Social Identity and Preferences over Redistribution*

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Abstract:

We design an experiment to study the effects of social identity on preferences over redistribution. The experiment highlights the trade-off between social identity concerns and maximization of monetary payoffs. Subjects belonging to two distinct natural groups are randomly assigned gross incomes and vote over alternative redistributive tax regimes, where the regime is chosen by majority rule. We find that a significant subset of the subjects systematically deviate from monetary payoff maximization towards the tax rate that benefits their group when the monetary cost of doing so is not too high. These deviations cannot be explained by efficiency concerns, inequality aversion, reciprocity, social learning or conformity. Finally, we show that behavior in the lab helps explain the relationship between reported income and stated preferences over redistribution observed in surveys.

KEYWORDS: Social Identity, Social Preferences, Income Redistribution, Experimental Economics.

JEL Classification: C92, D63, D72

1. Introduction

A lively debate among social scientists concerns the determinants of preferences over economic policies in democracies. Economic self-interest appears to be a rather poor predictor of voting behavior: poor people do not vote to expropriate the rich, and rich people sometimes support welfare programs from which they do not expect to benefit. While many other factors have been suggested to explain political choices, researchers have long noted that social context seems to have a crucial effect [Lazarsfeld et al. (1948), Miller et al. (1991), Beck et al. (2002)]. This view is supported by observed differences in voting patterns and reported policy preferences across social groups such as class, race and religious affiliation, controlling for some measures of economic self-interest [e.g. Evans (2000), Luttmer (2001), Glaeser and Ward (2006)]. One important factor underlying these relationships may be social identity.

The precise relationship between social identity and political choices has yet to be properly understood. The main difficulty is due to endogeneity of both economic variables and social variables. For example, people with certain characteristics are more likely to earn higher incomes, associate with certain groups and vote in certain ways. This hampers attempts at uncovering the mechanisms behind group-based voting and distinguishing them from other motives such as economic self-interest.

This paper uses an experimental approach to study the effect of social identification on voting over redistribution. In so doing, it sheds new light on our understanding of social preferences. We focus on one specific component of the general model developed

by Shayo (2007), which is based on a large body of work on social identity. According to the model, individuals that identify with a certain group behave in a way that not only takes into account their self-interest, but also the interest of the group and the typical behavior of its members. Therefore, when making a political choice, individuals may sacrifice some of their monetary payoff to support their group and/or to resemble the group's prototypical behavior. Our experiment abstracts from group conformity effects and focuses solely on the effect of the group's interest.

The experiment is designed to identify whether a subject's preferences over redistribution are affected by the payoffs' of her ingroup members. In the main treatment, subjects are divided into two natural groups based on their field of studies. We call this the *group treatment*. They are randomly assigned gross incomes, and are informed of their own income, the overall mean income and the mean income of each group. In the *control treatment*, subjects are unaware of the existence of groups. They are only informed of their own income and the overall mean income. After receiving this information, subjects in both treatments vote anonymously over a redistributive scheme consisting of a linear tax and a lump sum transfer. Taxes do not introduce distortions; that is, overall payoffs are unaffected by the chosen tax scheme. The tax is chosen by majority rule and applied to all the subjects. This procedure is repeated 40 times, without feedback between rounds, and without any interaction between subjects.

The subjects' incomes come from distributions designed to allow us to classify deviations from self-interest into two distinct categories: inequality aversion and group identification. Specifically, inequality averse subjects exhibit a bias towards high redis-

tribution regardless of their ingroup's income. In contrast, social identifiers exhibit a bias towards the tax rate that benefits their ingroup.

We propose an algorithm that classifies the subjects to three categories. Applying this algorithm to the group treatment yields the following results. Of the 126 subjects, 56% vote, by and large, to maximize their own monetary payoffs. About 6% are characterized as inequality averse. Finally, a third of the subjects systematically deviate from monetary payoff maximization towards the tax rate that benefits the average member of their group. That is, they tend to vote for high levels of redistribution when their group is relatively poor – even if they themselves are relatively rich. Further, and in sharp contrast to the behavior expected under inequality aversion, these subjects also vote for low levels of redistribution when their group is relatively rich – even if they themselves are relatively poor. This pattern of behavior is especially striking since all voting decisions are completely unobserved, and groups' prototypical behavior is unknown as well.[1]

Although social identifiers are sometimes willing to forego monetary payoffs to support their group, their decision is still affected by their economic self interest. That is, subjects respond systematically to the costs associated with supporting their ingroup. This allows us to estimate the trade-off between monetary payoff maximization and social identity concerns among the identifiers. We find that the probability of supporting the ingroup tax rate for the average subject decreases by 8 percentage points with a

[1] Applying the same algorithm to the control treatment categorizes 80% of the 54 subjects as monetary payoff maximizers, 11% as inequality averse and only one subject (1.9%) as a social identifier.

unit increase in the monetary cost to the subject divided by the average benefits to ingroup members. Furthermore, the probability of supporting one's group is always higher when the social identifiers belong to a rich ingroup than to a poor ingroup. This behavior cannot be reconciled with standard notions of inequality aversion.

The paper is related to three strands of research. The first, already mentioned, deals with the determinants of voting over economic policies. The second is the literature on social identity both in economics and in social psychology. Most notably, Akerlof and Kranton (2000) introduce social identity into economic analysis and propose a model of social identity that focuses primarily on the effects of prescribed behavior associated with various identities. As stated above, the current paper focuses on a different aspect of identification: caring about ingroup payoffs. This feature is a prominent implication of Social Identity Theory [Tajfel and Turner (1979) and (1986)] and is consistent with observed behavior in Minimal Group experiments [Brewer (1979), Bourhis and Gagnon (2001)] and in public goods experiments [Brewer and Kramer (1986), Orbell et al. (1988), Eckel and Grossman (2005), Ruffle and Sosis (2006)]. Our experimental design differs from these experiments in that decisions are costly yet overall payoffs are held constant, thus ruling out any effect of efficiency concerns.[2]

The third strand of literature is that on social preferences – namely, models that assume that individuals care about other individuals' payoffs. These models include,

[2]Note that studies based on Minimal Group experiments cannot measure the trade-off between monetary costs and social identity concerns since, in these experiments, all decisions are costless. Recently, Charness et al. (2007) showed that minimal groups are insufficient to affect the subjects' behavior when playing prisoners' dilemma and battle of the sexes. They report a significant effect of group identity only when group membership is common knowledge and there exists payoff commonality within the group.

most prominently, inequality aversion [Fehr and Schmidt (1999), Bolton and Ockenfels (2000)], various forms of altruism, Rawlsian and competitive preferences [Charness and Rabin (2002)], warm glow [Andreoni (1989)], and reciprocity [Rabin (1993), Fehr and Gächter (2000)]. The current paper attempts to expand our understanding of social preferences by isolating the effect of group membership from the motives listed above.

The paper is organized as follows. The next section presents the theoretical framework implemented in the experiment. Section 3 describes our experimental design. The main results of the paper appear in Section 4. Section 5 relates the behavior observed in the lab to survey evidence on the relation between income and preferences over redistribution. Section 6 concludes. Appendix A contains the proof to the theoretical claim and Appendix B contains the instructions of the experiment.

2. Theoretical Framework

The experiment is designed to isolate and examine one specific component of a general model of social identity in a political economy context. The general model has the following structure [Shayo (2007)]. A society may have many social groups, but in any given situation individuals identify with only some of them. Given their social identities, individuals choose courses of action which determine the aggregate outcome. That outcome forms the social environment that can in turn affect the pattern of social identities. The model is thus based on two major components. First, it specifies the main factors that determine which of the various social groups in a society individuals

tend to identify with. Second, the model defines the meaning of identifying with a group. The present study focuses on this last component. Therefore, it does not examine equilibrium behavior. In our experiment, subjects are exogenously assigned to groups, leaving the endogenous determination of group identification out of the analysis.

We define group identification in terms of preferences. In Shayo's (2007) formulation, these preferences involve two variables: the status of the various groups that exist in the economy, and the perceived distance between an individual and the other members of the group. Given these two variables, an individual is said to identify with group j if (1) she seeks to resemble typical members of group j (i.e. to reduce perceived distance from that group) and (2) she cares about the relative status of group j. The present study focuses on the latter aspect of identification, and we therefore omit from the specification of individuals' utility function the term that measures perceived distances from groups.

To be more precise, let $\mathcal{N}$ be a set of individuals, $\mathcal{A}_i$ a set of available *actions* for each individual $i \in \mathcal{N}$ and $\pi_i : \times_{i \in \mathcal{N}} \mathcal{A}_i \rightarrow \mathbb{R}$ the individual's *monetary payoff.* Let G be a set of social groups, each group being a subset of $\mathcal{N}$. In the present study we take these groups as given.

We now need to define group status. Studies of social identity often argue that the evaluation of groups cannot usually be based on some absolute standard. Rather, it is determined through social comparisons to other groups along valued dimensions of comparisons [Tajfel and Turner (1986)]. In our setting one such dimension is monetary payoff. Thus, the status of a social group can be thought of in terms similar to standard

definitions of individual status [e.g. Boskin and Sheshinski (1978); Clark and Oswald (1998)]. That is, the status of a group j is represented by a function

$$S_j(a) = S_j(\overline{\pi}_j(a), \overline{\pi}_{-j}(a)), \tag{2.1}$$

where $\overline{\pi}_j$ is the mean monetary payoff of individuals that belong to group j (the ingroup) and $-j$ is the reference-group of group j, which in our two-group setting is simply the other group (the outgroup). We assume that the status of group j is strictly increasing in $\overline{\pi}_j$ and is decreasing in $\overline{\pi}_{-j}$.[3] We define social identity as follows:

Definition *Individual $i \in \mathcal{N}$ is said to identify with social group $j \in G$ if her preferences over action profiles can be ordered by a utility function of the form:*

$$U_i(a) = U(\pi_i(a), S_j(a)) \tag{2.2}$$

such that U is strictly increasing in S_j.

