Social Insurance and Income Redistribution in a Laboratory Experiment

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Abstract

Public assistance programs usually have two distinct effects: they equalize wealth in society, but they also cushion people against the effects of random catastrophic events, like natural disasters and serious illnesses. Thus, citizens may support these programs because they desire equality and fairness, but also because they wish to enjoy the protections of social insurance. We conduct a laboratory experiment to determine how differences in the environment can change a person's preference for income redistribution programs through these two avenues of influence. We find that survey measures of an individual's economic ideology are only effective predictors of a person's preference for income redistribution in our experiment when there is a moderate chance of a catastrophic income loss. When the chance of loss is very low or very high, liberals and conservatives do not systematically differ in their preference for redistribution. Our findings support the idea that ideology is primarily a reflection of attitudes toward the role of luck in life outcomes and whether society should correct for the whims of chance, and that elements in our experimental environment triggered this difference.

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Introduction

Citizen preferences for income redistribution from the rich to the poor are complicated. Public assistance that is directed toward hard-working but unfortunate people who have suffered a setback is typically viewed as commendable and important for a just and caring nation. Yet much of this redistributed income also reaches those who are permanently poor and working class. The value of this type of public assistance is hotly debated, with arguments centering on whether equalizing incomes is a worthy social goal. Income redistribution occurs in both cases, but the first may be seen as *social insurance* while the second may be seen as *welfare*. As a result, the public's preference for public assistance programs is necessarily an amalgam of two distinct elements: the desire to insure against misfortune, and the desire to equalize wealth.

Insomuch as part of the concept of fairness is *equality of outcome* or *proportionate reward*, income redistribution makes society fairer in at least one sense of that word. Public support for income redistribution may therefore reflect voters' desire for a fairer set of outcomes and may be accomplished through political institutions (Plotnick and Winters, 1985). Of course, jurisdictions vary in the extent to which they seek to effect true income redistribution and may tie their largess to various conditions, like school attendance, job search, and the like (Soss et al., 2001). Aside from its goal of taking from the haves and giving to the have-nots, income redistribution also serves as a form of social insurance: those who are middle class or wealthier may experience a stock market crash, debilitating illness, bad business decision, or natural disaster away from poverty, and thus desire to guarantee a minimum standard of living should they be subject to such a disaster.

Much of the existing theoretical and empirical literature considers the case where the goals of social insurance and income redistribution are separable, mirroring a real-world distinction between welfare provision and unemployment insurance. Early ventures into a formalized theory of redistribution considered the two cases separately (Orr, 1976; Meltzer and Richard, 1981; Mirrlees, 1971). More recently, Moene and Wallerstein's model assumes that voters

choose between redistribution programs that target the unemployed, such as unemployment insurance, and those that target the employed, such as earned-income tax credits (Moene and Wallerstein, 2001). For many real-world policy interventions, we believe that both motivations for redistribution–providing insurance and equalizing wealth–are involved in support for the programs in a way that is difficult to separate. Consider the cases of welfare and unemployment insurance. Traditional welfare programs, which provide assistance on the basis of poverty, also serve as a form of insurance by providing a floor beneath which income cannot fall. The secondary insurance role of welfare provides a non-altruistic motivation to extend this sort of benefit(Friedman, 1953).

Conversely, unemployment insurance provides the greatest benefit to those with frequent job turnover, little personal savings, or limited prospects for re-entering the workforce if laid off–that is, those in the working and lower-middle classes. Therefore, a person might support unemployment benefits for reasons of equality: these benefits disproportionately help the poor and those in declining industries, factory workers with little savings who will need extensive retraining to be hired elsewhere, and others who are at greater risk of losing employment. Here, too, the benefit extends as well to people with a lower probability of needing such insurance but who may support it because it satisfies tastes for redistribution as well as a desire to be insulated from the vicissitudes of the economy.

We believe that the literature on income redistribution can be profitably extended by studying individual preferences for programs that mix the motives of income equalization and social insurance. To that end, we conduct a laboratory experiment to measure individual support for these programs and how this support changes as the need for social insurance rises. To be clear, our intention is not to suggest that the laboratory study will generate a generalized estimate of the greater population's preference for redistribution. Rather, we intend to focus on the comparative static responses of subjects across treatments as a way of determining how the preferences of individuals may change depending on which elements are present. Due to the ability in the lab to have similar individuals making decisions in multiple

types of environments which vary in controlled ways, we will be able to obtain detailed choice data in environments that would be unobtainable in field data. Consequently, the laboratory provides a uniquely favorable environment for the test, as it allows us to control and/or measure influences that are thought to be critical to preferences for redistribution while eliminating the endogenous relationships among them that complicate inference (Alesina and Angeletos, 2005; Franzese and Hays, 2008).

