects' behavior and attitudes rests on two pillars: random assignment of income and inducement of artificial group identities.

The experiment varies income and income distribution by changing subjects' incentives in a way that allows elicitation of how well they follow monetarized rationales. The implemented variation also allows me to gauge subjects' behavioral responses to different levels of inequality and inefficiency. I implement two income distributions: Low inequality (11, 22, 30, 45, 60) and High inequality (11, 22, 30, 45, 90); such a structure approximates the income distribution by income quintiles in Germany and the U.S., respectively. The income distribution arguably captures the difference in the size of the pie to be distributed more than income inequality since total income is

larger in the latter. Should subjects perceive the manipulation as variation in the size of the pie to be distributed and not as variation in inequality, it still speaks to the real world phenomena I aim to approximate. After all, the induced income distribution resembles the distribution of income quintiles across existing societies.

The income structure also gives a clear cut-point in the income space above which richer subjects should implement a tax rate of 0 and below which subjects should implement a tax rate of 100. This cut-point will vary with degree of inefficiency and level of inequality. Table 2 lists the payoff-maximizing choices of a tax rate given those covariates; payoff-maximizing in the allocation game equals utility maximizing in the simple game of redistributive allocations from Section 3. Note, tax rates will be presented as percentages ranging from 0 to 100% in the implemented allocation game. In the presentation of experimental results, I will refer to those subjects for whom 100% is the payoff-maximizing tax rate as *poor* and to those subjects that derived highest payoffs at a tax rate of 0% as *rich*.

Table 2: Predicted choices when subjects consider only *their own monetary payoff*

inefficiency	*inequality*	cut point	choose 0%	choose 100%
Low	Low	31	45, 60	11, 22, 30
Low	High	36	45, 90	11, 22, 30
Medium	Low	27	30, 45, 60	11, 22
Medium	High	32	45, 90	11, 22, 30
High	Low	17	22, 30, 45, 60	11
High	High	20	22, 30, 45, 90	11

Further, remember that when subjects choose preferred tax rates, they see the payoff consequences of that tax rate for themselves and for other members of the decision group, as well as the average in- and out-group welfare, but round payoffs are realized based on a random selection of the preferred tax rate choices of one of the five members in a decision group in each round.

Varying inefficiency and income inequality gives different payoff-maximizing choices at income levels 22 and 30. In this way, I can parse best responses to the monetary incentives from behavioral responses. Also, I am able to keep pivotality concerns constant by employing a random dictator rule to determine the applied tax rate; such a rule avoids allocation behavior changing effects from strategic voting choices and keeps income structure effects constant (Höchtl, Sausgruber and Tyran,

2012).

Creating identity groups instantiates a choice between selfish and other-regarding behavior. To be sure, the payoff for each subject is not affected by whether their fellow group members do well per se. However, it will be affected if subjects are willing to incur costs to make some or all of their fellow group members better off. I intentionally chose a non-strategic interaction to avoid confounding the measurement of other-regarding preferences with strategic responses to the expectation that other subjects hold other-regarding preferences.

What attitudes and behaviors are activated in the laboratory? The decision situation set up in the lab does not completely eliminate subjects' past experiences nor does it free them from expectations for the future. Indeed, subjects bring these experiences with them into the laboratory setting. How the experimenter presents choices to the subjects frames their decisions. Hoffman, McCabe and Smith (1996) and Eckel and Grossman (1996*a*) show that manipulating anonymity and social exclusion in the laboratory increases offers in the dictator game; these authors interpret this finding as clear indication that whatever subjects perceive to be the decision situation presented to them, they will be influenced by experiences and norms that precede the lab experiment.

In this experiment, subjects are told that they ought to indicate their most preferred tax rate and that one of the preferred tax rates of the five members of their decision group is randomly chosen to determine round payoffs. They are instructed that they will see the payoff consequences of their preferred tax rate for all five members of their group individually (ordered by income), the consequences for the average payoff of their in-group, and the effect on the average payoff of the out-group. The information displayed makes the trade-off between favoring the in-group and favoring the out-group obvious. Subjects may very well infer from this that they should pay attention to their payoff, others' payoff, and group payoffs. The question is how these different consequences factor into an individual's decision-making calculus when the distribution of identity groups and income is varied. I purposefully want to activate subjects' other-regarding preferences that are shaped by their societal backgrounds and that they perceive to be the norm in the real world. I cannot induce those norms within the laboratory, but I am able to demonstrate their existence.

4.5 Behavioral expectations

Linking the experimental design to the predictions derived in Section 3 may lead to the expectation that subjects are only concerned with their monetary payoff and will not consider the consequences of their choices to other agents' payoffs. If true,

poor subjects will prefer a tax rate of 100% and rich subjects a tax rate of 0% (BE-income).

This first behavioral expectation speaks to *Prediction 1* presented above. Note, that the status as being poor or rich is determined by what is the payoff-maximizing tax rate given the assigned income, the degree of inefficiency and the level of inequality. In this way, *BE-income* subsumes *Prediction 2* and *Prediction 3*. Nonetheless, subjects may also respond to variation in inefficiency and income inequality behaviorally demonstrating aversion against inefficient giving (Eckel and Grossman, 1996*b*; Harrison and Johnson, 2006) and inequality aversion (Forsythe et al., 1994; Bolton and Ockenfels, 2006; Tyran and Sausgruber, 2006; Höchtl, Sausgruber and Tyran, 2012). With this, the first behavioral expectation about a deviation from monetarized incentives is that, all else equal,

subjects will prefer a lower tax rate when inefficiency increases (BE-inefficiency).

Further, all else equal,

subjects will prefer a higher tax rate when income inequality increases (BE-inequality).

With respect to the main point of interest in the implementation of this experiment, I want to test whether

the rate of poor subjects that prefer 100% decreases with heterogeneity (BE-heterogeneity).

Alternately, given that subjects may deviate from their payoff-maximizing tax rate, this expectation also implies that the number of deviations from 100% for poor subjects should increase and the number of deviations of rich subjects from 0% should decrease.

Following what we learned from studying interactions between individuals when group identities are salient and intergroup competition is primed, a more precise statement of the relationship between choices of preferred tax rates and group heterogeneity, extending *BE-heterogeneity*, says that

> *the rate of subjects that prefer the tax rate that maximizes in-group payoffs increases with heterogeneity (BE-ingroup-bias).*

The complement to *BE-ingroup-bias* with respect to payoff consequences of individuals' choices for the out-group leads to the expectation that

> *The rate of subjects that prefer the tax rate that minimizes out-group payoffs increases with heterogeneity (BE-outgroup-hate).*

5 Results

I collect 1200 subject-round observations on 40 subjects. Among those, there are 240 observations each for income levels 11, 22, 30, and 45, and there are 120 observations in each of the 60, 120, and 90 income categories.

The main findings are as follows:[8]

1. Preferred tax rates decrease with assigned income and inefficiency but increases with income inequality.
2. Increasing group heterogeneity *increases* preferred tax rates.
3. Independent of assigned income, subjects choose higher tax rates when the resultant redistributive allocation benefits fellow in-group members.

When presenting average treatment effects, I will display difference-in-means and difference-in-distribution tests only when results are robust to variation in the level of inequality, inefficiency, difference in average payoffs in in- and out-group, and group income otherwise I present regression-based analysis.[9] Note, the experimental design, in particular the random assignment procedure of (group composition,inequality)-pairs to rounds in combination with a T of only 30, creates a positive

[8] Summary statistics for all variables are given in Section A.1 of the Appendix.

[9] Whenever I present difference-in-means t-tests it is implied that the corresponding Wilcoxon difference-in-distribution test delivers similar results. Also, the Fligner-Policello, which corresponds to the Wilcoxon test and relaxes both equal variance and approximately normal distribution, delivers nearly identical p-values. As a further robustness check, I simulate permutations of choices of preferred tax rates and run the test on each generated sample. The created distribution of test-statistics, again, has to yield nearly identical results to present simple t-tests in the main body of the paper. In what follows, whenever I compare distributions, I run all three tests. Throughout, I report p-values from a two-tailed test with 95%-confidence bounds unless otherwise indicated.

correlation between group composition and inequality. 3 out of 10 observations in the homogenous group and small minority treatment are low inequality scenarios but 7 out of 10 in the large minority treatment are high inequality scenarios.

In Subsection 5.1, I will first consider the relationship between subjects' choices of preferred tax rates and assigned income. Then, in Subsection 5.2, I turn to the question of whether and how group heterogeneity determines subjects' willingness to share with others in general and fellow in-group members in particular. Jointly considering the insights gained from those two sections generates more precise statements about the rationales behind behavior that reveals in-group favoritism to determine the relationship between preferred tax rate and income and are presented in Subsection 5.3. Finally, I break down average treatment effects by subject-level in Subsection 5.4 and check for the robustness of results found when the unit of analysis is subject-round by looking at subject-level behavior separately.