In words, identification with a group is taken to mean caring about the status of that group. Given equation (2.1) this implies caring about the monetary payoffs of the other ingroup members.

In what follows we assume that the utility function of an individual that identifies

[3]Note that we allow for the status function to be constant in $\overline{\pi}_{-j}$. In this case group j's status depends on the ingroup's mean absolute rather than relative payoff.

with group j is additively separable in monetary payoffs and group status; namely,

$$U_i(a) = u(\pi_i(a)) + v(S_j(a)), \tag{2.3}$$

where u and v are both strictly increasing functions and u is weakly concave.

2.1. Implications for Voting over Redistribution

We now embed the social identity framework developed above into a standard political setting of income redistribution, whereby individuals choose a tax rate with its associated lump sum transfers.

Consider a population of individuals where each individual i has an exogenous pre-tax income of y_i. The population is partitioned into two social groups, P and R. Assume that the mean income in group P, denoted y_P, is lower than y_R, the mean income in group R. The individuals' group affiliation does not affect their monetary payoffs: individual i's monetary payoff is just her after-tax income, which is composed of income net of taxes and a transfer payment financed by the tax revenues. That is, monetary payoffs are given by

$$\pi_i(\tau) = (1 - \tau)y_i + \tau y, \tag{2.4}$$

where $\tau \in [0, 1]$ is the tax rate and y is the mean income.[4] We refer to individuals with

[4]The profile of actions affects monetary payoffs only through the chosen tax rate. Hence we write π_i directly as a function of τ.

income above the mean income as "rich" and to those with income below the mean income as "poor."

The tax rate is chosen directly by the individuals. Individuals vote over two proposed tax rates, τ^h and τ^l, with $\tau^h > \tau^l$. The winner is decided by majority rule (ties are broken by an equal probability rule). Thus an action for individual i is a vote from $\mathcal{A}_i$, where $\mathcal{A}_i = \{\tau^h, \tau^l\}$ for all i.

Assuming perceived distances are unaffected by voting behavior, social identification has the following simple implications, depicted in Figure 1.

Claim. *Assume that individuals do not play weakly dominated strategies. Then:*

1. *An individual who maximizes her own monetary payoffs votes in support of the high tax rate if her income is below the mean income ($y_i < y$); and votes in support of the low tax rate if her income is above the mean income ($y_i > y$).*

2. *An individual who identifies with the rich group votes in support of the high tax rate if her income is below a threshold level $\underline{\omega}$ (with $\underline{\omega} < y$), and in support of the low tax rate if her income is above $\underline{\omega}$.*

3. *An individual who identifies with the poor group votes in support of the high tax rate if her income is below a threshold level $\overline{\omega}$ (with $\overline{\omega} > y$). If the utility function is sufficiently concave in the individual's monetary payoffs, there exists a threshold level $\widehat{\omega}$ (where $\widehat{\omega} > \overline{\omega}$) such that individuals with incomes between $\overline{\omega}$ and $\widehat{\omega}$ vote in support of the low tax rate whereas individuals with incomes above $\widehat{\omega}$ support the high tax rate. If u is not concave enough, all the individuals with income*

above $\overline{\omega}$ support the low tax rate.

[Figure 1 about here]

Proof: See Appendix A.

The basic intuition behind this claim is simple. Assuming that individuals do not play weakly dominated strategies, sheer economic interests should lead rich individuals to support a low tax rate and poor individuals to support a high tax rate [panel (a) in Figure 1]. This is, indeed, the standard approach of positive models of income redistribution.[5]

Strategies become more subtle once we allow for group identification. According to the second part of the claim, an individual identifying with the relatively rich group is expected to vote in support of a low tax rate even if her income is below the mean, as long as the difference between her income and the mean income is not too high [panel (b) in Figure 1]. Similarly, the third part states that individuals identifying with the poor group may vote in support of a high tax rate even if their income is above the mean income. Furthermore, if the marginal utility of income decreases fast enough, then an individual identifying with the poor group votes in support of the high tax rate even if her income is very high [Figure 1, panel (c)]. That is, her marginal utility from an increase of the poor group's status is higher than her marginal utility from an

[5]In the simplest version of this model individuals' income is exogenously determined [Hamada (1973)]. Later papers emphasize that individuals' income is a function of their ability and the chosen redistribution scheme [Romer (1975), Roberts (1977), Meltzer and Richard (1981)]. The main message remains unchanged as individuals with higher ability prefer lower tax rates.

increase in her own monetary payoffs.

Note that preferences for a more equal distribution of net income or a Rawlsian concern for the poor may also generate support for a high tax rate among relatively rich individuals. However, such preferences cannot account for poor individuals' support for a low tax rate when redistribution does not generate deadweight losses.

3. Experimental Design

The present experiment is designed to examine whether, and to what extent, subjects are influenced by their group membership when choosing a redistribution scheme. In particular, to what extent are individuals willing to vote against their own economic interest in order to enhance their ingroup's standing, even when they do not have any information about the typical (or prescribed) behavior in their group, and when their action is never observed by other individuals.

The experiment was conducted at the computer lab of an Israeli university. The 180 subjects in this experiment were recruited from the pool of undergraduate students that belong to either the Faculty of Social Sciences or the Faculty of Humanities at this university and had no previous experience in experiments related to redistribution.

The experimental sessions were conducted using networked computers. Each subject was seated at a cubicle in front of a computer screen and was given written instructions. An administrator read the instructions aloud before the experiment started to make sure the rules of the experiment were common knowledge. Subjects were also asked several

hypothetical questions at the end of the instructions to verify their comprehension of the procedure (the instructions and questions appear in Appendix B). A session lasted for about one hour. Payoffs were denominated in "Francs," which were converted to New Israeli Shekels (NIS) at the rate of 40 Francs per one NIS at the end of the experimental session. Average earnings were equal to NIS 67 (slightly over $15 USD) and were distributed privately and in cash.[6]

Eighteen subjects participated in each session. We ran seven sessions using a *group treatment* and three sessions as a *control treatment*. We first describe the group treatment. At the beginning of each session we divided the subjects into two groups of equal size based on their major field of studies. That is, for every session we recruited nine subjects whose major was from the Faculty of Social Sciences and nine subjects whose major was from the Faculty of Humanities.[7] At the beginning of each session we informed the subjects about the existence of groups, the size of the groups, and their group affiliation. Obviously, subjects maintained their group affiliation throughout the entire session. Subjects were not informed of the exact affiliation of other subjects. In fact, every effort was made to minimize the extent to which participants in a given session knew each other. We did not allow participants to sign up together for a specific session and, among the pool of over three thousands students who had signed up to participate in experiments, we allowed no more than two participants from the same

[6] The hourly minimum wage in Israel is slightly below NIS 20. Thus, subjects on average earned more than 3 times the minimum wage.

[7] Students at this university can choose to have a double major. For the group treatment we did not recruit any student who had one field of studies from the social sciences and the second field of studies from the humanities.

year and major. Throughout the experiment we ensured anonymity and effectively isolated each subject in a cubicle to minimize any undesired interpersonal influence. The allocation of subjects to cubicles was independent of subjects' field of study. Communication between subjects was not allowed throughout the session. Subjects' anonymity was guaranteed so that neither the other subjects nor the researchers knew the ingroup of any particular subject or her action in a given round.

Each session consists of 40 rounds. At the beginning of each round a chance move determines each group's gross income distribution and then each subject's income for the current round. The possible distributions – denoted x_1, x_2, z_1, z_2 – are presented in Table 1. In half the rounds one group draws x_1 and the other group draws x_2, and in the other half they draw z_1 and z_2. The design is such that each group draws each of the four distributions ten times. The exact timing of the assignment is randomly determined. Subjects are not informed of the exact distributions of gross income or of the way they are chosen. They only know that after their group's total gross income has been chosen, their individual gross income is randomly chosen, and varies between 10 and 150 Francs. At the beginning of each round each subject is informed of her own gross income, the mean gross income of each group and the overall mean gross income.

[Table 1 about here]

After receiving this information subjects choose between two redistribution schemes. These schemes consist of a proportional tax rate on the income of every subject, with

the resulting revenue distributed equally between all subjects. The two proposed tax rates are 20 and 40 percent. The implemented tax is decided by majority rule, with ties broken by an equal probability rule.

After the elections all subjects are notified of the end of the round and of the beginning of a new round. We do not provide the subjects with any feedback whatsoever regarding the outcome of the current or of previous rounds. Subjects learn of the elections' outcomes and their resulting payoffs for each of the rounds only at the end of the experiment. Subjects were informed of this feature of the experimental design at the beginning of the session.

After completing all the rounds and before learning the results of each round, each subject completed a questionnaire that included basic demographics as well as questions on attitudes to redistribution taken from the General Social Survey (GSS) and the World Values Survey (WVS). The questionnaire also included several questions to gauge the subject's identification with her ingroup. The questionnaire appears in Table 3. After each subject completed the questionnaire she was informed of her gross income, the chosen tax rate and her net income for every single round.

The control treatment follows exactly the same protocol except for the following differences. First, subjects are randomly assigned to two groups of nine subjects each. Most importantly, subjects are not informed of the existence of groups. Thus, they do not know they were assigned to a group and only receive information on the overall average gross income at the beginning of each round. Finally, we omit from the questionnaire questions related to social identity.