Our findings confirm certain aspects of existing theories of redistribution and fairness, but also add a new dimension. We find that a person's distance from the mean of population income is strongly related to his or her preference for income redistribution, with those above the mean preferring less and those below the mean preferring more. This finding is anticipated by the theoretical models mentioned above. We also find that an increasing probability of a disastrous event is associated with a greater preference for redistribution and a weakened relationship between earnings and redistribution, probably because all individuals (regardless of relative income) seek to shield themselves from potential losses.

We also find a result unanticipated by these models: moderate risk of a random loss in earnings activates the ideological preferences of individuals who self-identify as being more liberal, which leads to their voting for higher tax rates than individuals who report themselves to be more conservative. This ideological activation does not occur in cases with zero or very high risk of a random loss of earnings. The difference in behavior in the intermediate loss case suggests the different manner in which conservatives and liberals are willing to support redistribution. Our finding suggests that conservatives are only willing to support redistribution when it is in their self-interest while liberals will support redistribution when it is in their self-interest and when those who are in need of redistribution are in that position due to bad luck rather than solely due to their own (lack of) effort. This finding is consistent with some prior work (Alesina, Glaeser and Sacerdote, 2001; Alesina and Angeletos, 2005; Alesina and La Ferrara, 2005) indicating that conservatives and liberals differ in their view of the role of chance on financial life outcomes.

Experiments in Redistribution

Ours is, of course, not the first laboratory study targeted at trying to understand individual preferences for redistribution. There exists a large literature on social preferences which attempts to determine the manner and degree to which individuals take the well being of others into account in their own decision making. This literature includes both laboratory studies Camerer and Thaler, 1995 as well as multiple different theoretical frameworks constructed to help explain the laboratory data (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000)

While this literature is too large to summarize in depth, the general theme of this literature is that there are many conditions and situations in which individuals are willing to decrease their own welfare to improve the welfare of others. For example, many researchers have found that subjects in the ultimatum game–a game in which one subject proposes a division of payoffs, and the other subject either approves the division or destroys the payoff for both players–do not behave as game theorists traditionally expected. Specifically, the proposer usually offers a more substantial payoff to the responder than expected, while the responder more frequently rejects unequal divisions than expected (Güth and Tietz, 1990). This result, along with similar findings in other experiments, has been interpreted to mean that subjects in these experiments have a preference for equality of outcomes that they balance against their preference for monetary payoffs. That is, the responder rejects unequal offers rather than accept a token payoff because those payoffs are unfair. The proposer therefore offers a more equal offer to head off the rejection (and to serve his/her own preference for equality).

There is also a literature that builds on these insights but is aimed more directly at determining whether or not individuals value equitable income distributions more highly than inequitable ones (Frohlich and Oppenheimer, 1990; Scott et al., 2001; Michelbach et al., 2003). The general finding in these works is that, when making hypothetical choices or financially meaningful choices under a Rawlsian veil of ignorance, individuals indicate a preference for earnings distributions that are more equitable. This research is informative,

but leaves uncertain whether individuals would have the same value for equity when not behind the Rawlsian veil and when their stated preferences have a direct impact on their well-being. In a prior experiment, Esarey, Salmon, and Barrilleaux (2009) found that the relative earnings of a subject was the main determinant in their vote for taxation, while survey measures of preference for fairness were not strong predictors. One aim of the current study is to determine if increasing the role of chance and randomness in earnings activates these ideological preferences.

Theory

Individual preferences for redistribution are driven by a number of individual and contextual factors. Existing research suggests that redistribution is driven at least partly by ideological beliefs and by an innate desire for fairness. Beyond that, what factors will influence a person's preference for taxation and redistribution in a risky environment, where a substantial proportion of that person's earnings may disappear due to a random event beyond their control? We begin with the basic theoretical structure of Meltzer and Richard (1981), who studied preferences for income redistribution in the absence of risk, and add a random loss to the model to study how expectations for behavior change.

Basic Model

In the Meltzer and Richard model, individual earnings are randomly distributed about a mean. The government chooses a flat tax rate that is assessed on all incomes. The proceeds are then equally distributed to all citizens. The effect of the program is to redistribute income away from those above the mean of the distribution (who pay more than they receive) and toward those below the mean; the degree of benefit or gain is proportional to the distance from the mean of the distribution.