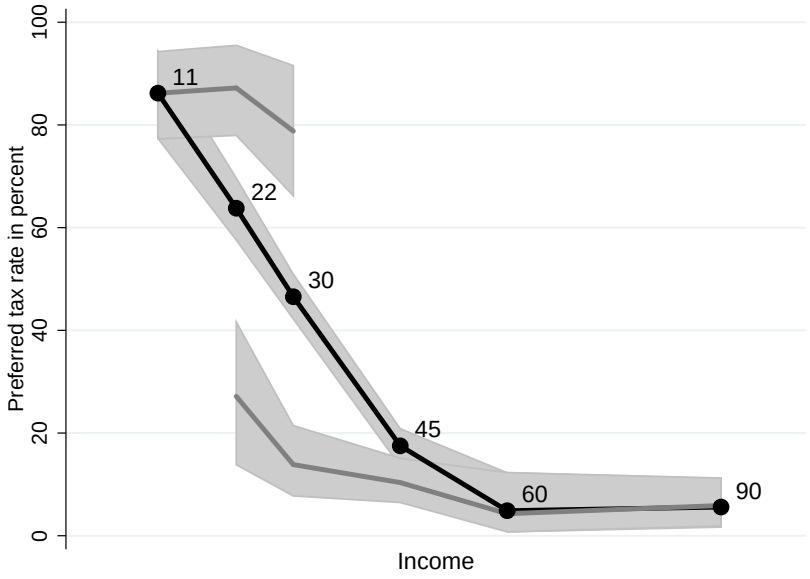
5.1 Willingness to share and income

5.1.1 Preferred tax by level of income

Subjects who are assigned a high income deviate from the payoff-maximizing tax rate of 0% in 65% of the cases; 25% deviate by more than 10%. Those who are assigned a low income do not choose the optimal tax rate of 100% in 63% of the observations, but only 21% deviate by more than 10 percentage points. Disaggregating the deviations from the payoff-maximizing tax by subject reveals that deviations vary within subject. That is, all but two subjects follow the incentivized payoff-maximizing tax rate at least once and all 40 subjects deviate in their preferred tax rate from the payoff-maximizing tax rate by more than 20% at least once.

In terms of preferred tax rate chosen, there is a clear negative correlation between subjects' willingness to redistribute and his/her assigned income. Figure 1 illustrates the downward trend in preferred tax rate when plotted against income.

Figure 1: Preferred tax rate by level of income; 95%-confidence band based on session and subject-clustered bootstrap of mean of preferred tax. The black line represents the estimate based on all observations, the gray line is the estimate when observations on each level of income are separated into those for which 100% is the payoff-maximizing tax rate (poor subjects, gray line at the top) and those for which 0% is the payoff-maximizing tax rate (rich subjects, gray line at the bottom).



Subjects clearly follow the monetary incentive set by the experiment *and base their choice of a preferred tax rate on their assigned income*, providing sufficient evidence to uphold the baseline behavioral expectation (BE-income).

Still, the following sections investigate whether deviations can be systematically accounted for by group diversity and/or minority or majority status. But, first, I will recapitulate some findings of previous laboratory research to see if this experiment reproduces established links between induced income, preferences for redistribution, and covariates like income inequality and inefficiency associated with allocating tax intake.

5.1.2 Payoff-maximizing and behavioral responses to inequality and inefficiency

According to the predictions in Table 2, subjects' choice of a preferred tax rate by level of income varies with inequality and inefficiency. Moreover, their decisions follow behavior that cannot be accounted for by monetary incentives.

In general, there is a positive correlation between preferred tax rate and income inequality; the preferred tax rate averages at 35.5 when the highest income is 60 but rises to 44.9 when the highest

income is 90 (Difference: 9.5, $p < .01$). And, the preferred tax rate drops with increasing inefficiency from 53% when 10% of collected taxes are lost to 44% when 20% are wasted to 24% when half the tax intake vanishes; comparison of means and distribution of preferred tax rates between the three levels of inefficiency implemented in this experiment reveal systematic differences ($p < .01$).

Some of the effects are driven by changed incentives for a subject that is assigned a particular level of income; that is, at the medium level of inefficiency (20% deadweight loss) subjects assigned income level 30 should choose a preferred tax rate of 100% in the low inequality scenario but 0% in the high inequality scenario (See Table 2). Or, with an assigned income level of 22 and 30, subjects should prefer a tax rate of 100% at some levels of inefficiency but not at others.

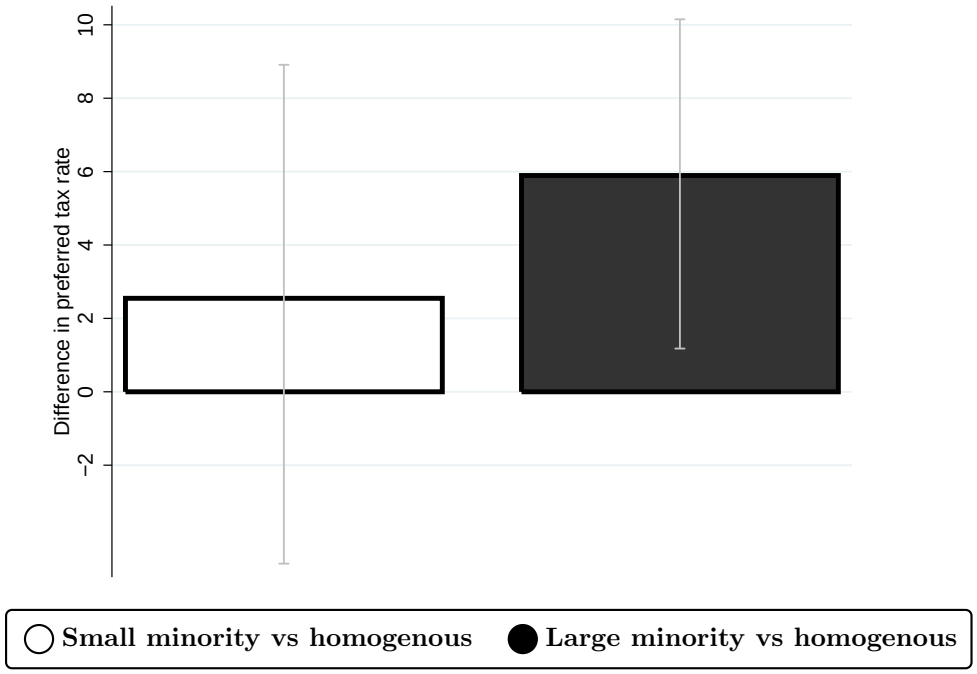
Accounting for those changes in incentives when inequality and/or inefficiency varies, allows me to parse out behavioral responses to inequality and inefficiency. Comparing choices of a preferred tax rate at particular (income,inefficiency)-pairs between low and high levels of inequality should not give any difference in behavior as predicted by the simple model above. If there are systematic differences, they indicate a behavioral response to rising inequality. In line with behavioral expectation *BE-inequality, the preferred tax rate increases with higher levels of inequality*, even though subjects should have no incentive to choose a higher tax rate (Difference in means: 7%, $p < .05$) if they consider monetary incentives alone. To be sure, the change in preferred tax rate between low and high levels of inequality is even starker when such a change is predicted by payoff incentives (Difference in means: 14%, $p < .01$). Following the behavioral expectation *BE-inefficiency, the preferred tax rate decreases with higher levels of inefficiency.* Facing low levels of inefficiency subjects chose a preferred tax rate of 37%, with medium levels they pick 34% on average, and with high levels it is 30%. While those choices do not differ systematically in means, there are slight differences in the distribution of preferred tax rates across levels of inefficiency with a p-value of .19 for the comparison of distributions between low and medium levels and a $p < .10$ for the comparison between medium and high levels.

5.2 Willingness to share and group heterogeneity

5.2.1 Willingness to share with others

By looking at the choices of preferred tax rate across different group compositions (*homogenous*, *small minority*, and *large minority*), it is possible to answer the question of whether preferred tax rates decrease with heterogeneity, as advanced by the literature that motivated this study and is captured by behavioral expectation *BE-inequality*. Figure 2 reveals that, on average, the preferred tax rate increases systematically with increasing heterogeneity. The difference-in-means between homogenous group and a group with a small minority is 2.6% ($p = .34$) and between homogenous group and a group with a large minority is 6% ($p < .01$).

Figure 2: Average treatment effect of group composition from homogenous to a group with a small minority and from homogenous to a group with a large minority on preferred tax rate; 95%-confidence band based on session and subject-clustered bootstrap of the mean of *preferred tax*.



These findings give some support for behavioral expectation *BE-heterogeneity* and indicate an *increase in preferred taxation with increasing group heterogeneity*, which may indicate an increased willingness to share with others when a large minority is present but not when the group is homogenous. Also, the average deviation from an payoff-maximizing tax rate of 0% (rich subjects) is low and slightly increasing with diversity. In homogenous groups it is 8%, in groups with a

small minority it is 10%, and in groups with a large minority it is 12%; the difference-in-means and difference-in-distributions between homogenous group and group with large minority approaches standard levels of significance ($p = .20$). In a regression framework controlling for the level of inequality and inefficiency as well as assigned income gives a systematic marginal effect of increased heterogeneity on the deviation from an payoff-maximizing tax rate of 0%.