3.1. Discussion

The chosen design allows us to closely examine the effect of group membership on voting patterns. The main treatment divides the subjects into (very weak) natural groups instead of creating artificial ones to ensure that groups have some meaning outside of the laboratory. This does not imply that social identity effects are not to be expected under artificial groups. However, using artificial groups may arguably create a situation where all socially meaningful bases for decision making have been removed. This may render inferences regarding the effects of group membership in real elections rather tenuous. By using natural groups we seek to avoid such a situation.[8]

Beyond comparing behavior in the group treatment to that in the absence of groups, we compare each subject's behavior when facing different environments. In every round of the group treatment, eight subjects face a conflict between monetary payoffs maximization and maximizing ingroup status: There are four poor subjects whose ingroup is rich, and four rich subjects whose ingroup is poor. We exploit these situations of conflict (shown in boldface in Table 1) to examine the existence of social identity effects.

The construction of the first two distributions (x_1 and x_2) is guided by three major considerations. First, we want to examine the behavior of a subject with a given income level in situations when the relative mean income of her ingroup changes. This allows us to keep her own monetary incentives constant while changing only the incentives regarding group status.[9] Therefore, except for the highest and lowest income levels, all

[8] Our analysis does not assume that the two groups are similar. Hence there is little gain from randomly assigning subjects to groups.

[9] Note that by keeping the overall mean income constant we abstract from efficiency considerations.

possible income levels appear in both distributions. Second, we want to distinguish deviations from monetary payoff maximization induced by social-identity from deviations induced by preferences for income equality [Loewenstein, Bazerman and Thompson (1989); Fehr and Schmidt (1999); Bolton and Ockenfels (2000)]. Although a preference for equality may drive a rich subject in a poor group to vote for a high tax rate, this type of preference cannot account for poor subjects in a rich group supporting a low tax rate. Finally, we want to observe the subjects' decisions under a sufficiently rich support of incomes to examine the trade-off between monetary payoff maximization and social-identity concerns. That is, even if subjects with incomes below the mean do vote for a low tax rate when they identify with the rich group, we want to quantify the amount of money that an individual is willing to forego in order to promote her ingroup's status.

The income distributions z_1 and z_2 maintain the main attributes of the distributions x_1 and x_2, varying only the difference between the mean incomes of the two groups. As it turned out, there was no significant difference in behavior under the x and z distributions. Hence the next section reports results combining both distributions.

A final comment relates to the information supplied to subjects. Recall that subjects do not receive any feedback until the end of the experiment. Hence, the subjects decide simultaneously on a set of forty votes. This suppresses repeated games effects [Costa-Gomes and Crawford (2006)], and is crucial for identifying behavior consistent with caring about ingroup status. For example, information on the outcomes of previous

See Charness and Rabin (2002) for a study showing the effects of these considerations.

rounds may induce subjects to vote according to their narrow pecuniary interests if others did that in the past, due to conformity to the group. Moreover, the design does not allow for collusive behavior or reciprocity effects. Therefore, the chosen design provides 40 independent observations on each subject. With the help of this data set we can examine the behavior of the same subject as her income and her ingroup income are randomly varied.

4. Results

This section presents the main experimental results. We first provide a glance of the subjects' behavior when facing a trade-off between social-identity concerns and their own monetary payoff. We then exploit the rich set of choices made by each subject to classify subjects into three categories: monetary payoff maximizers (MPM), social identifiers (SI), and inequality averse (IA). At the end of this section we closely examine the behavior of SIs vis-à-vis MPMs, and quantify the impact of monetary costs on the likelihood of supporting one's ingroup.

Recall that a subject faces a situation of conflict whenever the relative income of the subject is opposed to the relative income of her ingroup. For each subject we compute the proportion of votes in support of her ingroup out of her total votes in situations of conflict. Of course, subjects in the control treatment are unaware of the existence of groups (and thus of the existence of a conflict). Nevertheless, we compute for these subjects the proportion of votes in support of their ingroup as a benchmark to which

we can compare the behavior of subjects in the group treatment.

Figure 2 depicts the cumulative distribution of this proportion separately for the group and the control treatments. The figure highlights several important patterns of the data. Consider first the behavior in the control treatment. Almost 50 percent of subjects in this treatment never deviate from monetary payoff maximization in these situations. As for the remainder of the subjects, the vast majority of them deviate from monetary payoff maximization less than 20 percent of the time, and practically all subjects in this treatment deviate less than 50 percent of the time.

[Figure 2 about here]

Consider now the behavior in the group treatment. Again, a sizable amount of subjects never vote in support of their ingroup at the expense of their own monetary payoffs. This is not for lack of opportunities since, on average, each of these subjects faced slightly over 18 situations of conflict. The proportion of such subjects is, however, substantially lower than in the control treatment.

Another interesting pattern that emerges from the figure is the heterogeneity of the subjects' behavior in the group treatment. Once we focus on subjects that supported their group at least 15 percent of the time (61 subjects), the distribution is close to uniform, with subjects spanning the entire range. This is reflected in the close to linear shape of the cumulative distribution function for the group treatment. Thirty one subjects supported their ingroup at least 50 percent of the time, and eleven subjects

supported their ingroup at least 80 percent of the time. Some of this heterogeneity may be a consequence of subjects' different preferences. Some of it, however, may be due to the different monetary costs of voting for one's ingroup. We explore these two possibilities in turn.

4.1. Classifying Subjects into Preference-Types

As suggested by the behavior in the control treatment, the deviations from monetary payoff maximization depicted in Figure 2 may not necessarily reflect a preference for higher ingroup payoffs. These deviations may well stem from other factors such as plain errors or inequality aversion. We now propose an algorithm to classify each subject into one of three categories: monetary payoff maximizer, inequality averse or social identifier.

Consider the following econometric model, applied *separately* to each subject:

$$E[(vote\ low)_{it}|y_{it}, y_{jt}] = \beta_1(rich)_{it} + \beta_2(rich\ group)_{it} + \beta_3(rich * rich\ group)_{it} \quad (4.1)$$

where $(vote\ low)_{it}$ equals one if subject i voted for the low tax rate in round t and zero otherwise; $(rich)_{it}$ equals one if i's income in round t was above the mean income $(y_{it} > y_t)$ and zero otherwise; and $(rich\ group)_{it}$ equals one if the mean income of i's group in round t was above the mean income $(y_{jt} > y_t)$.

Consider now the behavior of a subject that always chooses to maximize her monetary payoff. Assuming that subjects do not play weakly dominated strategies, an MPM votes for a low tax in round t if and only if $y_{it} > y_t$, independently of her ingroup's

relative income. Thus, for an MPM,

$$E[(vote\ low)_{it}|y_{it}, y_{jt}] = rich_{it}. \tag{4.2}$$

It follows that a subject can be classified as a monetary payoff maximizer whenever the conditions

$$\beta_1 = 1 \text{ and } \beta_2 = \beta_3 = 0$$

are jointly satisfied.

Consider next a subject that has a preference for income equality. An inequality averse subject never supports the low tax rate when $y_i < y$, and may vote in support of the high tax rate when $y_i > y$. That is, for an IA,

$$E[(vote\ low)_{it}|y_{it}, y_{jt}] = \beta_1 rich_{it}, \tag{4.3}$$

where $1 - \beta_1 > 0$ represents the probability that the subject votes in support of a high tax rate when $y_{it} > y_t$. This gives us the following parameter restriction

$$\beta_1 < 1 \text{ and } \beta_2 = \beta_3 = 0.$$

Note that, similar to an MPM, the decisions of an IA are independent of her group's relative income.

Finally, a subject that identifies with group j always votes in support of the low

tax rate whenever $y_i > y$ and $y_j > y$ (thus $\beta_1 + \beta_2 + \beta_3 = 1$). Similarly, this subject never votes for the low tax rate when $y_i < y$ and $y_j < y$. As established in the Claim above, an SI sometimes supports a low tax even when $y_i < y$ provided that $y_j > y$. The necessary conditions for a subject to be an SI in terms of model (4.1) are thus

$$\beta_1 < 0,\ \beta_2 > 0 \text{ and } \beta_1 + \beta_2 + \beta_3 = 1,$$

where $1 - \beta_1 > 0$ is the probability of voting for the high tax when the subject is rich and her group is poor; and β_2 is the probability of voting for the low tax when the subject is poor and her group is rich.

This suggests that we can classify a subject as an MPM, an IA or an SI by estimating model (4.1) separately for each individual and then applying the following procedure:

1. We start with the null hypothesis that every subject is an MPM; that is, a subject is classified as an MPM whenever the joint hypothesis $H_0 : \beta_1 = 1$ and $\beta_2 = \beta_3 = 0$ cannot be rejected at the 95% confidence level.

2. If H_0 is rejected, we test the joint hypothesis $H_1 : \beta_1 < 1$ and $\beta_2 = \beta_3 = 0$. If this hypothesis is not rejected at the 95% confidence level we classify the subject as an IA.

3. If H_0 and H_1 are rejected, we test hypothesis $H_2 : \beta_2 > 0$ and $\beta_3 = 1 - \beta_1 - \beta_2$. If this hypothesis is not rejected at the 95% confidence level we conclude that the subject is an SI.

4. If H_0, H_1 and H_2 are rejected we conclude that the subject cannot be classified in any of these three categories.

We apply this procedure using OLS with robust standard errors.[10] The resulting classification of the subjects between the three categories is as follows.

Classification of Subjects

	Group Treatment	Control Treatment
MPM	70 (55.6%)	43 (79.6%)
IA	8 (6.3%)	6 (11.1%)
SI	42 (33.3%)	1 (1.9%)
None	6 (4.8%)	4 (7.4%)
Total	126	54

The resulting classification of subjects into three preference-types is striking for several reasons. In the control treatment, where subjects are asked to choose a tax policy knowing nothing about the characteristics of its beneficiaries, the overwhelming majority behave as MPMs. This is consistent with previous experimental results on voting over redistribution [Rusträöm and Williams (2000); Esarey et al. (2007)]. Although several subjects do show a consistent concern for the welfare of the relatively poor, their proportion is rather low compared to related studies [Tyran and Sausgruber (2006)].