Adapting this model for use in our setting is straightforward. First, consider that there

are two states of the world: one in which a person does not suffer a random loss of $r \in [0,1]$ proportion of their income, with probability π, and one in which a person does suffer this loss, with probability $(1-\pi)$. In the first state of the world, a person i expects to earn k_i dollars and pay τk_i in taxes, where $\tau \in [0,1]$ is the tax rate. He then expects to receive a $\frac{1}{n}$ share of the total taxes collected, which should equal $\tau n \mu$, where $\mu = \frac{1}{n}\sum_{j=1}^{n} k_j$ is the expected value of an individual's earnings before random losses in a population of size n. Therefore, a person's total utility function is:

$$u_i = (1-\pi)\left((1-\tau)k_i + \tau\mu\right) + \pi\left((1-\tau)(1-r)k_i + \tau\mu\right) \tag{1}$$

Differentiating this utility with respect to the tax rate, we find:

$$\frac{\partial u_i}{\partial \tau} = (1-\pi)\left(\mu - k_i\right) + \pi\left(\mu - k_i(1-r)\right) \tag{2}$$

Note that this derivative is a constant: utility either increases or decreases in taxes. Thus, the utility-maximizing tax rate will be a corner solution of either 0 or 100 percent taxes, depending on whether a person makes more or less than average; a person making more than average will prefer no taxes, while a person making less than average will prefer 100% taxes. When a random loss occurs, under most conditions[1] a person's net earnings will be less than the average, and therefore a greater probability of random losses should increase preference for taxation.

Key Comparative Statics

We can easily confirm that individual preference for redistribution decreases in one's own earnings. Letting $\mu_{-i} = \frac{1}{n}\sum_{j \neq i} k_j$ and substituting $\mu_{-i} + \frac{1}{n}k_i$ for μ in equation 2, we can

[1]Specifically, a random loss will move someone below the earnings average whenever whenever $\frac{\mu}{1-r} < k$.

take derivatives with respect to k_i:

$$\frac{\partial^2 u_i}{\partial \tau \partial k_i} = \pi \left(r - \left(1 - \frac{1}{n} \right) \right) - (1 - \pi) \left(1 - \frac{1}{n} \right)$$

This expression simplifies to:

$$\frac{\partial^2 u_i}{\partial \tau \partial k_i} = \pi r - \left(1 - \frac{1}{n} \right) \tag{3}$$

For all but the smallest populations, this quantity is negative.[2]

If we presume that the median voter makes less than μ_k (as would be consistent with a rightward-skewed earning distribution), the tax rate preferred by the median voter should increase if a mean-preserving spread in incomes occurs, just as it does in the Meltzer-Richard model. We can see this prediction by letting i be the median voter and examining equation 3: the marginal utility of tax increases for this voter rises as a mean-preserving spread in incomes forces his/her income downward.

Other Comparative Statics

We can also look at the impact of the probability and size of random losses on preference for taxation. The results largely comport with intuition. As the probability of a catastrophic income loss increases, preference for taxation should increase:

$$\frac{\partial^2 u_i}{\partial \tau \partial \pi} = k_i r \tag{4}$$

Enduring a random loss makes a person much more likely to have a final income below that of the average μ_k, and hence makes a tax and redistribution plan more attractive. The effect of this increase interacts multiplicatively with the size of the loss, r: preference for taxation

[2] Recall that $\pi, r \in [0, 1]$. Even for high probabilities of loss π and large loss rates r, the necessary population size to guarantee this result is small. For example, when $\pi = 0.8$ and $r = 0.8$, as in our experiment, $n \geq 3$ ensures that this derivative is negative.

should increase more as the size of the loss grows. Similarly, an increase in the size of the loss r causes an increase in preference for taxation:

$$\frac{\partial^2 u_i}{\partial \tau \partial r} = k_i r \tag{5}$$

Intrinsic Preference for Taxation

There are numerous reasons that individuals may intrinsically value (or devalue) taxation regardless of its impact on their individual self-interest. First, given prior evidence from dictator and ultimatum game experiments, it is plausible that people have an aversion to income inequality. As the income redistribution mechanism we study tends to reduce income inequality as well as providing social insurance, people may value taxation as a way of lowering income inequality. Second, people may have ideological support for (or opposition to) redistribution that transcends their financial self-interest, translating into a preference for higher (or lower) taxes.

