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Are Benevolent Dictators Altruistic in Groups? A Within-Subject Design

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Abstract

We use a within-subject experimental design to investigate whether systematic relationships exist across distinct features of individual preferences: altruism in a two-person context, risk aversion in monetary outcomes, and social preferences in a group context. We find that altruism is related to demographic variables, including years of education, gender, and age. Perhaps most importantly, self allocation in a two-person dictator game is related to social preferences in a group context. Participants who are more generous in a dictator game are more likely to vote against their self-interest in a group tax redistribution game which we interpret to be an expression of social preferences.

Keywords: Equity, social preferences, optimal taxation

JEL: C91, C92, D63, H21

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1 Introduction

Preferences are central to economic decision-making. A growing body of evidence in the social sciences supports the view that some people are concerned with the well-being of others as well as their own well-being. In the economics literature such concerns are often referred to as social preferences.[1] A number of theoretical models have been proposed to explain such findings. These theories implicitly assume that individual preferences are stable across games and over time. Whether in fact individuals have the same social preferences across different contexts is an important issue for developing a satisfactory theory of economic decision-making.

This question has received some attention in the literature. Brosig, Riechmann, and Weimann (2007) investigate a broad set of preferences across dictator and prisoner dilemma games as well as across time. They find that, except for those exhibiting purely selfish behavior, individually held social preferences are not consistent or stable across games. Blanco, Engelmann, and Normann (2010) examine the consistency of the Fehr and Schmidt (1999) theory of inequity aversion and find that the theory is capable of describing aggregate-level motives rather well but not individual-level motives.[2]

Despite the progress in understanding and modeling social preferences, there are still many unanswered questions, including the stability of social preferences across games. This paper reports the results of an experiment designed to shed further light on the nature of individually held social preferences across games and to provide useful insights into modeling them. In our experiment, we measure altruism among our participants using a two-person dictator game and measure social preferences in a five-person group tax redistribution game.[3]

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[1] See, for example, Fehr and Schmidt (1999); Bolton and Ockenfels (2000); Charness and Rabin (2002); Dufwenberg and Kirchsteiger (2004); Henrich, Boyd, Bowles, Camerer, Fehr, and Gintis (2004); Cox, Friedman, and Gjerstad (2007); Cox, Friedman, and Sadiraj (2008); and Battigalli and Dufwenberg (2009).

[2] In a sequential social dilemma game, Blanco, Engelmann, Koch, and Normann (2009) report evidence of a social preference effect but also an indirect effect based on beliefs about second-mover cooperation.

[3] While giving in an anonymous dictator game may arise from a variety of motives, such as signaling or guilt, we use it as a measure of altruism in this study.

We use altruism and social preferences as convenient terminology to distinguish between preferences expressed in our two-person dictator game as opposed to those expressed in our multi-person tax redistribution game. This distinction is important in the current context because behavior in our multi-person task may not be strictly altruistic.[4] Specifically, we explore whether a person who is more (less) generous in a dictator game is more likely to act against (in favor of) self-interest in a group task. Previous research suggests that risk preferences also influence individual choice.[5] Since cooperation and altruism may be adaptive responses to risk, we also include a task to measure the risk preferences of our subjects. We can thus examine whether risk preferences influence social preferences in our multi-person task.

Prior research suggests that there is significant heterogeneity among individuals in the three preference measures elicited in our experiments. For example, Charness and Genicot (2009) report evidence of significant heterogeneity in risk preferences among individuals. Bolton, Katok, and Zwick (1998) report that some people are quite generous when matched with an anonymous partner in dictator experiments. In contrast, other people are purely self-interested. Andreoni and Vesterlund (2001) report differences in altruism between genders. Finally, Ackert, Martinez-Vazquez, and Rider (2007) and Ackert, Gillette, Martinez-Vazquez, and Rider (2007) find that while many people appear to be concerned exclusively with their own payoff in a multi-person task, some appear to be willing to sacrifice their own payoff in order to benefit others.