[10] We repeated the estimation of (4.1) using Feasible Generalized Least Squares (FGLS) to adjust for heteroskedasticity of the standard errors. The estimation based on FGLS produced the exact same classification of the subjects as the one based on robust standard errors. The results of these estimations and the subsequent classification of the subjects can be obtained from the authors upon request.

Finally, one subject is classified as an SI even though she is unaware of the existence of groups.

The picture is dramatically different in the group treatment. We observe a significant decrease in the proportion of MPMs. Remarkably, this proportion is very similar to that found in Andreoni and Miller (2002), who classified 47.2 percent of the subjects as selfish in a dictator game experiment. Subjects that are not MPM are often classified as efficiency maximizers or inequality averse [Charness and Rabin (2002), Tyran and Sausgruber (2006)]. In contrast to previous studies, our design allows subjects to deviate from both selfishness and inequality aversion, without introducing efficiency considerations. As a result we obtain a different classification. This classification reveals a very low percentage of IAs and a significantly larger proportion of subjects that support their ingroup, even when this causes greater inequality.

Subjects' behavior varies significantly according to preference-types. Figure 3 presents the mean proportion of votes for the high tax rate together with the associated 95% confidence intervals, by the subjects' gross income.[11] The figure shows the behavior of subjects in the group treatment, differentiating the subjects' behavior according to the relative income of their ingroup. Panel (a) presents the behavior of all the subjects

[11] To construct this figure we compute, for each subject and each income level, the proportion of votes for a high tax across all the different rounds. We then compute the mean (and confidence interval) across subjects at that income level. This eliminates any effects due to possible correlations across repeated observations within a given subject.

whereas panel (b) shows separately the behavior of MPMs and SIs.[12]

[Figure 3 about here]

Figure 3 plainly shows that group identification significantly affects the subjects' voting behavior. Consider first the behavior of poor subjects (gross income less than 67 Francs). Panel (a) shows a lower propensity to support a high tax rate when one's group is rich, compared to when it is poor. This pattern masks important differences between different types of subjects. Panel (b) shows that for MPMs it makes virtually no difference whether their group is rich or poor: they almost always vote for the high tax rate.[13] For SIs, on the contrary, the ingroup's income has a large effect. Whereas poor SIs in a poor group support the high tax rate over 90 percent of the times on average, poor SIs in a rich group support the high tax less than 30 percent of the times.[14] That is, poor SIs in a rich group show a striking disposition to sacrifice their own monetary payoffs to increase their ingroup average welfare. As already pointed out, this behavior is in sharp contrast with possible concerns for inequality aversion.

The overall behavior of subjects when their income is above the mean mirrors their

[12]Behavior of MPMs in the control treatment is basically the same as that of MPMs in the group treatment.

[13]The average proportion of votes for the high tax among poor MPMs is above 97% when in the poor group and slightly below 95% when in the rich group. Mann-Whitney tests cannot reject equal behavior of MPMs in the rich group and in the poor group for any income at a significance level of 10 percent.

[14]The proportion of poor SIs in a rich group voting for a low tax rate is highly statistically different from the proportion observed for poor SIs in a poor group for any income level. The confidence intervals do not overlap and equality of behavior is also rejected by Mann-Whitney tests with p-value < 0.001 for any income level.

behavior when they are poor. Accordingly, MPMs almost always support the low tax, regardless of the income of their group. By contrast, whereas SIs in a rich group also vote overwhelmingly for the low tax, SIs in a poor group are equally likely to vote for the low tax as for the high tax.[15] Notably, MPMs are not the only ones to show little concern for equality of payoffs. Rich SIs behave similarly when their group is rich.

Summarizing, there is no significant difference in the voting patterns of SIs and MPMs in situations that do not impose a trade-off between self and group interest. In situations of conflict, however, SIs deviate from narrow self-interest towards the tax that benefits the average member of their ingroup.

4.2. Do Social Identifiers Respond to Monetary Costs?

In a situation of conflict the cost of supporting the tax that benefits the ingroup increases with the difference between the subject's income and the mean income. Although SIs sacrifice money for their group, Figure 3 suggests that these subjects do take into account the associated cost. That is, an increase in the cost of supporting the ingroup seems to cause a decrease in the proportion of subjects that choose to do so. For example, SIs in a rich group support the low tax rate over 81% of the time when their income is 40 Francs or higher. Their support for the low tax drops to 64% and 58% at incomes of 30 and 20 Francs, respectively. Similarly, the average support for a high tax by rich SIs in a poor group decreases monotonically from 53% to 39% as their income

[15] The behavior of rich SIs in a poor group is highly statistically different from the behavior of rich SIs in a rich group for any given income level (Mann-Whitney, p-value < 0.001).

increases from 80 to 100 Francs. Interestingly, the support for the high tax of SIs in a poor group increases to almost 50% when their income is equal to 110 Francs.

To further analyze the trade-off between own monetary payoffs and group status among SIs we need to quantify the cost of voting for one's group. The subject's cost of supporting the tax that benefits her ingroup is zero if she is not in a situation of conflict. Consider now a situation of conflict. When the tax that benefits the subject's ingroup is adopted her monetary loss is $0.2\left|y_i - y\right|$; that is, the difference between the two tax rates times the difference between the subject's income and the mean income. When the subject is pivotal, by voting for the tax that benefits her ingroup she increases the probability that this tax is adopted by 50 percent. Thus, if p is the probability that the individual is pivotal, then the expected cost of siding with one's ingroup is:

$$cost = \begin{cases} p * 0.5 * 0.2\left|y_i - y\right|, & \text{if in conflict} \\ 0, & \text{otherwise.} \end{cases} \tag{4.4}$$

At the same time, the expected benefit to the average member of group j from the subject's siding with that group is:

$$benefit = \ p * 0.5 * 0.2\left|y_j - y\right| \tag{4.5}$$

regardless of whether or not i is in a situation of conflict.

The analysis below examines how the ratio of expected cost to expected benefit affects the behavior of SIs. A convenient feature of this cost/benefit measure is that

the term measuring the probability of being pivotal cancels out. The cost/benefit measure ranges from 0 to 6.03 for subjects in the rich group and from 0 to 5.54 in the poor group.

Table 2 presents the results of the estimation of a random effects probit model for SIs.[16] The dependent variable is whether or not subject i voted in support of the tax that benefits the average member of her ingroup. The explanatory variable is the cost/benefit ratio of supporting that tax.

[Table 2 about here]

The first column shows that overall the effect of costs on the probability that SIs vote for their ingroup is negative, large and highly statistically significant. The implied probability of supporting the ingroup tax rate for the average subject decreases by 8 percentage points for an increase of one unit in the cost to benefit ratio of doing so. Column (2) adds to the model the square of the cost to benefit ratio to assess possible nonlinearities. The results suggest that indeed the subjects' propensity to support their ingroup is better represented by a decreasing convex function.

Column (3) examines whether the subjects' behavior differs systematically when their ingroup is poor or rich. To that effect we introduce a dummy variable equal to one when the ingroup is poor, fully interacted with the cost variables. Interestingly, the subjects' behavior is qualitatively different in a rich or a poor ingroup. This difference

[16] A linear probability model with fixed effects yields very similar results.

is illustrated in Figure 4.

[Figure 4 about here]

The figure presents the predicted probabilities of supporting the ingroup's tax rate as functions of the cost/benefit ratio, for rich and poor ingroups separately, based on the estimates in Column (3). Accordingly, the probability that SIs support their ingroup is significantly higher when that group is rich than when it is poor at any given cost/benefit ratio, even though supporting a rich group increases income inequality. We conjecture that this behavior could be a consequence of subjects attaching a higher status to rich groups, which tends to increase identification (Shayo 2007). Finally, we observe that the probability of supporting the ingroup decreases almost linearly for rich groups but is a convex function of cost for poor groups.

5. Relating Behavior in the Lab to Survey Evidence

This section examines whether the classification of subjects into preference types can help explain the low correlation between preferences over redistributive policies and income, observed in numerous surveys [Blinder and Krueger (2004); Fong (2001)]. Specifically, is it the case that the observed low correlation is due to the lumping together of individuals who care primarily about their own economic interests (MPMs) with individuals who care about other issues, notably the wellbeing of their groups? We address this issue using answers to the questionnaire administered at the end of each session.

We begin with summary statistics. Table 3 depicts mean responses to the question-

naire by subjects in both treatments and separately for SIs and MPMs in the group treatment. Consistent with other studies, we observe the well known "economist effect" whereby subjects studying economics and/or business administration are significantly more likely to exhibit selfish behavior [Marwell and Ames (1981); Frank et al. (1993)]. We do not find a significant direct relationship between the subjects' revealed preferences and their reported income. On the other hand, social identifiers convey greater concern over income inequality and express a somewhat higher willingness to help the poor (though not statistically significant at conventional levels). The answers to the questions measuring the components of social identity show the expected pattern. SIs consistently report a heightened awareness of their group membership and feel more emotionally involved with their group than MPMs.

[Table 3 about here]

Table 4 presents the correlation between self-reported income and self reported preferences for redistribution for subjects in the group treatment. Income is measured on a 5 point scale from Rich, through Middle-Class to Poor as done in the World Values Survey (WVS). Since our subjects are university students, we concentrate on reported parental income when subjects were in high school, rather than on current income.[17] We use two questions that measure preferences for redistribution. The first, adapted from the WVS, asks whether inequality in Israel should be reduced or increased. The

[17] Presumably, this is a better measure of the subjects' economic conditions. Results are qualitatively similar when using current income, but the correlations tend to be weaker.

second, adapted from the General Social Survey (GSS), asks whether the government should improve the standard of living of the poor in Israel. We then compare the results obtained from our sample of university students to those obtained from representative samples of the Israeli and American populations, using the WVS and the GSS.