In contrast to the average treatment effects presented to this point, the average deviation from the payoff-maximizing tax rate of 100% (poor subjects) decrease from 22% in homogenous to 15% in groups with a large minority ($p < .10$) and remains unchanged in groups with a small minority ($p = .47$). The former treatment effect is robust to controlling for structural covariates – inequality and inefficiency – as well as assigned income. This finding raises questions about the robustness of an increase, on overage, of redistribution when groups become more heterogeneous.

Are there systematically higher choices of a preferred tax rate when moving from a homogenous group to a group with a small minority to a group with a large minority? And, what drives such choices? In fact, comparing differences in means only hides the much larger effect that becomes visible when looking at the average treatment effect while controlling for other covariates; this is true for poor and rich subjects alike. *The marginal effects of moving from a homogenous group to a group with a small minority and of moving to a group with a large minority is estimated as a 10% increase in preferred tax rate for the former and as a 14% for the latter.* This result is robust to controlling for levels of inequality and inefficiency, round-specific effects, payoff consequences of the preferred tax rate for fellow in-group members, and individual-level fixed effects (See Section A.2 in the Appendix for full set of the regression results).

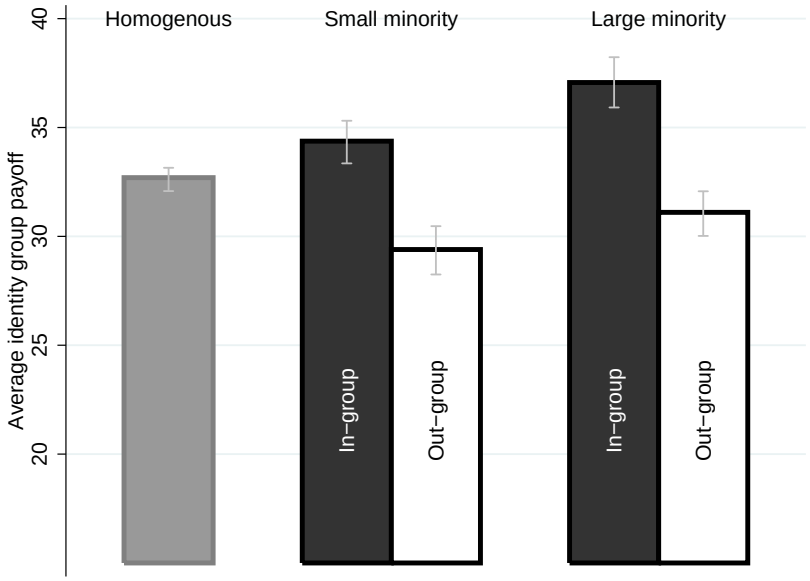
The next section investigates concerns for consequences of an individual subject's choice for the payoffs for fellow in-group members or members of the out-group – other-regarding preferences – and links them to the relationship between preferred tax rate and assigned income. In doing so, it becomes clear why considering who is targeted by redistribution is the crucial factor affecting this relationship and needs to be included in every analysis of treatment effects.

5.2.2 In-group payoffs: A measure of the willingness to share with in-group members?

Preferred levels of taxation and deviations from the payoff-maximizing tax rate are certainly measures of the willingness to share resources with other subjects. In addition, the average payoff to

in-group members and out-group members serves as an appropriate proxy of who is targeted by subjects' allocation choices. To understand why the existence of an out-group, as is the case in groups with a small minority and groups with a large minority, considering payoff consequences for in- and out-group members is essential. In fact, on average, increasing decision group heterogeneity corresponds to increased average in-group payoff (See Figure 3): the payoff rises from 33 tokens in homogenous groups to 34 in groups with small minorities to 37 tokens in groups with a large minority; differences between the three treatments are significant ($p < .01$). The average out-group payoff rises from 29 to 31 tokens.

Figure 3: Average identity group payoff by group composition and target (in-group in all groups and, in addition, out-group in groups with small minority and groups with large minority); 95%-confidence band based on session and subject-clustered bootstrap of the mean of *inGroupPayoff*

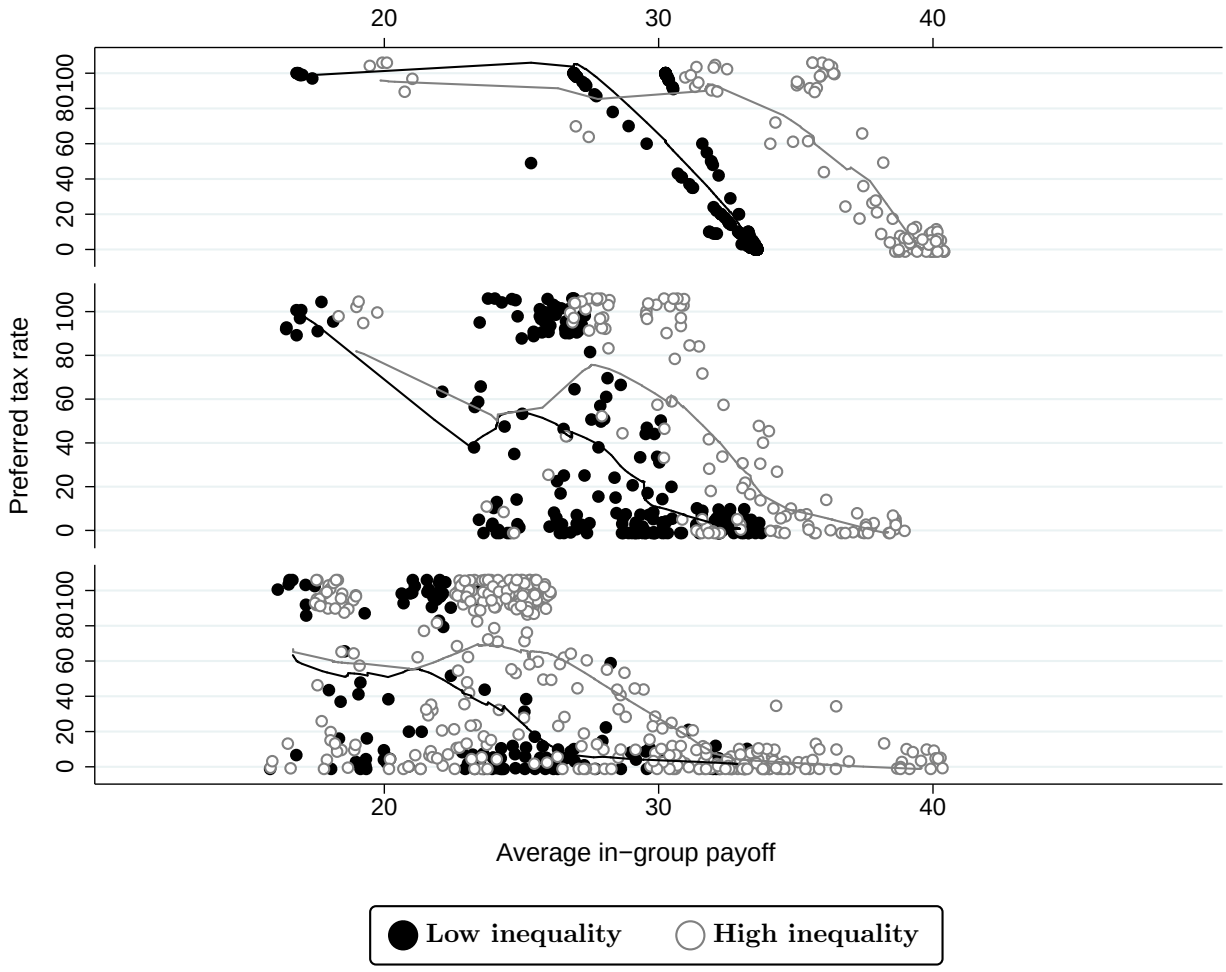


It is important to note, however, that the range of average in-group/out-group payoff values increases with a smaller in-group/out-group – a smaller group means that it may contain only poor or only rich subjects making the feasible values of average in-group payoffs more extreme. Therefore, interpreting the average in- and out-group payoff across group composition-treatment needs to be done with caution. Contrasting the increase with heterogeneity across average in- and out-group payoff at a given group composition is a valid measure, but indicates indistinguishable effects of a more diverse group on in- and out-group payoffs.

Nonetheless, the significance of average in-group payoffs as a measure of willingness to target

fellow in-group members lies in the variation in preferred tax rates that follows from differences in which members benefit from redistribution. There are different mechanical effects for each group composition that affect how tax rates translate into average in-group and out-group payoffs. To get a better grasp on what this transfer looks like, it is first necessary to bring in-group/out-group payoffs on the same range of values by normalizing them to the range present in homogenous groups. Figure 4 gives the realizations of in-group payoffs for each preferred tax rate chosen by group composition on such a normalized range of average in-group payoff values.

Figure 4: Realized in-group payoffs as function of observed preferred tax rate choices; the lines gives the loess estimate of the relationship between the two variables for to levels of income inequality. Note, the range of in-group payoff values for group compositions *small minority* and *large minority* is normalized to equal the range of values in homogenous groups.