By examining the relationship between choice in a two-person game and choices in a group task using a within-person design we can gain greater insight into the stability of social preferences across contexts. Importantly, we also control for potential confounding effects due to risk-sharing, changes in population expectations, and wealth effects. We measure an individual's social preferences using a tax redistribution voting game where the collective decision is made by majority rule. This design has several advantages. It is a collective decision with a fair likelihood of capturing heterogeneity of social preferences without invoking free-rider and reciprocal motives. In addition, individuals in the United States, where some of our

[4] For example, individuals may have malevolent motives, such as spite or envy; therefore, the "social preferences" observed in our multi-person task may not be altruistically motivated. Nonetheless, even in the case of malevolent motives, such behavior would reflect concerns about the well-being of others (in the negative sense) and thus an expression of social preferences.
[5] See, for example, Charness and Gneezy (2007), Charness and Genicot (2009), and Charness and Villeval (2009).

experimental subjects come from, are familiar with tax redistribution issues and are likely to have strong preferences about them. We also had access to nonstudent foreign nationals working as policy analysts in developing countries. Since tax regimes differ across countries, different decisions among our subject pools could be attributable to differences in the underlying population preferences for redistribution.

Since the context of our multi-person task may induce our subjects to express social preferences and exhibit risk averse behavior, we estimate a number of models that accountfor the potential endogeneity of altruism and risk preferences in this game. We find evidence consistent with previous findings in the literature: altruism and risk attitudes are correlated with gender, age, level of education, source of financial support, and total household income. Accordingly, we use these characteristics of our subjects as instrumental variables for altruism and risk attitudes in our empirical model of individual choice in the multi-person task. Interestingly, we find that once we control for altruism and risk attitudes, conventional demographic proxies for such preferences do not appear to have an independent effect on choices in our multi-person task.

The results of our within-subject design indicate a systematic relationship at the individual-level between self allocation in a dictator game and social preferences in a group task. This is in contrast to the results reported in the recent within-subject design of Blanco, Engelmann, and Normann (2010). The difference in their findings and ours may arise from the strategic properties of the group games chosen in our respective studies. Their group public goods game imbeds additional complexity with a confounding free-rider problem that is not present in ours. In addition, our group task involves five participants and theirs just two.

The remainder of this paper is organized as follows. In section 2 we describe our experimental design, including the details of each task. In section 3 we present the findings for each task. In section 4 we consider whether an individual's expression of altruism in a two-person dictator game and risk preferences in an investment game can predict expressions of social preferences in a group context. We conclude in section 5 with a summary of our results and suggestions for future research.

2 Experimental design and method

Each experimental session includes three tasks to measure distinct aspects of individual preferences: altruism in an anonymous two-person dictator game, risk preferences in an

investment game, and social preferences in an anonymous multi-person tax redistribution game. A total of six sessions were conducted, and every subject completed all three tasks. There were two subject pools. Four sessions consisted of students recruited at a large urban university (students), and two sessions consisted of foreign nationals who work as policy analysts in a variety of low-income countries visiting the United States for a two-week training course in fiscal analysis (policy group). Salient monetary earnings were paid with average earnings of $50 per participant for approximately two and a half hours of their time. The instructions are included in appendix A.

At the beginning of each session, an experimenter (the same person in all six sessions) read the instructions aloud. Participants were told that there would be three sections to the experiment and that their choices in one section would not affect their choices or earnings in any other section. To reduce the potential for wealth effects across tasks, all outcomes and earnings were determined at the end of each session. In addition to their earnings from the three tasks, subjects earned $4 if they arrived on time to the experiment and $4 for completing a post-experiment questionnaire which was designed to gather demographic information as well as their views on the experiment. Specific design considerations for each section are described below.

2.1 Risk preferences

Instructions for the investment task asked participants to make a choice regarding an investment of cash. They were given an endowment of $10 of which they could invest any portion in a risky asset that had a 50 percent chance of success. A randomly chosen participant flipped a coin at the end of the experimental session to determine the success of the investment. A participant's section 1 earnings were $10 – 1.5×X if the toss was heads and $10 – X if the toss was tails, where X is the amount invested in the risky asset.