[Table 4 about here]

Consider first the attitudes towards inequality, starting with Column (3). Overall, the correlation between the subjects' income and their stated preferences over inequality in our entire sample is 0.16. That is, higher income is associated with more acceptance of inequality. This value is remarkably similar to the correlation of 0.12 observed in the 2001 Israeli WVS, which consists of a representative sample of 1,161 respondents. A similar correlation is also observed in the American WVS. Consider now the same correlation when differentiating subjects by their revealed preference types. Among MPMs the correlation is relatively high, consistent with what standard models of political economy suggest: richer people tend to oppose redistribution more strongly. However, for those subjects who exhibited social identification, the hypothesis that the correlation is zero cannot be rejected.[18]

Our results thus suggest that the well-documented low correlation between income and preferences over redistribution may partly be due to an aggregation effect. That

[18]Regarding the helping-the-poor item we do not have representative data from Israel. The relationship using the American GSS is much stronger than that observed in our sample. In fact, views regarding helping the poor (as opposed to views regarding inequality) do not correlate very strongly with income even among MPMs.

is, it may be a consequence of there being a significant portion of the population that tends to vote according to group membership – rather than by own economic interests.

6. Conclusions

This paper developed an experimental design to study the effect of group membership on preferences over redistribution. Our point of departure is a theoretical framework that draws on a large body of work on social identity. Using this framework we derived precise predictions that characterize the behavior of individuals who identify with the group to which they belong. We implemented this theoretical framework using an experimental design that allowed us to distinguish between social identification, monetary payoff maximization and inequality aversion. Furthermore, the design explicitly ruled out other prominent explanations for deviations from simple selfish behavior, most notably collusion, efficiency concerns and reciprocity.

The results support the common view in the political science literature that social identification is an important force shaping voting behavior. A third of the subjects consistently deviated from both monetary payoff maximization and inequality aversion to support the average member of their ingroup. Given that the groups we used are extremely weak, it is not improbable that in real life situations individuals consistently forego personal gains for the wellbeing of their groups.

Importantly, social identifiers did not automatically support their ingroup in every situation. Rather, they tended to support their ingroup only when the cost of doing

so was not too high. Finally, we found that among social identifiers, the correlation between their actual economic situation and their stated preferences for redistribution outside the laboratory is essentially zero. By contrast, the correlation among monetary payoff maximizers is positive and relatively high. This suggests that the low correlation between these two variables observed in many surveys may be partly due to the effects of social identity on some individuals' policy preferences.[19]

The design developed in this paper is rich in what it allows us to infer regarding subjects' policy preferences, yet it is easy to implement. We thus believe that it can be useful for examining a wide variety of issues: Do members of one ethnic group (gender) identify with their group more than members of another ethnic group (gender)? How sensitive are identification patterns to varying group attributes (e.g. group status)? What happens to the proportion of social identifiers in the electorate when voting is costly?

This paper was confined to the study of preferences over redistribution. Social identification has, however, wide ranging implications in other important spheres of social behavior. We hope that future studies will shed more light on the interaction between social identity and individual behavior in economic environments.

[19] This is consistent with the empirical results of Shayo (2007). He showed that individuals with higher levels of national identification exhibit a lower support for redistribution, controlling for their income. Given that national identification is higher among the poor, the overall correlation between income and support for redistribution is attenuated.

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Appendix A: Proof of Claim 1

1. Assume first that individual i maximizes her monetary payoffs π_i. From equation (2.4) follows that $\pi_i(\tau^h) > \pi_i(\tau^l)$ if and only if $y_i < y$. Thus, for $y_i < y$ and any profile of actions of the other voters, individual i cannot increase $\pi_i(\tau^h)$ by voting τ^l, and is strictly better off voting τ^h when she is pivotal. A similar argument holds for $y_i > y$.

2. Assume that individual i identifies with group j and keep the mean income of group j, y_j, fixed. Let us define

$$\begin{aligned} \Delta u_i &\equiv u(\pi_i(\tau^h)) - u(\pi_i(\tau^l)) \text{ and} \\ \Delta v_i &\equiv v(S_j(\overline{\pi}_j(\tau^h), \overline{\pi}_{-j}(\tau^h)) - v(S_j(\overline{\pi}_j(\tau^l), \overline{\pi}_{-j}(\tau^l)). \end{aligned}$$

Individual i's weakly dominant strategy is to vote in support of τ^h whenever $\Delta u_i + \Delta v_i > 0$ and to vote in support of τ^l otherwise. Since u is increasing in π_i we have $\Delta u_i > 0$ if and only if $y_i < y$. Similarly, it follows from (2.1) that $S_j\left(\overline{\pi}_j(\tau^h), \overline{\pi}_{-j}(\tau^h)\right) > S_j\left(\overline{\pi}_j(\tau^l), \overline{\pi}_{-j}(\tau^l)\right)$ if and only if $y_j < y$. Given that v is increasing in S_j we have that $\Delta v_i > 0$ if and only if $y_j < y$ as well.

Suppose individual i identifies with the rich group. This implies that $\Delta v_i < 0$. If $y_i > y$ then $\Delta u_i < 0$ and i's weakly dominant strategy is to vote for τ^l. If $y_i < y$ then $\Delta u_i > 0$. Since u is an increasing and weakly concave function of π_i it follows that there exists $\varepsilon > 0$ such that $\Delta u_i + \Delta v_i < 0$ for $y_i + \varepsilon = y$. This

establishes that $\underline{\omega} < y$. Concavity of u implies that $\underline{\omega}$ is uniquely defined.

3. An argument similar to the one above proves the existence of $\overline{\omega} > y$. To establish the existence of $\widehat{\omega}$ note that whereas $\pi_i(\tau^l) - \pi_i(\tau^h)$ strictly increases with y_i when $y_i > y$, for u concave enough there exists a threshold value of income such that the absolute value of Δu_i decreases with y_i. Since Δv_i (which is strictly positive) is independent of y_i it follows that exists $\widehat{\omega} > \overline{\omega}$ such that $\Delta u_i + \Delta v_i > 0$. ■

Appendix B: Experimental Instructions (translated from the Hebrew original)

B1. Instructions for Group Treatment:

Experiment in Decision-Making

This is an experiment in group decision-making. During the experiment, you will make decisions and the other participants will do so as well. Your decisions and those of the others will determine the payment that you will receive according to rules that we will explain later on.

You will be paid in cash at the end of the experiment, exactly as the rules say. Your income during the experiment will be measured in **Francs.** Your income in **NIS** [New Israeli Sheqalim] will be determined at the exchange rate of 40 Francs per 1 NIS.

The experiment will be conducted by means of computer. All decisions that you make during the experiment will be implemented by keying appropriate commands.

Please remain totally silent during the experiment and do not speak with the other participants. Turn off your cell phones. If you have a question of any kind, raise your hand and one of the supervisors will come over to you.

At this time, we wish to explain the rules that determine how much you will be paid in this experiment. At the end of the explanation stage and before the experiment itself begins, you will be asked to answer several questions that are meant to make sure that you understand the rules of the experiment clearly. Your answers to these questions will not affect the payments that you will receive at the end of the experiment. We will begin the experiment only after all participants understand the rules clearly.

There will be 18 participants in the experiment.

Placement in Groups

The experiment examines decision-making in groups. The group in which you have been placed was determined by your major field of studies at the University; all other members of your group are majoring in similar fields.

The participants in this experiment come from two groups: students of the Faculty of the Humanities and students of the Faculty of Social Sciences. (Students whose majors include departments in both faculties are not taking part in the experiment.) The two groups are identical in size and include nine participants each.

Note that since the composition of the groups was determined by the participants' majors, it will be *constant* throughout the experiment.

Decision-Making

In the course of the experiment, you will be asked to make several decisions. The decisions that you make will determine the payments that you, the members of your group, and the members of the second group will receive at the end of the experiment.

The experiment will include 40 rounds. At the beginning of each round, the computer will determine randomly the total income of each group and the "gross" income of each participant in this round. A participant's income in a certain round may range from 10 Francs to 150 Francs. The computer will inform each participant about his or her gross income in this round. Each participant will also receive information about the following:

* the average income in his or her group in this round;
* the average income in the second group in this round;
* the average income of all participants in the experiment in this round.

After receiving the information about incomes in this round, you will be asked to make a decision.

The decision is a choice between two proposed tax rates (for example 20 percent or 40 percent). One of these rates, the one that is chosen, will be imposed on the incomes of all participants in this round. The tax rate is determined by elections; the rate that receives a majority of votes is the winner in the elections. In the event of a tie, the computer will determine the winning tax rate at random (by a draw).

The tax rate that wins the elections will be imposed on the gross income of all participants in the experiment (from both groups). The revenue collected from the participants are the tax receipts. After the computer collects these taxes, all the tax receipts from this round will be distributed equally to all participants in the experiment as a "bonus."

For example, say that in a given round the tax rate chosen in the elections is 10 percent. In this case, each participant whose gross income in this round was 100 Francs will pay 10 Francs in taxes. Other participants whose gross income in this round was 20 Francs will pay a tax of 2 Francs. However, all participants will receive **the same bonus,** equal to the total tax receipts—gathered from all participants—divided by the number of participants.

Say that the total income of the participants in this round is 1080 Francs. The computer will collect 10 percent of this sum from all participants as tax receipts in this round (108 Francs) and each participant will receive an equal portion of the tax receipts, in this case: 108 / 18 = 6 Francs.

Thus, the final income in this round of the participants whose gross income was 100 Francs is 96 Francs (100 – 10 + 6 = 96).