In homogenous groups, showing other-regarding preferences means to redistribute less when poor and more when rich. Given the incentives to vote based on income-induced interests, the

negative relationship between preferred tax rate and assigned income seems most pronounced while there is an apparent spread of average in-group payoff values at each preferred tax rate in groups with a small or large minority. However, this is merely an artifact of the experimental design as the preferred tax rates transfer more directly into average payoffs for all subjects in a homogenous decision group solely as a function of the inequality and inefficiency parameters than in a group with a minority where there are numerous combinations of income possible for each group.

The task is to parse which observed preferred tax rates are driven by the simple existence of a non-universal in-group with varying income-characteristics where subjects follow monetary incentives induced by income contingent on inequality and inefficiency parameters. Alternately, it is necessary to determine which observations represent choices driven by other concerns. To make a qualified statement about subjects' willingness to share with in-group members and about the effect of who is targeted by redistribution on allocation choices, a comprehensive model of preferred tax rate choices needs to incorporate the average payoff to in- and out-group while controlling for payoff-maximizing tax rates at a given level of income. I turn to an analysis incorporating these factors in the following subsection.

5.3 Preferred tax rates, income, group payoffs, and willingness to share with in-group members

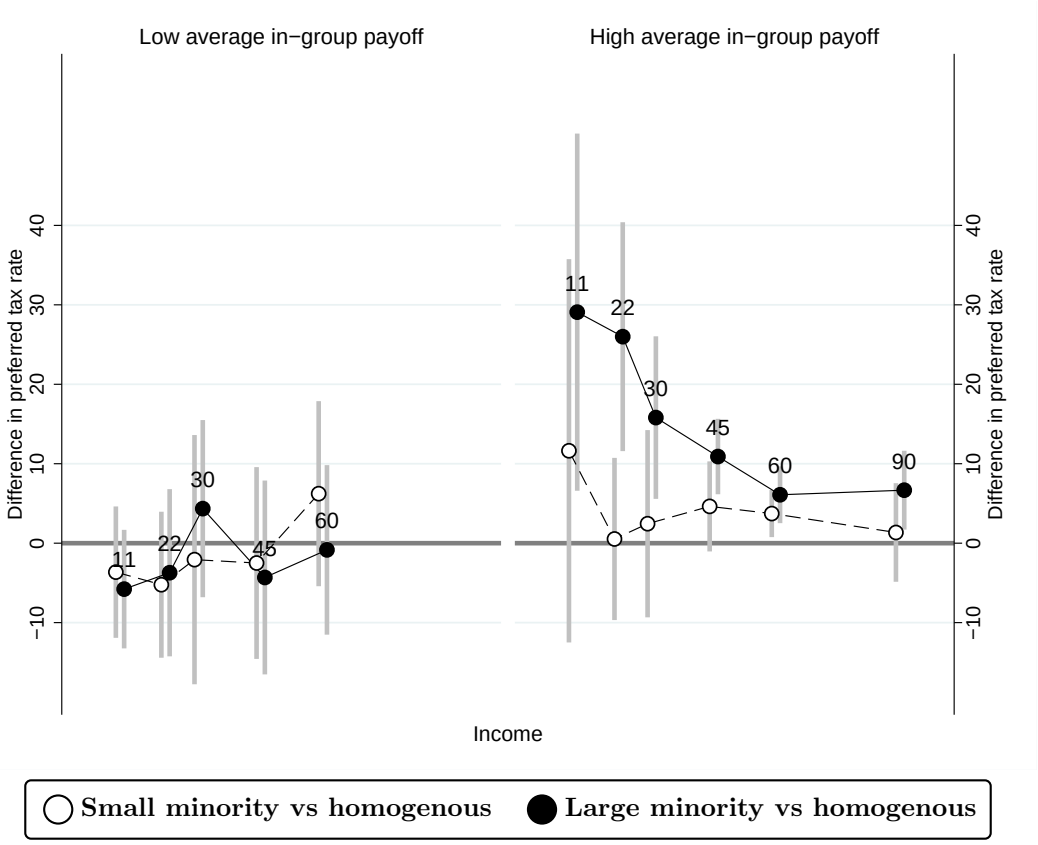
At center of attention surrounding the study of the relationship between group heterogeneity and redistribution is the question of whether increasing group diversity alters the willingness to share and whether the relationship between income and preferred level of redistribution is influenced by variation in group heterogeneity. Thus far, I have established that there is some evidence for a shift towards more redistribution when group composition moves from a homogenous group to a group with a small minority and a further increase when moving to a group with a large minority. To robustly estimate the effect of increasing heterogeneity on the relationship between income and preferred tax rate in the context of this experiment, I need to control for the payoff-maximizing tax rate for a given value of assigned income, for the target of redistribution, approximated by average in-group payoff, and the level of income of the in-group, and for the overall composition of the group, that is whether it is a poor, average income, or rich group.

Figure 5 provides the treatment effect of increasing heterogeneity on preferred tax rates based

on a regression of preferred tax rate on income, payoff-maximizing tax rate, average in-group payoff, and the proportion of rich subjects in the in-group, all interacted with the treatment variable *group composition*.[10] The estimates are the predicted difference between preferred tax rates in groups with a small minority and in homogenous groups (white markers) and between in-groups with a large minority and in homogenous groups (black markers). The presented estimation sheds light on multiple aspects of subjects' choices: (1) It could reveal for which income group(s) the effect of increasing group heterogeneity on the relationship between income and preferred tax rates is strongest; (2) it could provide evidence whether increasing group heterogeneity has a monotonic or non-monotonic effect on the relationship between income and preferred tax rates; and, (3) it could demonstrate how average in-group payoff – the question which group is targeted by redistributive allocations – affects the relationship between income and preferred tax rates.

[10] I dropped all observations on the minority in small minority groups for this analysis; average in-group payoff and the proportion of rich subjects in the in-group are pre-determined by one subject's income in the small minority and therefore do not add variation, but instead gives the illusion of a higher number of observations than actually exists.

Figure 5: Predicted average treatment effect of group heterogeneity (*group composition*) on preferred tax rate. Estimates are based on a regression of preferred tax rate on income, payoff-maximizing tax rate, average in-group payoff, and the proportion of rich subjects in the in-group, all interacted with the treatment variable *group composition*.



I find that when average in-group payoffs are low, there is no difference in preferred tax rate at any level of income between homogenous groups, groups with a small minority, and groups with a large minority. When average in-group payoffs are high, however, increased group diversity is predicted to produce more choices of high preferred tax rates. The average treatment effect of moving from a homogenous group to a group with a large majority ranges from 29% at an assigned income of 11 to 7% at an assigned income of 60 and is systematic for all levels of income. The difference between homogenous groups and groups with small minorities is much smaller but with a tendency towards increased preferred tax rates as well. *With increasing group heterogeneity, subjects prefer higher levels of redistribution only when they are able to target fellow in-group members.*

5.4 Subject-level behavior

While many subjects behave selfishly and rarely deviate from the payoff-maximizing tax rate, I have demonstrated that there is a sufficient amount of subject choices that impose costs on the individual but benefit others; this is particularly true when the individual subject shares a group identity with the others.

At the subject level, we want to know whether individuals are less likely to behave selfishly when they are in a group with a small or large minority than when they are in a homogenous group. When selfish behavior is defined as a choice of preferred tax rate that equals the payoff-maximizing tax plus/minus 5% and requires that a selfish subject consistently follows such behavior, the results reveal that 25% of subjects in homogenous groups are selfish, 13% of subjects in groups with small minorities behave selfishly, and 15% of subjects are selfish in groups with large minorities. Increasing the error-margin to define selfish behavior to 20% increases those numbers to 33%, 45%, and 45%, respectively. None of the subjects chooses selfishly under all of the group composition treatment-conditions at either of the margins of error.

Estimating average treatment effects of increasing group heterogeneity on the relationship between assigned income and preferred tax rates for selfish and unselfish subjects separately reveals that the definition of selfishness is robust with findings from previous sections. As expected, there is no average treatment effect of group heterogeneity on preferred tax rates – controlling for income, average in-group payoff, and proportion of rich subjects in the in-group – for selfish subjects ($p = .55$ for the comparison of preferred tax rate choices in homogenous groups and groups with a small minority and $p = .95$ for the one between homogenous groups and groups with a large minority); these results are derived from the same regression estimated in Subsection 5.3 with an additional interaction with being a selfish subject (at an error margin of 5%). Subjects not consistently exhibiting selfish behavior react quite similarly to the group composition treatment as presented above: controlling for appropriate covariates only yields an increase in preferred tax rate of 1.2% when moving from homogenous groups to groups a small minority ($p = .62$) but an increase of 7% when comparing homogenous groups and groups with a large minority ($p < .01$).

6 Discussion

This experiment varied the composition of decision groups in which subjects are asked to make redistributive allocation choices. It primed the consequences of a subject's behavior for other subjects in that group by the income of other subjects as well as the payoff consequences for the in- and out-group of a particular subject. Subjects were asked to choose their preferred tax rate employing a slider and were shown payoff consequences (See Appendix Section B.3). The manipulation was intended to clearly demonstrate what the payoff-maximizing tax rate is for each subject given the assigned income, but also to make salient that those choices are not made in isolation and have payoff consequences for the other subjects at both the individual level and at the identity group level. Which mechanism may explain how these manipulations generate the finding of increased willingness to share with in-group members when decision group heterogeneity rises?