2.2 Altruism

As in task 1, participants were asked to make a choice concerning the allocation of $10 in cash, but this time the allocation was between themselves and another anonymous, randomly selected participant in the session. They were told that at the end of the experimental session 50 percent of the participants would be randomly chosen to be allocators. Allocators would earn the amount they allocated to themselves, while the remaining participants would be recipients whose

earnings would be determined by the "recipient amount" allocated by one of the chosen allocators. Participants were told that in making their allocation decision they should assume that they would be among the chosen allocators. The instructions made it clear that neither they nor their matched partner would be able to discover each other's identity at any time.

2.3 Social preferences

Finally, thirteen tax decision sheets were distributed to the participants. Each decision is a paired choice between "Tax 1" and "Tax 2" which determined after-tax income and section earnings for each member of a five-person group. A majority vote determined the tax regime for that group.

There were twenty (ten) participants in each session and thus four (two) different groups per decision. The members of the groups for each of the thirteen decisions were anonymous and pre-randomized, and each member within a group had a different pre-tax income level. In all thirteen decision pairs, Tax 1 is always a flat $5 tax for each member of the group. The paired Tax 2 distributions were chosen, given the limits of our time and attention, to minimize collinearity among different measures of social preferences (i.e., advantageous inequality aversion, disadvantageous inequality aversion, efficiency, and maxi-min). Participants knew that only one of the thirteen decisions would be randomly chosen for the determination of earnings for this section.[6]

The pre-tax income or status of each participant was determined by drawing a card from a set of twenty (ten) cards, one for each participant. In the set of cards there were four (two) cards for each of the five pre-tax income levels: $10, $20, $30, $40, and $50. Participants were told that they would have the same pre-tax income for all thirteen decisions and that the participants would be randomly assigned to groups so that each of the five pre-tax income levels would be represented in each group. To set a common knowledge benchmark, they were also told that the total income in each group was $150, and the average income was $30.

The design considerations of group anonymity and the reporting of majority votes after all decisions reduces the possibility of visually-related personal biases, controls for wealth effects between decisions, and promotes stationary population expectations across the decisions.

[6] Recently, Hey and Lee (2005) examine whether subjects respond to the complete set of questions or separate various questions when paying them for just one choice. They conclude that subjects separate the various questions.

Importantly, there is no economic incentive for risk sharing in this task because (1) income level and income rank for each participant were held constant, (2) group membership was anonymous, and (3) groups were re-randomized after each of the thirteen tax distribution decisions.

3. Experimental results

A total of 110 subjects completed the experiment, including 70 university students and 40 foreign nationals in the policy group. Three participants did not provide their age, so we eliminated them from the sample used in the analysis. Descriptive statistics for the resulting sample of 107 participants and for each subject pool are reported in table 1. The average age across both subject pools is 31.6 years old, with the average age of the policy group (41.4) greater than that of the university students (26.2). Forty-two percent of the students are female, which is twice that of the policy group (21 percent). Forty-five percent of our student sample reports household income greater than $25,000 per year; the corresponding figure for the policy group is only 18 percent. These features of our sample reflect the fact that a large fraction of the student population consists of part-time students, many of whom work full-time, and the fact that the policy professionals come from very low income countries, primarily in Sub-Saharan Africa. Across all participants, 65 percent are male, 65 percent support themselves (self support), and 21 percent report household income in excess of $50,000 per year.

3.1. Risk preferences

As previously discussed, each participant was asked to allocate $10 between a risk free asset and a risky one. On average, participants allocate $6.12 to the risky asset. Every participant allocated something to the risky asset. Over forty percent of the participants invested between $4 and $6, with the modal frequency being $5. Only 2.7 percent of participants invested $2 or less in the risky asset, while approximately 15 percent invested at least $8. Below we denote the amount invested in the risky asset as "risky," which serves as our operational measure of individual risk preferences in the analysis of the data generated by the multi-person tax redistribution game.