The final income in this round of participants whose gross income was 20 Francs is 24 Francs (20 – 2 + 6 = 24).

After receiving the information about incomes in this round, the screen will show the two proposed tax rates: 20 percent and 40 percent. You will have to decide which rate to vote for. As stated, the rate that receives a majority of votes from participants in this round of the experiment will be applied to the gross incomes of all participants in this round. In the event of a tie, the computer will determine the winning rate at random, with each rate having an equal likelihood of being chosen.

The first round ends when all participants, in both groups, finish voting and the computer applies the chosen tax rate to their income. Round 2 will take place on the basis of the same rules as Round 1, and so on until the last round.

You will be given details about the results of the voting in each round only at the end of the experiment.

Note that in each round a new draw is held for the gross income of the two groups and their members. The participants vote only for the tax rate to be applied to the income from this round. In the next round, the computer holds a new draw for the gross income of the groups and of each participant, and the tax rate to be applied to this income is chosen all over again.

After the last round of voting is over, you will be asked to fill in a brief questionnaire. This will mark the end of the experiment.

At the end of the experiment, each participant's computer screen will show him or her the detailed results of the voting in all 40 rounds. At this stage, the computer will add up the total

Francs that you have accumulated in all the rounds of the experiment. Each participant will receive a notice with details on the following:

* his or her net income in all rounds of the experiment (i.e., the *final* tally of income from all rounds, after subtraction of tax payments and addition of bonuses in each and every round);
* the average income of his or her group (net, from all rounds in the experiment);
* the average income of the second group (net, from all rounds in the experiment).

As mentioned above, at the end of the experiment we will pay you the full sum that you accumulated in cash, at the exchange rate of 1 NIS for every 40 Francs.

The payments at the end of the experiment will be made in private; you do not have to tell anybody how much you earned.

The following example is meant to make sure that the rules of the experiment—how the taxes are calculated and collected and how the bonus is distributed—are clear to you. During the experiment, you will not have to make these calculations yourself; the computer will do it for you.

To save time, the example is based on two groups of three participants each. (As stated, in the actual experiment there will be two groups of nine participants each.)

Example 1:
The table below shows the income data of possible participants in a certain round. **Say that the tax rate that the participants chose in this round is 20 percent.**

	Gross income in this round	**Taxes collected from participants**	**Total taxes collected from all participants**	**Bonus per participant, from tax receipts**	**Final income of participant at end of round**
Group of students from Faculty A			4+8+18+ 8+18+28= 84		
Itamar	20	20%*20=4		84: 6 = 14	20-4+14=30
Moran	40	20%*40=8		14	40-8+14=46
Tal	90	20%*90=18		14	90-18+14=86
Avg., Faculty A	50	10		14	(30+46+86):3=54
Group of students from Faculty B					
Matan	40	20%*40=8		14	40-8+14=46
Iris	90	20%*90=18		14	90-18+14=86
Irena	140	20%*140=28		14	140-28+14=126
Avg., Faculty B	90	18		14	(46+86+126):3=86
Overall average	70	14		14	70

Notice that the taxation and the payment of the bonus do not change the average total income. However, they do change the income of each participant in the experiment. Furthermore, the average income of students in Faculty A rose from 50 to 54 whereas the average income of students in Faculty B declined from 90 to 86.

Example 2:
This time we assume that the 40 percent tax rate was chosen for this round.

	Gross income in this round	**Taxes collected from participants**	**Total taxes collected from all participants**	**Bonus per participant, from tax receipts**	**Final income of participant at end of round**
Group of students from Faculty A			8+16+36+16+36+56=168		
Itamar	20	40%*20=8		168:6=28	20-8+28=40
Moran	40	40%*40=16		28	40-16+28=52
Tal	90	40%*90=36		28	90-36+28=82
Avg., Faculty A	50	20		28	(40+52+82):3=58
Group of students from Faculty B					
Matan	40	40%*40=16		28	40-16+28=52
Iris	90	40%*90=36		28	90-36+28=82
Irena	140	40%*140=56		28	140-56+28=112
Avg., Faculty B	90	36		28	(52+82+112):3=82
Overall average	70	28		28	70

B2. Instructions for Control Treatment

Experiment in Decision-Making

This is an experiment in decision-making. During the experiment, you will make decisions and the other participants will do so as well. Your decisions and those of the others will determine the payment that you will receive according to rules that we will explain later on.

You will be paid in cash at the end of the experiment, exactly as the rules say. Your income during the experiment will be measured in **Francs.** Your income in **NIS** [New Israeli Sheqalim] will be determined at the exchange rate of 40 Francs per 1 NIS.

The experiment will be conducted by means of computer. All decisions that you make during the experiment will be implemented by keying appropriate commands.

Please remain totally silent during the experiment and do not speak with the other participants. Turn off your cell phones. If you have a question of any kind, raise your hand and one of the supervisors will come over to you.

At this time, we wish to explain the rules that determine how much you will be paid in this experiment. At the end of the explanation stage and before the experiment itself begins, you will be asked to answer several questions that are meant to make sure that you understand the rules of the experiment clearly. Your answers to these questions will not affect the payments that you will receive at the end of the experiment. We will begin the experiment only after all participants understand the rules clearly.

There will be 18 participants in the experiment.

Decision-Making

In the course of the experiment, you will be asked to make several decisions. The decisions that you make will determine the payments that you will receive at the end of the experiment.

The experiment will include 40 rounds. At the beginning of each round, the computer will determine randomly the "gross" income of each participant in this round. A participant's income in a certain round may range from 10 Francs to 150 Francs. The computer will inform each participant about his or her gross income in this round. Each participant will also receive information about the average income of all participants in the experiment in this round.

<u>After receiving the information about incomes in this round, you will be asked to make a decision.</u>

The decision is a choice between two proposed tax rates (for example 20 percent or 40 percent). One of these rates, the one that is chosen, will be imposed on the incomes of all participants in this round. The tax rate is determined by <u>elections</u>; the rate that receives a majority of votes is the winner in the elections. In the event of a tie, the computer will determine the winning tax rate at random (by a draw).

The tax rate that wins the elections will be imposed on the gross income of all participants in the experiment. The revenue collected from the participants are the tax receipts. After the computer collects these taxes, all the tax receipts from this round will be distributed <u>equally</u> to all participants in the experiment as a "bonus."

For example, say that in a given round the tax rate chosen in the elections is 10 percent. In this case, each participant whose gross income in this round was 100 Francs will pay 10 Francs in taxes. Other participants whose gross income in this round was 20 Francs will pay a tax of 2 Francs. However, all participants will receive **the same bonus,** equal to the total tax receipts—gathered from all participants—divided by the number of participants.

Say that the total income of the participants in this round is 1080 Francs. The computer will collect 10 percent of this sum from all participants as tax receipts in this round (108 Francs) and each participant will receive an equal portion of the tax receipts, in this case: 108 / 18 = 6 Francs.

Thus, the final income in this round of the participants whose gross income was 100 Francs is 96 Francs (100 – 10 + 6 = 96).

The final income in this round of participants whose gross income was 20 Francs is 24 Francs (20 – 2 + 6 = 24).

After receiving the information about incomes in this round, the screen will show the two proposed tax rates: 20 percent and 40 percent. You will have to decide which rate to vote for. As stated, the rate that receives a majority of votes from participants in this round of the experiment will be applied to the gross incomes of all participants in this round. In the event of a tie, the computer will determine the winning rate at random, with each rate having an equal likelihood of being chosen.

The first round ends when all participants finish voting and the computer applies the chosen tax rate to their income. Round 2 will take place on the basis of the same rules as Round 1, and so on until the last round.

You will be given details about the results of the voting in each round only at the end of the experiment.

Note that in each round a new draw is held for the gross income of all the participants. The participants vote only for the tax rate to be applied to the income from this round. In the next round, the computer holds a new draw for the gross income of each participant, and the tax rate to be applied to this income is chosen all over again.

After the last round of voting is over, you will be asked to fill in a brief questionnaire. This will mark the end of the experiment.

At the end of the experiment, each participant's computer screen will show him or her the detailed results of the voting in all 40 rounds. At this stage, the computer will add up the total Francs that you have accumulated in all the rounds of the experiment. Each participant will receive a notice with details on his or her net income in all rounds of the experiment (i.e., the final tally of income from all rounds, after subtraction of tax payments and addition of bonuses in each and every round).

As mentioned above, at the end of the experiment we will pay you the full sum that you accumulated in cash, at the exchange rate of 1 NIS for every 40 Francs.

The payments at the end of the experiment will be made in private; you do not have to tell anybody how much you earned.

The following example is meant to make sure that the rules of the experiment—how the taxes are calculated and collected and how the bonus is distributed—are clear to you. During the experiment, you will not have to make these calculations yourself; the computer will do it for you.

To save time, the example is based on an experiment with six participants. (As stated, in the actual experiment there will be eighteen participants).

Example 1:

The table below shows the income data of possible participants in a certain round. **Say that the tax rate that the participants chose in this round is 20 percent.**

	Gross income in this round	**Taxes collected from participants**	**Total taxes collected from all participants**	**Bonus per participant, from tax receipts**	**Final income of participant at end of round**
			4+8+18+ 8+18+28= 84		
Itamar	20	20%*20=4		84: 6 = 14	20-4+14=30
Moran	40	20%*40=8		14	40-8+14=46
Tal	90	20%*90=18		14	90-18+14=86
Matan	40	20%*40=8		14	40-8+14=46
Iris	90	20%*90=18		14	90-18+14=86
Irena	140	20%*140=28		14	140-28+14=126
Overall average	70	14		14	70

Notice that the taxation and the payment of the bonus do not change the average total income. However, they do change the income of each participant in the experiment.