We know from social psychology, economics, and cognitive sciences that creating in- and out-groups is sufficient to create intergroup competition (Brewer, 1979; Erev, Bornstein and Galili, 1993; Esses, Jackson and Armstrong, 1998; Bornstein, Gneezy and Nagel, 2002). The mere existence of an out-group may have primed subjects, on the margins, to value better performance of in-group members in contrast to out-group members. The best indicator of doing well is the average in- and out-group payoff; the influence of this indicator on preferred tax rates is clearly visible (See results presented in Subsection 5.3). Unfortunately, in my experiment there is no way to separate such an effect of more salient intergroup competition from blunt in-group favoritism, which has been shown to exist in many social interactions even in the artificial environment of an experimental laboratory (Tajfel, 1981; Tajfel and Turner, 1986; Andreoni, 1989; Goette, Huffman and Meier, 2006; Bernhard, Fehr and Fischbacher, 2006; Chen and Li, 2009; Landa and Duell, 2014).

Testing the behavioral expectation *BE-in-group-bias* requires accounting for the confounding influence of group conflict to parse out beneficial treatment toward fellow in-group members driven by a simple feeling of warm glow when doing so. The comparison between average in- and out-group payoffs provides a weak measure to speak to the distinction of the two rationales behind treating fellow in-group members more favorably than out-group members. Figure 3 illustrates that while in-group payoffs increase with group heterogeneity, out-group payoffs did not decrease. This is evidence against what I termed *BE-out-group-hate*, which is the expectation that increased group

heterogeneity should increase the willingness to mistreat others with whom the individual subject does not share a group identity. Out-group hate should be a consideration when subjects grow more competitive, but need not be on the minds of subjects as the flip side to in-group biased choices. In other words, in-group love can exist without out-group hate as a companion (Brewer, 1999; Halevy, Bornstein and Lilach, 2008).

Increased competitiveness could also be indicated by a more pronounced relationship between the status of the in-group, in contrast to the out-group, in terms of average or total income. My experiment provides evidence that subjects who are assigned a low income – an income with payoff-maximizing tax rate 100% – choose lower preferred tax rates when the in-group has more rich than poor subjects. This negative relationship holds true at all levels of group heterogeneity but is most systematic in groups with a large minority; the most robust regression from section 5.3 predicts a decrease in preferred tax rate of 13% when comparing the choices of poor subjects in a rich in-group versus those in poor in-groups. Notably, there is no such effect for rich subjects.

Further, the revealed treatment effect does not vanish when controlling for the history of play or learning effects; that is, including period-dummies, variables capturing the history of play, or temporal effects in the regression models error structure does not change the estimates presented in this paper. Unlike previous studies, I can therefore rule out that a norm of reciprocity has an effect on the the displayed behavior that clearly favors the in-group, which guides subjects' behavior in many experimental interactions even when they do not share a social history (Berg, Dickhaut and McCabe, 1995).

Finally, considering the effect of inducing minimal identity groups instead of priming social groups that exist in reality, in-group bias could be interpreted not only as a preference for favoring in-group over out-group members, but also as activated norms of in-group favoritism that are optimal because they sustain future cooperation and are established by past positive experiences outside of the laboratory (in line with Habyarimana et al. (2007)). Insofar as weak identities serve to prime residual out-of-the-lab group experiences, they do so in a way that allows subjects to self-select from such experiences those that seem to them most relevant to the group experience modeled in the lab – something the researcher cannot herself do for the subjects. The explicit communication of induced social identities to subjects and the priming of intergroup comparisons means that subjects' behavior is likely to reflect both the automatic responses to identity as well as

subjects' perceptions about what the proper response to social identities should be. The identity-related behavior characterized in this paper should, thus, be interpreted as reflecting the subject's bundle of attitudes to social identity. In the world outside the lab, on top of those attitudinal effects of identity, there are surely others. It is a measure of how subjects perceive identity without additional explicit payoff pressures.

7 Conclusion

This paper presented an laboratory experimental study that aimed to provide evidence to answer two questions: (1) how much are subjects willing to share with other subjects in a redistributive environment when sharing is costly to them? and, (2) is the amount they are willing to share contingent on in-group status of welfare recipients and the level of group diversity? The experimental design establishes a counterfactual environment to making allocation decisions in a heterogenous group: choosing redistributive allocations in a homogenous group in which gains for one's own group do not directly translate into losses for the other group, but where the individual is still aware of the fact that an in-group exists and feels attachment to this group. I find that that preferences for redistribution do not necessarily decrease in group heterogeneity, but that, independent of assigned income, subjects choose higher tax rates when they are able to benefit fellow in-group members with their redistributive allocations.

The finding that higher group heterogeneity increases the level of redistribution may seem surprising at first. The only conclusion we can confidently draw from the behavioral patterns established in the laboratory is that at a particular distribution of income, at a particular relative level of income of interacting individuals, and at a particular distribution of income across in- and out-group, individuals have the desire to share with fellow in-group members. And yet, the experimental results from this study provide evidence to support the more general claim that when group concerns are salient and competition is primed, individuals' willingness to share with other in-group members increases when the redistributive allocation is able to specifically target those in-group members. What is special about this finding – in light of the fact that various observational and experimental studies demonstrate that the targetability of welfare state benefits is an important determinant of individuals' attitudes and behavior – is the fact that heterogenous groups of people

provide the breeding ground for the consideration of the concerns of fellow in-group members. It need not be the case that we see high levels of redistribution only in rather homogenous societies because welfare state policies are most likely to target in-group members. In such societies where intergroup conflicts are not as salient, redistributive conflicts driven by the income distribution should be prevalent and whether the societal level of redistribution is high or low will be determined by the exact shape of that income distribution. Extrapolating from my account of the mechanism between group heterogeneity, income, and preferred taxation, high levels of redistribution may arise especially in societies that are diverse when policies can be targeted to particular groups.

The presented experiment features at least one major weakness. The design aimed to set an extremely obvious payoff-maximizing choice which biased results against any influence other-regarding preferences produced by variation in group heterogeneity on individuals' willingness to share. Given that I still find systematic and not unsubstantial differences between subjects interactions in homogenous groups, in groups with small minorities, and groups with large minorities, is even more surprising and should raise confidence in the presented results. Results from previous research do not agree on whether social preferences – i.e., altruism and inequality aversion – actually exists in subjects' minds when making decision in games with redistributive allocation choices. In particular, recent work by (Agranov and Palfrey, 2014) claims that endogenizing labor market outcomes and the political process when eliciting individuals' preferences for redistribution provides no evidence for prevalent social preferences. Conversely, this study points to the important role in-group favoritism, or at least choices driven by intergroup competition, plays in accounting for deviation from income-driven preferences for redistribution.

There is a broad range of interesting extensions that stem from the presented experiment. One could put the established covariates determining the prevalence of social preference in individuals' decision-making to the test. Individuals tend to contribute more to a common good when their choices are not anonymous and interactions are repeated, when the individual is sometimes at the giving and sometimes at the receiving end, and when sanctioning mechanism are in place (Fehr and Gächter, 2000; Milinski, Semmann and Krambeck, 2002; Fehr and Fischbacher, 2003; Haley and Fessler, 2005). This experiment elicits individuals' giving behavior only but does not consider how attitudes and behavior would change when subjects would have the opportunity to evaluate and sanction other subjects' allocation decisions. Variation in group heterogeneity, in-group favoritism,

and the competition between in- and out-group will have a substantial effect on behavior through peer pressure (Masclet et al., 2003), the salience of group norms (Akerlof and Kranton, 2000, 2010), or the substitutability of relatedness with punishment for violation of group norms (Bowles and Gintis, 2004).

References

Ackert, Lucy F, Jorge Martinez-Vazquez and Mark Rider. 2007. "Social preferences and tax policy design: some experimental evidence." *Economic Inquiry* 45(3):487–501.

Agranov, Marina and Thomas R Palfrey. 2014. Equilibrium Tax Rates and Income Redistribution: A Laboratory Study. Technical report.

Akerlof, George and Rachel Kranton. 2000. "Economics and Identity." *Quarterly Journal of Economics* 115(3):715–53.

Akerlof, George and Rachel Kranton. 2010. *Identity Economics*. Princeton: Princeton University Press.

Alesina, Alberto and Edward Glaeser. 2004. *Fighting Poverty in the U.S. and Europe. A World of Difference*. Oxford: Oxford University Press.

Alesina, Alberto, Edward Glaeser and Bruce Sacerdote. 2001. "Why Doesn't the United States Have a European-Style Welfare State?" *Brookings Papers on Economic Activity* pp. 187–254.

Alesina, Alberto, Reza Baqir and William Easterly. 1999. "Public goods and ethnic divisions." *The Quarterly Journal of Economics* 114(4):1243–1284.