To examine whether individual characteristics are related to risk preferences, we estimate OLS regressions where the dependent variable is the amount allocated to the risky asset. The independent variables include the number of years in university (years in university); a dummy variable set equal to 1.0 if female (gender); a dummy variable set equal to 1.0 if the participant is

a member of the policy group (policy); number of completed university courses in finance and economics (economics courses); a dummy variable set equal to 1.0 for business majors (business students); a vector of dummy variables indicating whether the participant's primary source of income is self support (self support), support by a parent (parental support), or support by spouse (spousal support); total household income; and age and age-squared.[7]

In appendix B we report the regression results of a variety of specifications in order to shed light on the robustness of the estimated coefficients to alternative specifications. However, our discussion focuses on the specification that includes all the independent variables. Males, the subjects in the policy group, and those whose primary source of income is self support or parental support are less risk averse. We also find that risk aversion increases at a decreasing rate in age.

3.2 Altruism

Participants were asked to allocate $10 in cash between themselves and another anonymous, randomly selected participant. Randomly chosen allocators received the amount they allocated to themselves, while the remaining participants received the amount allocated to the recipient by their randomly paired allocator. For the complete sample of 110 subjects, the average self allocation was $6.90. The vast majority of our subjects kept at least half of their endowment of $10. In fact, 18 percent of the participants kept all of it. By comparison, 36 percent of the participants in Forsythe, Horowitz, Savin, and Selton (1994) offered zero to their paired recipient in a dictator game.[8] Below we denote the amount allocated to self as "self allocation," which serves as our operational measure of altruism in our analysis of the data generated by the multi-person tax redistribution game.

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[7] Total household income is a variable that assumes integer values between 1 and 5, where "1" indicates total household income is less than $25,000; "2" indicates household income is between $25,000 and $50,000; "3" indicates total household income is between $50,000 and $75,000; "4" indicates total household income is between $75,000 and $100,000; and "5" indicates total household income is greater than $100,000.

[8] Many dictator games are reported in the literature, and there is significant variability in self allocations in such games. In their examination of this variability, Bolton, Katok, and Zwick (1998) conclude that differences in context and written instructions are the primary sources of the observed varaibility. According to Forsythe et. al. (1994), a potential source of greater selfishness is that dictators were certain to take that role in their version of the game.

To examine whether individual attributes are related to self allocation, we estimate regressions where the dependent variable is self allocation. The independent variables are the same as those used in the regressions for risk preferences. The results reported in appendix B indicate that self allocation is positively correlated with the number of economics and finance courses and negatively correlated with self and spousal support. As with risk, we do not observe a significant difference across student and the policy subject pools.

3.3 Social preferences

Our third task provides a measure of participants' social preferences in a group context allowing for potential status effects, which are induced by the endowed pre-tax income levels randomly assigned to our subjects. We find that roughly 80 percent of the 1,391votes are consistent with self-interest, i.e., voting for the distribution that maximizes own payoff; whereas, approximately18 percent are consistent with a willingness to sacrifice own payoff to benefit others. Interestingly, only 48 percent of the participants vote exclusively for the distribution that maximizes own payoff across all 13 decisions. In our analysis, we classify a decision as consistent with self-interest (social = 0) if the vote is cast for the distribution that maximizes own payoff; a vote is consistent with social preferences (social = 1) if the subject votes for the smaller of the two own payoffs.[9]

We examine the distribution of the 246 other-regarding votes according to the cost or sacrifice from voting against the alternative that would maximize own payoff. We measure the frequency of social votes for a given sacrifice in own payoff out of the total number of 1,391 votes. As one might expect, the percent of social votes is decreasing in the change in own payoff, suggesting an inverse relationship between the willingness to benefit others and the price of doing so in terms of the sacrifice in own payoff.[10] We also examine the distribution of social votes by status, which is simply a participant's rank in the pre-tax income distribution (pre-tax

[9] Ackert, Gillette, Martinez-Vazquez, and Rider (2007) use the data from the third task of the experiment reported in this paper to examine the maximin preferences of Rawls (1971) and the inequality aversion model of Fehr and Schmidt (1999) and conclude that both models appear to explain choices. In contrast, Engelmann and Strobel (2004 and 2006) find inequality aversion has no additional explanatory power relative to a model that accounts for maximin preferences and concerns about efficiency or the sum of all payoffs.