Example 2:
This time we assume that the 40 percent tax rate was chosen for this round.

	Gross income in this round	**Taxes collected from participants**	**Total taxes collected from all participants**	**Bonus per participant, from tax receipts**	**Final income of participant at end of round**
			8+16+36+16+36+56=168		
Itamar	20	40%*20=8		168:6=28	20-8+28=40
Moran	40	40%*40=16		28	40-16+28=52
Tal	90	40%*90=36		28	90-36+28=82
Matan	40	40%*40=16		28	40-16+28=52
Iris	90	40%*90=36		28	90-36+28=82
Irena	140	40%*140=56		28	140-56+28=112
Overall average	70	28		28	70

Table 1: Gross Income Distributions

	x_1	x_2	z_1	z_2
1	10	**20**	10	**20**
2	20	**30**	20	**30**
3	30	**40**	20	**40**
4	40	**50**	20	**50**
5	50	80	20	110
6	**80**	90	**80**	110
7	**90**	100	**90**	110
8	**100**	110	**100**	110
9	**110**	150	**110**	150
Group Mean	58.9	74.4	52.2	81.1
Overall Mean	66.7		66.7	

Note: Treatments with a conflict between own and group monetary payoff appear in boldface.

Table 2: Support for Ingroup among Social Identifiers

Random Effects Probit Estimates

	(1)	(2)	(3)
Cost/Benefit of Voting for Ingroup	-0.301***	-0.751***	-0.592***
	(0.021)	(0.062)	(0.091)
$(\text{Cost/benefit})^2$		0.090***	0.055***
		(0.012)	(0.016)
Poor Ingroup			-0.400***
			(0.132)
(Poor Ingroup) * (Cost/Benefit)			-0.399***
			(0.129)
(Poor Ingroup) * $(\text{Cost/benefit})^2$			0.083***
			(0.024)
Constant	1.348***	1.558***	1.833***
	(0.111)	(0.116)	(0.149)
Log likelihood	-759.3	-728.5	-696.2

Notes: The dependent variable is the probability of voting in support of the ingroup. The sample consists only of subjects classified as Social Identifiers and has 1680 observations. Standard errors in parentheses.
*** - significant at 1%.

Table 3: Subjects' Characteristics by Preference Type

	Group treatment			Control
	SI	**MPM**	**All**	
Percent male	0.333	0.486	0.413	0.333
Percent in Humanities	0.571	0.429	0.5	0.5
Percent studying Economics and/or Business	0.190***	0.471***	0.341	0.222
Parent income when in high school (1 = poor, 5 = rich)	3.143 (0.751)	3.057 (0.883)	3.056 (0.813)	3.278 (0.811)
Income today (1 = poor, 5 = rich)	2.929 (0.947)	2.886 (0.826)	2.849 (0.859)	3.037 (0.726)
Inequality: 1 = "Incomes in Israel should be more equal" 10 = "We need larger income differences as incentives for individual effort"	3.881* (2.452)	4.543* (2.250)	4.206 (2.347)	3.981 (2.023)
Helping the poor 1 = "The government should do everything possible to improve the standard of living of all the poor in Israel" 10 = "improving the standard of living of the poor is not the government's responsibility: people should take care of themselves"	3.048 (2.326)	3.529 (2.131)	3.373 (2.160)	3.444 (2.034)
Social identification: (1= strongly disagree, 7= strongly agree)				
1. Being a student of [own faculty] is an important part of my identity	4.143 (1.761)	3.829 (1.818)	4.040 (1.791)	
2. When someone criticizes[own faculty] it feels like a personal insult	3.167* (1.807)	2.629* (1.704)	2.968 (1.771)	
3. When I talk about students of [own faculty] I usually say 'we' rather than 'they'	3.976 (2.170)	3.786 (1.887)	3.968 (1.984)	
4. I am proud to be a student in [own faculty]	5.095 (1.590)	4.814 (1.467)	4.968 (1.486)	
5. I am similar to other students of [own faculty]	3.976 (1.774)	3.943 (1.453)	4.000 (1.565)	
6. I would rather be a student of [*other* faculty]	2.262 (1.251)	2.300 (1.366)	2.325 (1.361)	
Number of Subjects	42	70	126	54

Notes: Mean responses to questionnaire administered at the end of the experiment. Standard deviations are in parentheses. *Inequality* item adapted from the World Value Survey (WVS); *Helping the poor* item adapted from the General Social Survey; Social identification items 1-3 adapted from Roccas (2003); item 4 adapted from WVS, and items 5-6 adapted from Ellemers et al. (1999).

* - difference between SI and MPM populations is significant at 10% level by Mann-Whitney test.

*** - difference between SI and MPM populations is significant at 1% level by Mann-Whitney test.

Table 4: Correlation between Income and Self-Reported Preferences over Redistribution

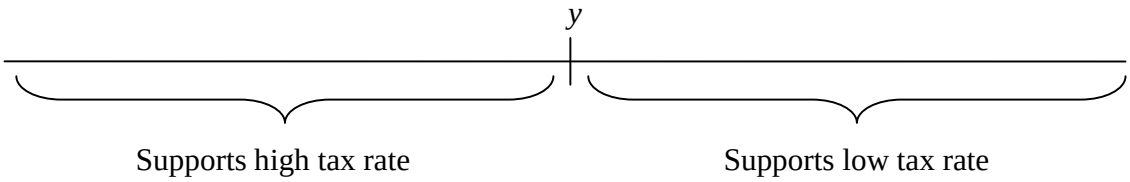
	SI	MPM	All	WVS Israel 2001	WVS/GSS USA 1999/2000
	(1)	(2)	(3)	(4)	(5)
Inequality: 1 = "Incomes in Israel should be more equal" 10 = "We need larger income differences as incentives for individual effort"	-0.070 (0.660)	0.283** (0.018)	0.162* (0.071)	0.120*** (0.000)	0.114*** (0.0001)
Helping the poor 1 = "The government should do everything possible to improve the standard of living of all the poor in Israel" 10 = "improving the standard of living of the poor is not the government's responsibility: people should take care of themselves"	-0.102 (0.522)	0.146 (0.230)	0.047 (0.599)		0.132*** (0.000)
N	42	70	126	1161	WVS:1174 GSS: 1816

Notes: p-values in parentheses. Columns 1-3 report results for experimental subjects in the group treatment, using the *parent income* variable (1=poor, 2=lower middle class, 3=middle class, 4=upper middle class, 5=rich). Column 4 reports results from the Israel World Values Survey using the same *inequality* question and respondent's social class (1=lower class, 2 =lower middle class, 3=middle class, 4=upper middle class, 5=upper class). Column 5 reports results for the *inequality* item from the USA 1999 World Value Survey, and for the *helping the poor* item from the GSS 2000, using a 4-valued social-class question (1=lower class, 4=upper class).

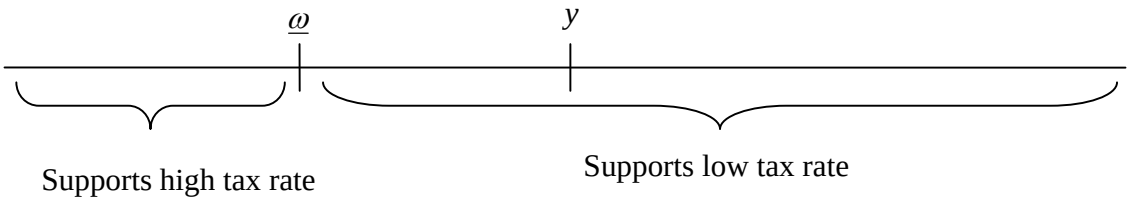
* - significant at 1%; ** - significant at 5%; *** - significant at 1%.

Figure 1: Implications of Identification for Voting Behavior

(a) A monetary payoff maximizer:



(b) An individual that identifies with a rich group:



(c) An individual that identifies with a poor group:

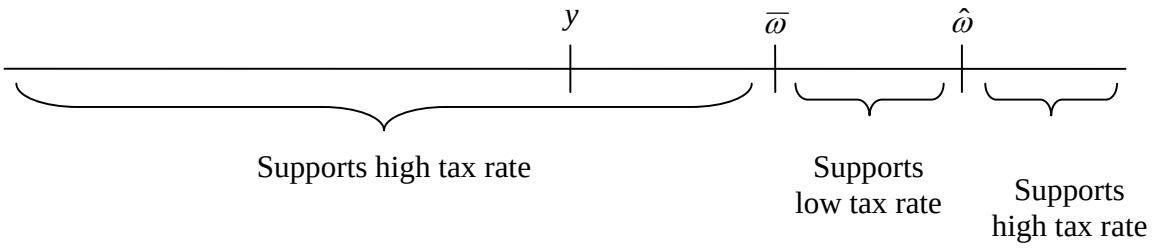
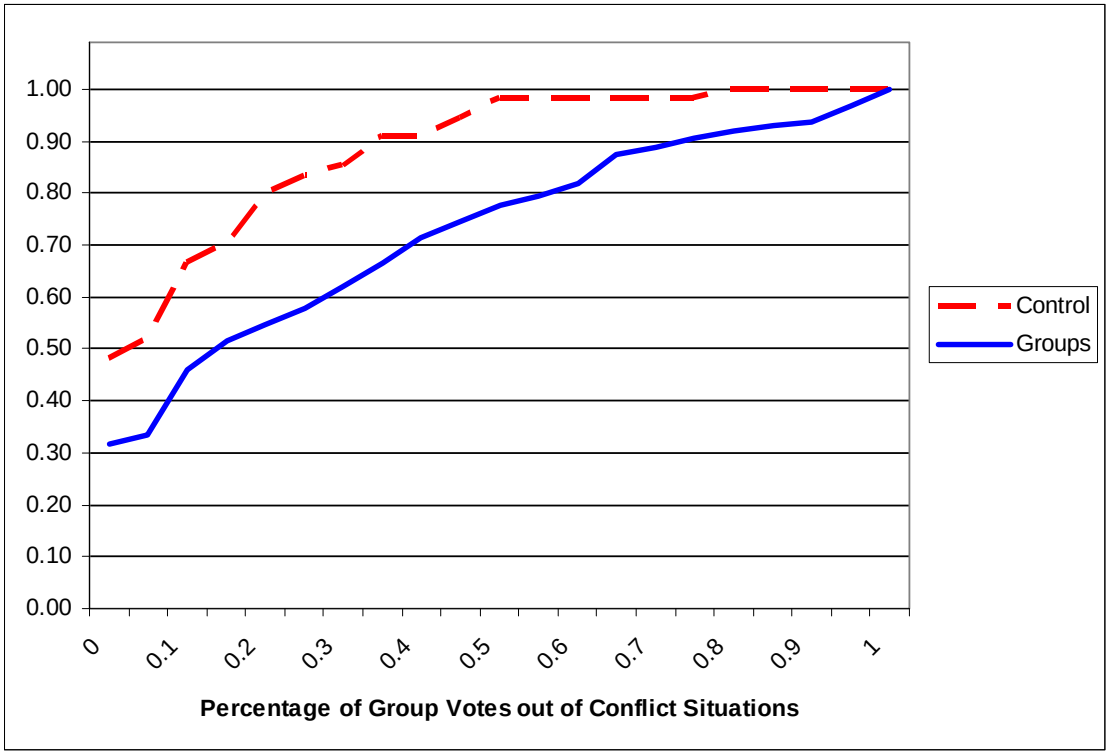
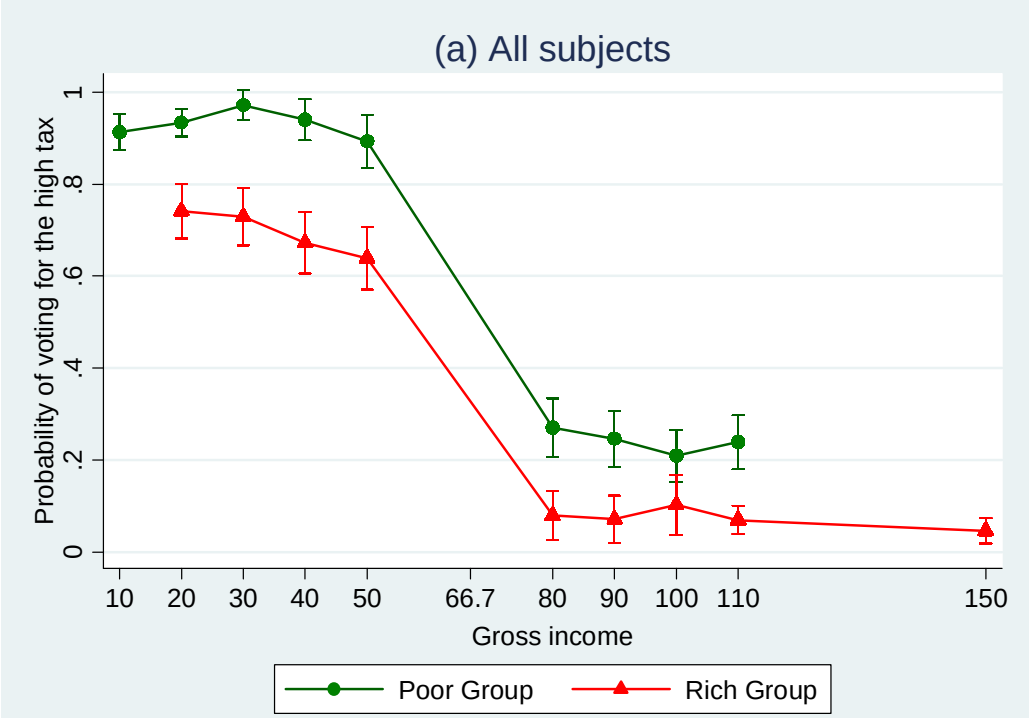


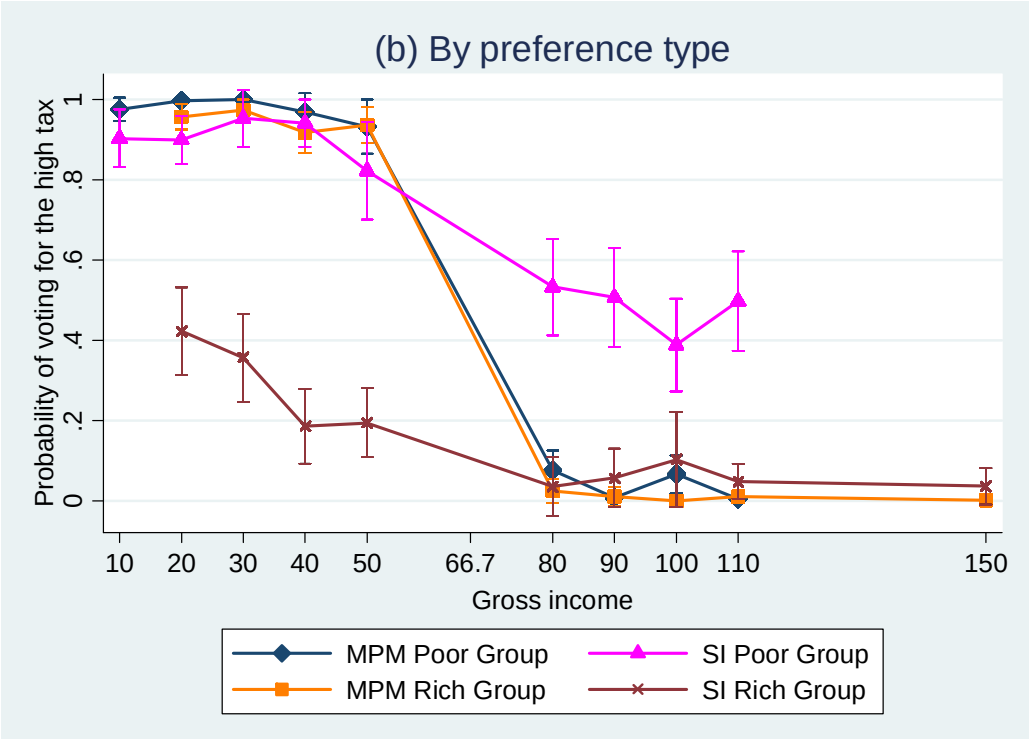
Figure 2: Cumulative Distribution of Group Votes out of Conflict Situations



Notes: There are 126 subjects in the group treatment and 54 subjects in the control treatment. The number of situations of conflict per subject varies from 10 to 26; its median is 18.

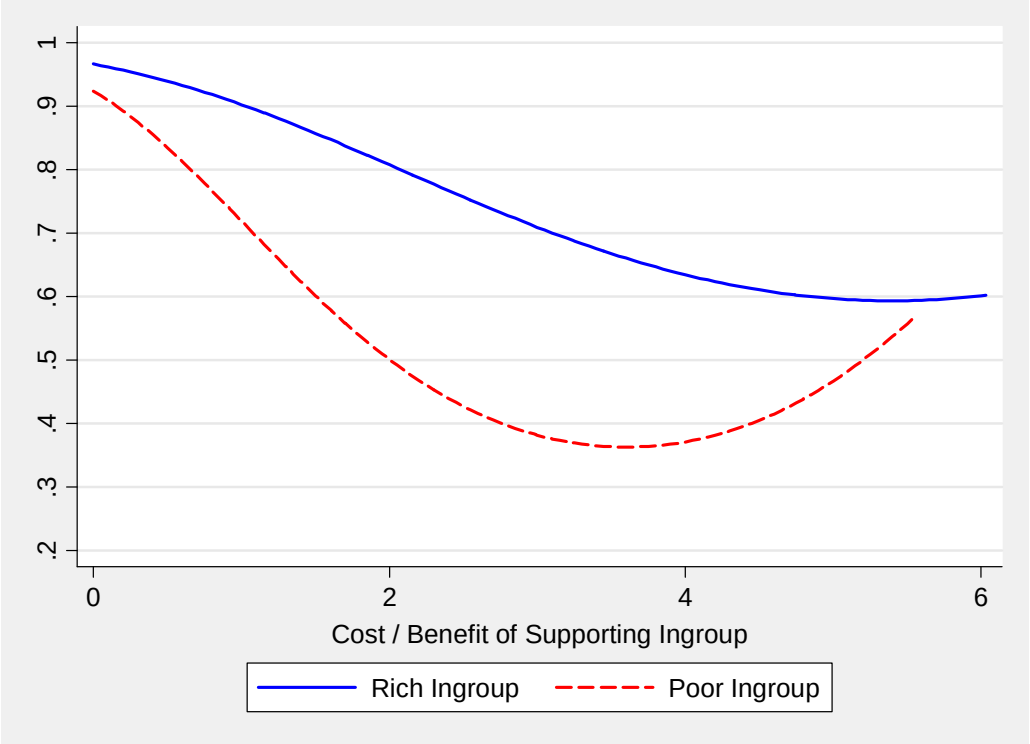
Figure 3: Propensity to Vote in Support of the high tax rate





Notes: For each subject we compute the proportion of votes for a high tax rate separately for each income and the subject's ingroup's relative income. The figures depict the mean across subjects at each income level. Capped ranges indicate 95 percent confidence intervals. Data are from the group treatment only.

Figure 4: Predicted Probability of Supporting the Ingroup



Note: Predicted probabilities from the random effects probit model in Table 2, estimated for Social Identifiers.