Alesina, Alberto, Reza Baqir and William Easterly. 2000. "Redistributive public employment." *Journal of Urban Economics* 48(2):219–241.

Andreoni, James. 1989. "Giving with Impure Altruism: Applications to Charity and Ricardian Equivalence." *Journal of Political Economy* 97(6):1447–58.

Berg, Joyce, John Dickhaut and Kevin McCabe. 1995. "Trust, reciprocity, and social history." *Games and economic behavior* 10(1):122–142.

Bernhard, Helen, Ernst Fehr and Urs Fischbacher. 2006. "Group Affiliation and Altruistic Norm Enforcement." *American Economic Review* 96(2):217–21.

Billig, Michael and Henri Tajfel. 1973. "Social categorization and similarity in intergroup behaviour." *European Journal of Social Psychology* 3(1):27–52.

Bolton, Gary E and Axel Ockenfels. 2006. "Inequality aversion, efficiency, and maximin preferences in simple distribution experiments: comment." *The American economic review* 96(5):1906–1911.

Bornstein, Gary, Uri Gneezy and Rosmarie Nagel. 2002. "The effect of intergroup competition on group coordination: An experimental study." *Games and Economic Behavior* 41(1):1–25.

Bouckaert, Jan and Geert Dhaene. 2004. "Inter-ethnic trust and reciprocity: results of an experiment with small businessmen." *European Journal of Political Economy* 20(4):869–886.

Bowles, Samuel and Herbert Gintis. 2004. "The evolution of strong reciprocity: cooperation in heterogeneous populations." *Theoretical population biology* 65(1):17–28.

Brewer, Marilynn. 1979. "In-group Bias in the Minimal Intergroup Situation: A Cognitive-Motivational Analysis." *Psychological Bulletin* 86:307–24.

Brewer, Marilynn. 1999. "The Psychology of Prejudice: Ingroup Love or Outgroup Hate?" *Journal of Social Issues* 55(3):429–44.

Chandra, Kanchan. 2012. *Constructivist theories of ethnic politics*. Oxford University Press.

Charness, Gary, Luca Rigotti and Aldo Rustichini. 2007. "Individual Behavior and Group Membership." *American Economic Review* 97(4):1340–52.

Chen, Roy and Yan Chen. 2011. "The Potential of Social Identity for Equilibrium Selection." *American Economic Review* 101(6):2562–89.

Chen, Yan and Sherry Li. 2009. "Group Identity and Social Preferences." *American Economic Review* 99(1):431–57.

Cutler, DM, DW Elmendorf and RJ Zeckhauser. 1993. "Demographic characteristics and the public bundle." *Public Finance* 48:178–98.

Durante, Ruben, Louis Putterman and Joël van der Weele. 2013. "Preferences for Redistribution and Perception of Fairness: An Experimental Study.".

Eckel, Catherine C and Philip J Grossman. 1996*a*. "Altruism in anonymous dictator games." *Games and economic behavior* 16(2):181–191.

Eckel, Catherine C and Philip J Grossman. 1996*b*. "The relative price of fairness: Gender differences in a punishment game." *Journal of Economic Behavior & Organization* 30(2):143–158.

Eckel, Catherine and Philip Grossman. 2005. "Managing Diversity by Creating Team Identity." *Journal of Economic Behavior Organization* 58:371–392.

Engelmann, Dirk and Martin Strobel. 2004. "Inequality aversion, efficiency, and maximin preferences in simple distribution experiments." *The American Economic Review* 94(4):857–869.

Erev, Ido, Gary Bornstein and Rachely Galili. 1993. "Constructive intergroup competition as a solution to the free rider problem: A field experiment." *Journal of Experimental Social Psychology* 29(6):463–478.

Esses, Victoria M, Lynne M Jackson and Tamara L Armstrong. 1998. "Intergroup competition and attitudes toward immigrants and immigration: An instrumental model of group conflict." *Journal of Social Issues* 54(4):699–724.

Feddersen, Timothy, Sean Gailmard and Alvaro Sandroni. 2009. "Moral bias in large elections: theory and experimental evidence." *American Political Science Review* 103(02):175–192.

Fehr, Ernst and Simon Gächter. 2000. "Cooperation and Punishment in Public Goods Experiments." *The American Economic Review* 90(4):980–994.

Fehr, Ernst and Urs Fischbacher. 2003. "The nature of human altruism." *Nature* 425(6960):785–791.

Fershtman, Chaim and Uri Gneezy. 2001. "Discrimination in a segmented society: An experimental approach." *The Quarterly Journal of Economics* 116(1):351–377.

Finseraas, Henning. 2008. "Immigration and preferences for redistribution: An empirical analysis of European survey data." *Comparative European Politics* 6(4):407–431.

Fischbacher, Urs. 2007. "z-Tree: Zurich Toolbox for Ready-made Economic Experiments." *Experimental Economic* 10(2):171–178.

Fong, Christina M and Erzo FP Luttmer. 2009. "What determines giving to Hurricane Katrina victims? Experimental evidence on racial group loyalty." *American Economic Journal: Applied Economics* 1(2):64.

Forsythe, Robert, Joel Horowitz, N. Savin and Martin Sefton. 1994. "Fairness in Simple Bargaining Experiments." *Games and Economic Behavior* 6:347–69.

Gerdes, Christer. 2011. "The impact of immigration on the size of government: Empirical evidence from Danish municipalities." *The Scandinavian Journal of Economics* 113(1):74–92.

Gilens, Martin. 1995. "Racial attitudes and opposition to welfare." *The Journal of Politics* 57(04):994–1014.

Gilens, Martin. 1996. ""Race Coding" and White Opposition to Welfare." *American Political Science Review* pp. 593–604.

Gilens, Martin. 2009. *Why Americans hate welfare: Race, media, and the politics of antipoverty policy*. University of Chicago Press.

Glaeser, Edward L, David I Laibson, Jose A Scheinkman and Christine L Soutter. 2000. "Measuring trust." *The Quarterly Journal of Economics* 115(3):811–846.

Goette, Lorenz, David Huffman and Stephan Meier. 2006. "The Impact of Group Membership on Cooperation and Norm Enforcement: Evidence Using Random Assignment to Real Social Groups." *American Economic Review* 96(2):212–6.

Goette, Lorenz, David Huffman and Stephan Meier. 2012. "The Impact of Social Ties on Group Interactions: Evidence from Minimal Groups and Randomly Assigned Real Groups." *American Economic Journal: Microeconomics* 4(1):101–15.

Habyarimana, James, Macartan Humphreys, Daniel N Posner and Jeremy M Weinstein. 2007. "Why does ethnic diversity undermine public goods provision?" *American Political Science Review* 101(04):709–725.

Haile, Daniel, Abdolkarim Sadrieh and Harrie AA Verbon. 2008. "Cross-racial envy and underinvestment in South African partnerships." *Cambridge Journal of Economics* 32(5):703–724.

Halevy, Nir, Gary Bornstein and Sagiv Lilach. 2008. ""In-Group Love" and "Out-Group Hate" as Motives for Individual Participation in Intergroup Conflict : A New Game Paradigm." *Psychological Science* 19(4):405–11.

Haley, Kevin J and Daniel MT Fessler. 2005. "Nobody's watching?: Subtle cues affect generosity in an anonymous economic game." *Evolution and Human behavior* 26(3):245–256.

Harrison, Glenn W and Laurie T Johnson. 2006. "Identifying altruism in the laboratory." *Research in experimental economics* 11:177–223.

Höchtl, Wolfgang, Rupert Sausgruber and Jean-Robert Tyran. 2012. "Inequality aversion and voting on redistribution." *European economic review* .

Hoffman, Elizabeth, Kevin McCabe and Vernon L Smith. 1996. "Social distance and other-regarding behavior in dictator games." *The American Economic Review* pp. 653–660.

Hopkins, Daniel J. 2011. "The limited local impacts of ethnic and racial diversity." *American Politics Research* 39(2):344–379.

James, Estelle. 1993. "Why do different countries choose a different public-private mix of educational services?" *Journal of Human resources* pp. 571–592.

Knack, Stephen and Philip Keefer. 1997. "Does social capital have an economic payoff? A cross-country investigation." *The Quarterly journal of economics* 112(4):1251–1288.

Kuijs, Louis. 2000. *The impact of ethnic heterogeneity on the quantity and quality of public spending*. International Monetary Fund.

Landa, Dimitri and Dominik Duell. 2014. "Social Identity and Electoral Accountability." *American Journal of Political Science* forthcoming.

Lind, Jo Thori. 2007. "Fractionalization and the size of government." *Journal of Public Economics* 91(1):51–76.

Luttmer, Erzo. 2001. "Group Loyalty and the Taste for Redistribution." *Journal of Political Economy* 109(3):500–28.

Masclet, David, Charles Noussair, Steven Tucker and Marie-Claire Villeval. 2003. "Monetary and nonmonetary punishment in the voluntary contributions mechanism." *American Economic Review* pp. 366–380.

McLeish, Kendra and Robert Oxoby. 2007. "Identity, Cooperation, and Punishment." IZA Discussion Paper No. 2572.