[10] Andreoni and Miller (2002) also report that altruistic preferences are not monotonic.

income = $10, $20, $30, $40, or $50). We find that high status participants (pre-tax income = $40 or $50) cast more social votes than that cast by low status subjects (pre-tax income = $10 or $20). Specifically, low status subjects cast 77 social votes as opposed to 98 social votes cast by high status subjects. As discussed in more detail below, this finding holds up when we control for potential confounding effects. We find that status has a positive and statistically significant effect on the probability of casting a social vote in this multi-person tax redistribution game.

4 Do risk preference and altruism predict social preferences?

To examine whether altruism, risk preferences, and social preferences are systematically related, we next combine the evidence collected across the three tasks. We ask the following question: Can we predict individual expressions of social preferences in a group task based on altruism observed in a two-person dictator game and risk preferences observed in an investment game?

The challenge in selecting an econometric model of social preferences is twofold. First, there is no widely accepted economic theory of the way in which social preferences enter an individual's utility function, if indeed that is the proper way to account for social preferences. There are a number of competing theories, and the research on the relative performance of these theories is mixed.[11] Second, the source of social preferences is not clear. According to one school of thought, other-regarding behavior is an intrinsic attribute of an individual that may be independent of the acquired characteristics of an individual, such as their age, education, income, and so on. In contrast, others contend that fairness and altruism are the result of socialization and other life experiences. For still other researchers, social preferences depend on the behavior of others and an individual's status, so that other-regarding preferences vary for a particular person across games and contexts. To further complicate matters, there is some preliminary evidence that a large fraction of the population are conditional cooperators, while others may be unconditionally cooperative, and still others may be unconditionally competitive.

To choose an appropriate econometric model one must first choose among the competing theories of social preferences. Rather than taking a firm stand, we try to model a variety of theories. More specifically, we estimate Probit regressions with a binary dependent variable which indicates whether a participant votes for or against maximizing own payoff in the multi-

[11] For a discussion of the various schools of thought and references to this literature, see Henrich, Boyd, Bowles, Camerer, Fehr, and Gintis (2004).

person tax redistribution task (social vote = 1). Since the sacrifice in own payoff is used to code the dependent variable, we cannot use the change in own payoff as an independent variable in our model. In the Fehr and Schmidt specification (henceforth FS model), the independent variables are the individual's risk preferences; self allocation in the dictator game; status in the group task as measured by their initial endowment; the difference in disadvantageous and advantageous inequality between the two tax regimes; and demographic variables shown to be correlated with altruism.[12] In the Charness and Rabin quasi-maximin specification of the model (henceforth the CR model), we substitute (i) the difference in the payoff to the subject in each group with the lowest pre-tax income (Rawls) and (ii) the difference in the sum of the payoffs (efficiency) for the differences in disadvantageous and advantageous inequality.

In the FS model, people are concerned about their own payoff but are averse to disadvantageous and advantageous payoff inequality. Following their definitions, we measure the difference in disadvantageous and advantageous inequality in the group task as $\Delta(n\text{-}1)^{-1}\Sigma_j \max(\pi_j - \pi_i, 0)$ and $\Delta(n\text{-}1)^{-1}\Sigma_j \max(\pi_i - \pi_j, 0)$, respectively, where π_i is the payoff of the i^{th} participant.[13] In the CR model, people are concerned with maximizing the sum of the payoffs and maximizing the payoff of the worst off individual. Following their definitions, we measure the difference in total payoffs (efficiency) and the difference in the minimum payoff (Rawls) as $\Delta\Sigma_i\pi_{it}$ and $\Delta\min(\pi_{it})$, where π_{it} is individual i's payoff under tax regime t (=1,2), respectively.

As explained in greater detail below, the context of the specific game may make our measures of altruism and risk preferences endogenous in our multi-person tax redistribution task.

[12] Ackert, Gillette, Martinez-Vazquez, and Rider (2007) include a measure of the change in the payoff to the worst off participant to control for maxi-min preferences and the change in the sum of individual payoffs to control for concerns about efficiency. When these variables are included in the analysis of this paper, they do not explain choices. We believe that this discrepancy in findings in the two closely related studies stems from a difference in the definition of the dependent variable which highlights the complexity of using a generic term such as altruism to explain multifaceted social behavior within and across games.

[13] We calculate the difference in disadvantageous inequality (ddi) and the difference in advantageous inequality (dai) differently than in Ackert et al (2007) who calculate ddi and dai relative to tax 2.

Therefore, we also report the results of estimates from an IV Probit model that accounts for the potential endogeneity of our operational measures of altruism and risk preferences.[14]

Probit estimates of both the FS and CR models are reported in columns 1 and 2 of table 2, respectively. Starting with the FS model (column 1), the estimated coefficient of status is positive and statistically significant at conventional levels, suggesting that an increase in status increases the propensity to cast a social vote. The estimated coefficient of the difference in advantageous inequality is negative and statistically significant at conventional levels, suggesting that, consistent with theory, a decrease in the difference in advantageous inequality all else constant, increases the propensity to cast a social vote. Finally, the estimated coefficients of the number of years in university and business major indicate that they have a negative and statistically significant effect on the propensity to cast social votes.

The estimates of the CR model (column 2) are very similar to those for the FS model. More specifically, status, business major, and years in university have the same signs and are statistically significant at conventional levels, as in the FS model (column 1). The estimated coefficient of "Rawls", which is the change in the minimum after-tax payoff in the group, is negative and statistically significant at conventional levels, suggesting that an increase in the payoff to the worst off individual decreases the propensity of casting a social vote. This is not consistent with Rawls preferences; thus, the CR model does not appear to predict social votes, at least in this context.

Finally and perhaps most importantly, the estimated coefficients of self allocation in the dictator game and investment in the risky asset are statistically indistinguishable from zero in both the FS and CR specifications. However, these specifications do not account for the potential endogeneity of risky and altruism; therefore, these estimates may not be consistent. We proceed below by addressing the potential endogeneity of altruism and risk preferences by estimating instrumental variable Probit regressions (henceforth IV Probit).

Previous research suggests that participant behavior in laboratory experiments may be quite sensitive to the context of the game.[15] Although we use neutral framing and language in the

[14] Since each of our 107 subjects makes 13 decisions in the multi-person tax redistribution game, we cannot assume that our 1,391 observations in this task are independent random variables. Therefore, we report clustered standards errors, assuming 107 clusters.

instructions, the nature of our game may elicit altruistic and risk-averse behavior. Thus, our measures of "altruism" and "risk preferences" are potentially endogenous in the Probit regressions reported above. To give our results a causal interpretation and to account for the potential bias due to potential endogeneity of these variables, we estimate IV Probit specifications of the FS and CR models.[16]

We use gender, age, age-square, self support, and total household income as instrumental variables for the potentially endogenous variables. To be valid, our instruments must be correlated with the potentially endogenous variables and uncorrelated with the error term in the second-stage Probit regression. As previously noted, our proposed instruments are correlated with altruism and risk preferences. Since the instruments are pre-determined, they should be exogenous. In addition, the usual rationale for including demographic characteristics, like our proposed instruments, in a model of social preferences is to account for unobserved heterogeneity in risk preferences and altruism. Since we are including direct measures of risk preferences and altruism to control for heterogeneous preferences in our sample, our proposed instruments should not have an independent effect on the dependent variable. Thus, excluding them in the second stage regression should be valid. Below, we report the results of a Durbin-Wu-Hausman test of exogeneity and the results of an Amemiya-Lee-Newey test of over identification. As discussed in more detail below, the results of these tests are generally consistent with the foregoing discussion.