Milinski, Manfred, Dirk Semmann and Hans-Jürgen Krambeck. 2002. "Reputation helps solve the 'tragedy of the commons'." *Nature* 415(6870):424–426.

Mueller, Dennis C and Peter Murrell. 1986. "Interest groups and the size of government." *Public Choice* 48(2):125–145.

Posner, Daniel N. 2004. "Measuring ethnic fractionalization in Africa." *American journal of political science* 48(4):849–863.

Senik, Claudia, Holger Stichnoth and Karine Van der Straeten. 2009. "Immigration and natives' attitudes towards the welfare state: evidence from the European Social Survey." *Social indicators research* 91(3):345–370.

Shayo, Moses and Alon Harel. 2012. "Non-consequentialist voting." *Journal of Economic Behavior & Organization* 81(1):299–313.

Soroka, Stuart, Keith Banting and Richard Johnston. 2006. Immigration and redistribution in a global era. In *Globalization and egalitarian redistribution*. Princeton University Press Princeton, NJ chapter 10, pp. 261–88.

Stichnoth, Holger. 2012. "Does immigration weaken natives' support for the unemployed? Evidence from Germany." *Public Choice* 151(3-4):631–654.

Stichnoth, Holger and Karine Van der Straeten. 2011. "Ethnic diversity, public spending, and individual support for the welfare state: A review of the empirical literature." *Journal of Economic Surveys* .

Taijfel, H. 1970. "Experiments in intergroup discrimination." *Scientific American* 223(5):96.

Tajfel, Henri. 1981. *Human Groups and Social Categories*. Cambridge: Cambridge University Press.

Tajfel, Henri and John Turner. 1986. The Social Identity Theory of Intergroup Behavior. In *The Psychology of Intergroup Relations*, ed. Stephen Worchel and William Austin. Chicago: Nelson-Hall pp. 7–24.

Tajfel, Henri, Michael Billig, R. Bundy and Claude Flament. 1971. "Social Categorization and Inter-group Behavior." *European Journal of Social Psychology* 1:149–77.

Tyran, Jean-Robert. 2004. "Voting when money and morals conflict: an experimental test of expressive voting." *Journal of Public Economics* 88(7):1645–1664.

Tyran, Jean-Robert and Rupert Sausgruber. 2006. "A little fairness may induce a lot of redistribution in democracy." *European Economic Review* 50(2):469–485.

A Statistical appendix

A.1 Summary statistics

Table A.3: Summary statistics of main variables by treatment

		Main treatments Mean (SD)	Min	Max
income		36.6 (23.2)	11	90
preferred tax	All	40.1 (43.8)	0	100
	11	84.3 (30.6)	0	100
	22	60.4 (43.2)	0	100
	30	39.6 (42.0)	0	100
	45	11.6 (20.9)	0	100
	60	4.4 (10.5)	0	49
	90	5.8 (14.4)	0	67
applied tax		41.2 (43.8)	1	100
round payoff	All	33.4 (17.2)	10	99
	11	18.5 (9.0)	10	36
	22	25.0 (5.0)	17	36
	30	29.1 (3.5)	17	36
	45	38.5 (7.5)	17	36
	60	47.6 (14.8)	17	48
	90	63.3 (25.4)	20	99
Number of Observations		1200		
Number of Subjects		40		

A.2 Average treatment effect of group composition on preferred tax rate

The most comprehensive model of preferred tax rate would include structural factors like *group composition* (Treatment), *inequality*, and *inefficiency*, payoff consequences of the chosen preferred tax rates for fellow in-group members (*average in-group payoff*), as well as the interactions of the treatment variable with all the other factors; it would allow for temporal effects, individual-level effects, and censoring. Table A.4 demonstrates that the significant treatment effect of group composition on preferred tax rate remains largely the same across estimators, error structures, and model specifications.

Table A.4: Average treatment effect of group composition on preferred tax rate

Model	1	2	3	4	5	6
Small minority	10.32	10.32	14.25	14.83	11.52	11.22
	(2.39)	(2.60)	(4.05)	(4.50)	(2.66)	(2.54)
Large minority	14.06	14.06	20.70	19.38	14.41	13.87
	(2.37)	(2.96)	(4.35)	(5.70)	(3.47)	(3.27)
Estimator						
Least squares	x	x				
Censored mle			x	x		
Fixed effects					x	
Random effects						x
Censored random effects						
First differenced						
Allowed error structure						
iid	x	x	x	x	x	x
heteroscedastic		x	x	x	x	x
serially correlated		x	x	x		x
correlated with individual-level effect					x	
Model specification						
Inequality and inefficiency	x	x	x	x	x	x
In-group payoff consequences	x	x	x	x	x	x
Interactions	x	x	x	x	x	x
Temporal effect				x	x	x
Individual effect					x	x

Model	Estimator	Notes
1	Pooled OLS	Coefficient estimates are consistent when the pooled idiosyncratic errors are uncorrelated with the regressors (iid).
2	Pooled OLS with clustered errors	Errors may be correlated over time for a given subject so adjustment for clustering is appropriate.
3	Pooled Tobit	*choice 1* may be censored from below at 5 and from above at 20.
4	Pooled Tobit with round-dummies	Particular rounds of play may have an effect on behavior.
5	Fixed Effects	Individual-level effects may exist; a robust Hausman test suggests that the Fixed Effects is preferable
6	Random Effects	

B Experimental design

B.1 Distribution of identity groups and game parameters by round

Round	Group composition (out of 8 groups)	Inequality	Inefficiency
1	6 small minority, 2 large minority	High	Medium
2	8 large minority	High	High
3	6 small minority, 2 large minority	High	High
4	6 homogenous, 2 small minority	Low	Medium
5	6 small minority, 2 large minority	Low	Medium
6	6 homogenous, 2 small minority	Low	Medium
7	6 small minority, 2 large minority	High	Medium
8	6 homogenous, 2 small minority	Low	Low
9	6 homogenous, 2 small minority	High	Low
10	8 large minority	Low	Medium
11	8 large minority	High	Medium
12	6 homogenous, 2 small minority	Low	Medium
13	6 homogenous, 2 small minority	High	Medium
14	8 large minority	High	Low
15	6 small minority, 2 large minority	Low	Low
16	8 large minority	High	Medium
17	6 homogenous, 2 small minority	Low	Low
18	6 small minority, 2 large minority	Low	Low
19	6 small minority, 2 large minority	Low	High
20	8 large minority	High	Low
21	8 large minority	High	Low
22	6 small minority, 2 large minority	Low	Low
23	6 homogenous, 2 small minority	Low	High
24	6 small minority, 2 large minority	Low	High
25	8 large minority	High	High
26	6 homogenous, 2 small minority	Low	High
27	6 homogenous, 2 small minority	High	High
28	8 large minority	Low	High
29	8 large minority	High	High
30	6 small minority, 2 large minority	High	Low

B.2 Experimental instructions

Einleitung
Dies ist ein Experiment über Entscheidungsverhalten in Gruppen. In diesem Experiment werden Sie eine Reihe an Entscheidungen zu treffen haben. Am Ende des Experiments werden Sie abhängig von Ihren Entscheidungen und von denen anderer Teilnehmer bezahlt. Wenn Sie der Anleitung aufmerksam folgen und entsprechende Entscheidungen treffen, können Sie bis zu 20 Euro verdienen. Während des Experiments werden Ihre Einnahmen in *Punkten* angegeben und am Ende des Experiments in Euro umgerechnet.

Dieses Experiment besteht aus zwei Teilen. Ihr Verdienst besteht aus einer Teilnahmeentschädigung in Höhe von 5 Euro und Ihren Einnahmen, die Sie in den jeweiligen Teilen des Experiments erzielen. Wir beginnen mit einer kurzen Einleitungsphase und Teil 1 des Experiments. Danach erhalten Sie eine weitere Anleitung für Teil 2 des Experiments. Falls Sie Fragen bezüglich der Anleitung haben, heben Sie bitte Ihre Hand. Nachdem ich die Anleitung verlesen habe, werde ich zu Ihnen kommen und Ihre Frage beantworten. Falls Sie Fragen während des Experiments haben, heben Sie bitte ebenfalls Ihre Hand.

Teil 1
Zuweisung zu Malergruppen
In Teil 1 des Experiments werden Sie fünf Paare von Bildern zweier Künstler, Paul Klee und Wassily Kandinsky, sehen. Sie werden für jedes Paar gefragt, welches der beiden Bilder Sie bevorzugen und basierend auf Ihren Präferenzen entweder als Mitglied der "KLEEs" (ein " KLEE" in Kurzform) oder als Mitglied der "KANDINSKYs" (ein "KANDINSKY" in Kurzform) kategorisiert und einzeln über diese Klassifizierung informiert. Ihre Identität als KLEE oder KANDINSKY und die Identitäten aller anderen Teilnehmer bleiben für das gesamte Experiment, also in Teil 1 und Teil 2, bestehen.