The estimated coefficients using IV Probit of the FS and CR models are reported in columns 3 and 4, respectively, of table 2. Beginning with the FS model (column 3), the estimated coefficient of "self allocation in the dictator game" is negative and statistically significant at conventional levels. The IV Probit estimate of -0.396 (standard error = 0.192) is nearly 10 times larger than the Probit estimate. The IV Probit estimate of the coefficient of "investment in the risky asset" is negative but, just as before, statistically indistinguishable from zero at conventional levels. Using a Durbin-Wu-Hausman test, we reject the null hypothesis that altruism is exogenous (p-value = 0.10). Since there are more instruments than potentially

[15] Social preferences may be exaggerated in our group context because the likelihood of a vote proving pivotal is relatively small. Feddersen, Gailmard, and Sandroni (2009) argue that people are more likely to express preferences when the pivot probability of their vote is small.
[16] We use two-step, Generalized Method of Moments to estimate the IV Probit models. We report bootstrap estimates of clustered standard errors (107 clusters), using 1,000 replications.

endogenous variables, we are able to test the implied exclusion restrictions of omitting the instrumental variables in the second-stage Probit regression. According to the Amemiya-Lee-Newey minimum chi-square test with four degrees of freedom, we fail to reject the null hypothesis that the instruments are exogenous (p-value = 0.794).

The estimated coefficient of status is positive and statistically significant. However, the IV Probit estimate of 0.024 (SE = 0.010) is nearly twice that of the corresponding Probit estimate. The estimated coefficient of the change in disadvantageous inequality is statistically indistinguishable from zero, as in the case of the Probit estimate, and the estimated coefficient of the change in advantageous inequality aversion is negative and statistically significant at conventional levels. In the interest of space, we do not report specifications using the remaining demographic characteristics, namely the number of economics courses, business major, parental support, and spousal support. Including these variables in the model does not change our qualitative results, and their estimated coefficients are indistinguishable from zero. Finally, the IV Probit estimates of the CR model are qualitatively similar to the IV Probit estimates obtained from the FS model. Specifically, self allocation and status have the same signs and magnitudes as those in the FS model, and they are statistically significant. The estimated coefficient of Rawls is statistically significant but again has the wrong sign. According to the Durbin-Wu-Hausman test, we reject the null hypothesis that altruism is exogeneous at conventional levels of statistical significance. According to the Amemiya-Lee-Newey minimum chi-square statistic, we cannot reject the null hypothesis that the instrumental variables are exogenous in the second stage Probit regression.

In summary, the IV Probit estimates are generally consistent with one another. We find evidence that self allocation in the dictator game is endogenous.[17] Comparing the IV Probit estimates with their corresponding Probit estimates, it appears that failing to account for the endogeneity of self allocation results in biased and therefore potentially misleading results.

[17] Treating "risky" as exogenous or excluding it from the regressions altogether does not change our qualitative results of the remaining variables. In the interests of space, we do not report these alternative specifications.

5 Conclusion

We examine risk preferences, altruism, and social preferences in a laboratory experiment where the experimental design eliminates risk sharing motives and controls for changes in population expectations and wealth effects. We report evidence of a causal relationship between self allocation in a dictator game and social preferences in a group task designed to elicit social preferences. However, risk preferences do not appear to influence social preferences in our group task. Once we account for altruism and risk preferences in the multi-person tax redistribution game, demographic characteristics do not appear to belong in a model of social preferences. Our results suggest that social preferences, or the lack thereof, may be a fundamental trait of each individual's psychological make-up that explains behavior. Among participants who cast social votes, those with higher relative status in our group task are actually more likely to vote *against* their self-interest as compared to those with lower status. This is a noteworthy finding because status is induced by the game itself.

The findings reported in this paper should be reassuring to theorists and behavioral economists alike because there appears to be consistency in social motives across the two games. Specifically, our results suggest that the willingness to sacrifice own payoff to benefit another in the two-person dictator game is related to the willingness to sacrifice own payoff to benefit others in the multi-person tax redistribution game.

Future research should examine the impact of earned status on social preferences. Recall that status is endowed in our experiment. The existing literature does not provide a clear answer to the question of whether an earnings-based notion of justice has important effects on social preferences [see, for example, Hoffman and Spitzer (1985) and Rutström and Williams (2000)]. We would like to know how quickly behavior adapts and when the attitude towards other individuals becomes permanent, if it at all.

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Table 1
Summary Statistics[a]

Variable	All	Students	Professionals
Number of years in university	5.3 (1.7)	5.0 (1.5)	6.0 (1.8)
Gender (female = 1.0)	35%	42%	21%
Number of economics courses	4.8 (6.1)	5.0 (6.0)	4.3 (6.4)
Business major	65%	57%	82%
Age	31.6 (10.1)	26.2 (4.7)	41.4 (9.8)
Source of support			
Self support	65%	49%	95%
Parental support	24%	35%	5%
Spousal support	7%	12%	0%
Financial aid	28%	38%	10.5%
Scholarship	30%	43%	5.3%
Other	5%	7%	0%
Total household income			
1. $0 - $25,000	64%	55%	82%
2. $25,001 - $50,000	15%	20%	5%
3. $50,001 - $75,000	8%	12%	3%
4. $75,001 - $100,000	6%	7%	3%
5. Greater than $100,000	7%	6%	8%
Number of observations	107	69	38

[a] This table reports sample means (with standard deviations in parentheses) or the percentage of the sample falling within a particular category.

Table 2: Social votes in a multi-person tax game

Variable	Probit[a]		IV Probit[b]	
	(1)	(2)	(3)	(4)
Constant	-1.357 (1.573)	-1.287 (1.576)	1.275 (1.692)	1.281 (1.817)
Self allocation in dictator game	-0.040 (0.045)	-0.040 (0.038)	-0.396** (0.192)	-0.390** (0.208)
Investment in risky asset	0.032 (0.039)	0.030 (0.038)	-0.035 (0.139)	-0.031 (0.140)
Status	0.014** (0.006)	0.011*** (0.006)	0.024** (0.010)	0.021** (0.010)
Disadvantageous inequality	0.006 (0.006)	-	0.008 (0.006)	-
Advantageous inequality	-0.025*** (0.008)	-	-0.021*** (0.008)	-
Rawls	-	-0.011*** (0.004)	-	-0.009** (0.004)
Efficiency	-	-0.004 (0.003)	-	-0.003 (0.003)
Age	0.029 (0.088)	0.029 (0.088)	-	-
Age-squared	-0.0002 (0.001)	-0.000 (0.001)	-	-
Policy students	0.067 (0.302)	0.084 (0.303)	-	-
Number of economics courses	0.009 (0.016)	0.010 (0.017)	-	-
Total household income	-0.066 (0.077)	-0.073 (0.077)	-	-
Gender (female = 1)	0.300 (0.193)	0.286 (0.193)	-	-
Business major	-0.442** (0.173)	-0.447*** (0.172)	-	-
Years in university	-0.126** (0.064)	-0.127** (0.065)	-	-
Self support	0.289 (0.204)	0.289 (0.201)	-	-
Parental support	0.062 (0.262)	0.075 (0.263)	-	-
Spousal support	0.129 (0.318)	0.148 (0.310)	-	-
Number of observations	1,391	1,391	1,391	1,391
Log pseudolikelihood	-588.6	-593.3	-	-
Amemiya-Lee-Newey minimum chi-square statistic (p-value)	-	-	1.032 (0.794)	0.902 (0.825)

[a]Clustered standard errors are reported in parentheses, using 107 clusters.
[b]IV Probit is estimated by two-step Generalized Method of Moments, and bootstrap clustered standard errors, using 107 clusters, are reported in parentheses. The instrumental variables are gender, age, age-square, policy, self support, and total household income.
* significant at 10%; ** significant at 5%; *** significant at 1%.