Sie werden dann in einem Quiz gebeten den Maler (Klee oder Kandinsky) von fünf weiteren Gemälden zu benennen. Für jedes dieser Gemälde können Sie zwei Antworten abgeben; zum einen Ihren Tipp und zum anderen Ihre endgültige Antwort. Nachdem Sie einen Tipp abgegeben haben, haben Sie die Gelegenheit Tipps anderer KLEEs, wenn Sie selbst ein KLEE sind, oder Tipps anderer KANDINSKYs, wenn Sie selbst ein KANDINKSY sind, zu sehen und danach die Gelegenheit Ihre getippte Antwort zu ändern, bevor Sie Ihre endgültige Antwort abgeben.

Nehmen wir an, Sie sind ein KLEE und mindestens die Hälfte aller KLEEs gibt die richtige endgültige Antwort, dann erhalten Sie und alle anderen KLEEs 8 Punkte unabhängig davon, ob Ihre eigene endgültige Antwort richtig oder falsch war. Das gleiche gilt für den Fall, dass Sie ein KANDINSKY sind und mindestens die Hälfte aller KANDINSKYs die richtige Antwort gibt. Dann erhalten Sie und alle anderen KANDINSKYs 8 Punkte unabhängig davon, ob Ihre eigene entgültige Antwort richtig oder falsch war. Wenn Sie ein KLEE sind und mindestens die Hälfte aller KLEEs jedoch eine falsche Antwort gibt, dann erhalten Sie und alle anderen KLEEs 0 Punkte unabhängig davon, ob Ihre eigene endgültige Antwort richtig oder falsch war. Das gleiche gilt, wenn Sie ein KANDINSKY sind und mindestens die Hälfte aller KANDINSKYs eine falsche Antwort gibt, dann erhalten Sie und alle anderen KANDINSKYs 0 Punkte unabhängig davon, ob Ihre eigene endgültige Antwort richtig oder falsch war.

Des Weiteren, wenn Sie ein KLEE sind und Sie und die anderen KLEEs mehr richtige Antworten

über alle fünf Quizfragen hinweg geben als die KANDINSKYs, dann erhalten Sie und allen anderen KLEEs 8 zusätzliche Punkte. Wenn Sie ein KANDINSKY sind und Sie und die anderen KANDINSKYs mehr richtige Antworten über alle fünf Quizfragen hinweg geben als die KLEEs, dann erhalten Sie und alle anderen KANDINSKYs die zusätzlichen 8 Punkte.

Wir werden nun Teil 1 des Experiments durchführen. Nachdem Teil 1 beendet ist, erhalten Sie weitere Anleitung für Teil 2 des Experiments.

Teil 2
Wir fahren nun mit Teil 2 des Experiments fort. Teil 2 besteht aus **30** Runden.

Einteilung in Entscheidungsgruppen
Zu Beginn jeder Runde des Experiments werden Sie zufällig in Gruppen von **fünf** Teilnehmern eingeteilt. Wir werden diese Gruppen als Ihre *Entscheidungsgruppe* bezeichnen. Am Beginn der nächsten Runde werden Sie einer anderen Gruppe zufällig zugeteilt. Alle Interaktionen zwischen Ihnen und den anderen Teilnehmern sind anonym und werden über Computer durchgeführt, somit wissen Sie nicht, welche Teilnehmer in Ihrer Gruppe sind.

Zuweisung von Einkommen
Zu Beginn jeder Runde des Experiments wird Ihnen zufällig ein Einkommen in Punkten zugewiesen. Dieses Einkommen beeinflusst Ihren Verdienst in diesem Teil des Experiments. Ihr Verdienst wird aber vor allem durch Ihre Entscheidungen oder die anderer Teilnehmer in Ihrer Entscheidungsgruppe beeinflusst. Das Ihnen zugewiesene Einkommen ist eines aus der folgenden Liste an möglichen Einkommen:

11, 22, 30, 45, 60, oder 90

Alle möglichen Einkommen können Ihnen zugewiesen werden und jede Runde wird Ihnen neues Einkommen zugewiesen; somit kann sich Ihr Einkommen von Runde zu Runde ändern, muss es aber nicht.

Entscheidungen in jeder Runde
In jeder Runde des Experiments können Sie angeben, welche Besteuerung Ihres Einkommens und der Einkommen aller anderen Teilnehmer in Ihrer Entscheidungsgruppe Sie sich persönlich wünschen würden. Sie haben die Möglichkeit jede Steuerlast zwischen 0% und 100% zu wählen. Wir werden die von Ihnen genannte Besteuerung als Ihre *persönlich gewünschte Steuerlast* bezeichnen.

Verdienst
Wieviel Sie mit Ihrer Teilnahme an Teil 2 des Experiment verdienen, kann von Ihren Entscheidungen oder aber den Entscheidungen der anderen Teilnehmer abhängen. Zur Vereinfachung wird Ihnen Ihr Verdienst in Punkten am Ende jeder Runde angezeigt. Ihr *Verdienst* in Teil 2 besteht aus dem höchsten Verdienst aus zwei zufällig ausgewählten Runden.
Am des Experiments werden die Punkte die Sie in Teil 1 und Teil 2 verdient haben in Euro zum Wechselkurs von

100 Punkte = 10 Euro

umgerechnet.

Ihr Gesamtverdienst besteht aus Ihrem Verdienst in Teil 2 plus dem Verdienst aus Teil 1 und der Teilnahmeentschädigung von 5 Euro.

Ihr Verdienst in jeder Runde berechnet sich folgendermaßen:

$$\textbf{Verdienst} = (1 - \textit{Steuerlast}) \times \text{Einkommen} + \frac{\textit{Steuerlast} \times (1 - \textit{Steuererhebungskosten}) \times \textit{Gesamteinkommen}}{\text{Anzahl Teilnehmer in Entscheidungsgruppe}}$$

Welche *Steuerlast* letztendlich auf Ihr Einkommen und die Einkommen aller anderen Teilnehmer in Ihrer Entscheidungsgruppe in jeder Runde angewandt wird, entscheidet das Los. Hierbei wird eine Steuerlast zufällig aus den von Ihnen und von den anderen Mitgliedern Ihrer Entscheidungsgruppe in dieser Runde angegebenen persönlich gewünschten Steuerlasten ausgewählt. Die von Ihnen persönlich gewünschte Steuerlast hat die gleiche Chance ausgewählt zu werden, wie die persönlich gewünschten Steuerlasten der anderen 4 Teilnehmer in Ihrer Entscheidungsgruppe. Die Steuererhebungskosten reduzieren die Gesamtsteuereinnahmen um entweder 10%, 20% oder 50% der erzielten Gesamtsteuereinnahmen. Als *Gesamteinkommen* bezeichnen wir die Summe der Einkommen aller Teilnehmer in Ihrer Entscheidungsgruppe (einschließlich Ihnen).

Sie sehen, dass ihr Rundenverdienst aus dem Punktbetrag besteht, der nach Abzug der Steuerlast von Ihrem Einkommen übrig bleibt (1. Zeile der obigen Formel), aber auch aus dem Punktbetrag, den Sie aus den Gesamtsteuereinnahmen nach Abzug der Steuererhebungskosten und Aufteilung unter allen Teilnehmer in Ihrer Entscheidungsgruppe erhalten (2. Zeile der obigen Formel).

Informationen zu Ihrer *Entscheidungsgruppe*
In jeder Runde des Experiments, nachdem alle Teilnehmer ein Einkommen zugewiesen bekommen haben und während Sie die von Ihnen persönlich gewünschte Steuerlast wählen, sehen Sie welche Auswirkungen diese Steuerlast auf Ihren Verdienst und den Verdienst aller anderen Teilnehmer in Ihrer Entscheidungsgruppe haben würde, würden Sie diese Steuerlast tatsächlich wählen und würde diese Steuerlast am Ende der Runde zufällig zur Bestimmung des Rundenverdienstes herangezogen werden. Eine Illustration, auf welche Weise Sie diese Information, gegeben Ihrer Wahl Ihrer persönlich gewünschten Steuerlast, auf Ihrem Bildschirm während des Experiments sehen werden, ist auf Seite 5
(Abbildung 1) dieser Anleitung abgebildet.

Sie sehen in Abbildung 1, dass auf dem Bildschirm Ihnen zunächst mitgeteilt wird, welches Einkommen Ihnen in dieser Runde zugewiesen wurde und was die Höhe der Steuererhebungskosten ist (1. Zeile). Darunter können Sie dann durch Verschieben des Reglers, die von Ihnen gewünschte Steuerlast wählen. Gegeben Ihrer Wahl werden Ihnen dann unterhalb des Reglers die Verdienste aller Teilnehmer in Ihrer Entscheidungsgruppe geordnet nach Einkommen in grüner Farbe angegeben und ebenso graphisch dargestellt. Sie sehen außerdem den Durchschnittsverdienst aller KLEEs und den Durchschnittsverdienst aller KANDINSKYs in Ihrer Entscheidungsgruppe. Wenn Sie den Regler bewegen um eine andere persönlich gewünschte Steuerlast zu wählen, werden sich die dargestellten Verdienste aller Teilnehmer, gegeben Ihrer Wahl, ä"ndern.

B.3 Screen shot

Figure B.6: Screen shot of subjects' allocation