We therefore add intrinsic preference for (or against) taxation to the original utility model of equation 1:

$$u_i = (1-\pi)\left((1-\tau)k_i + \tau\mu + \alpha\tau\right) + \pi\left((1-\tau)(1-r)k_i + \tau\mu + \beta\tau\right) \tag{6}$$

Note that we assign different intrinsic preferences for taxation in the cases where the person has (α) and has not (β) suffered a random income loss. Evidence a person's preference for taxation is related to the extent to which they believe luck is a factor in determining outcomes (Alesina, Glaeser and Sacerdote, 2001; Alesina and Angeletos, 2005; Alesina and La Ferrara, 2005). Specifically, liberals tend to believe that luck is an important determinant of outcomes, while conservatives deemphasize its role. Thus, intrinsic preference for taxation may systematically differ according to a person's response to the probability of a catastrophic loss.

The addition of these terms does not influence the relationship between earnings and preferred tax rate. However, the relationship between π and τ is now influenced by α and β:

$$\frac{\partial^2 u_i}{\partial \tau \partial \pi} = k_i r + \beta + \alpha \tag{7}$$

Similarly, intrinsic preference for taxation is bound up with the probability of a random loss of income:

$$\frac{\partial^2 u_i}{\partial \tau \partial \alpha} = \pi \tag{8}$$

$$\frac{\partial^2 u_i}{\partial \tau \partial \beta} = (1 - \pi) \tag{9}$$

Probabilistic Choice and Risk Aversion

The corner predictions that we make above are, of course, too strong for us to find in the results from the experiment. For our empirical analysis, we will adapt this deterministic choice model into a probabilistic one that allows a person to be more likely to choose the tax rates that yield them higher expected utility. This probabilistic choice model will retain the fundamental comparative static properties of this deterministic one, but will have the benefit of allowing us to employ it as a structural model in examining the behavior of the subjects.

We also make the assumption of risk neutrality in our theory above. If an individual is risk averse, then in the cases for which a risk neutral decision maker would prefer $\tau = 1$, the risk averse decision maker will as well: the expected value of a tax rate of 1 is still higher than any other tax rate. But when earnings are high enough relative to the average to lead to an optimal tax rate of 0 for a risk-neutral decision maker, we could observe interior tax rates or a move to the other bound for a risk-averse decision maker because a tax rate lowers the variance in the expected outcome; the reduction in variance can be more valuable to the risk averse decision maker than the potential drop in expected value. As a result, we will

include a risk aversion measure in our empirical analysis.

Research Design

If we could conduct an ideal test of our theory, what would the test look like? First, we need to measure a person's revealed preference for income redistribution, providing the appropriate incentives for the person to accurately and thoughtfully report that preference. Then, we need to measure that person's intrinsic (ideological or moral) preference for redistribution, the extent to which they stand to gain from redistribution, and their risk of catastrophic loss. Unfortunately, a person's economic standing and their social and political attitudes are endogenously intertwined with the social welfare system itself in a way that makes them difficult to separate empirically (Alesina and Angeletos, 2005; Franzese and Hays, 2008). Finally, we must rule out all other potential influences on redistribution preference that might frustrate causal inference.

These problems, which may be difficult to solve in field data, are comparatively easy to solve in a laboratory setting. We can ensure that income and political/social attitudes are causally separated by having subjects earn income in a task where their ability is heterogeneous, yet largely unrelated to their real-world income or political attitudes. We can design an institution that incentivizes subjects to accurately report their preferences for income redistribution. As the redistribution scheme is specific to the experiment and created via subjects' actions within it, we can ensure that causality flows in one direction. Finally, we can rule out rival causes or spurious correlation via randomization and control.

During a session of our experiment, 11 subjects are seated at private computer terminals. Each subject receives $10 at the end of the session for participating, with the opportunity to earn more money via decisions made in the experiment. The subjects are given oral and written instructions describing each aspect of the experiment. Practice screens allow the subjects to gain familiarity with each part of the software before the experiment begins.

Sample versions of the instruction scripts are available from the authors upon request. The experiment was conducted using the zTree software package for conducting experiments (Fischbacher, 2007).

Production

During each period, a subject spends 90 seconds engaged in a private, individual production task, a twenty-question multiple-choice spelling test. All subjects received the same spelling questions at the same times. The subject earns 16 cents as payment for each question correctly answered, loses 5.3 cents for each question incorrectly answered, and receives neither credit nor penalty for questions left blank.[3] This task is designed to model the sense of entitlement that wage-earners have to their paychecks; this entitlement may not exist if, for example, we simply gave them the money at the start of the experiment.

Treatment Conditions: Probability of Lost Earnings

There are three treatment conditions in the experiment. In the first treatment condition, earnings are simply distributed to the subjects according to their performance in the task. In the second condition, there is a 20% chance that any subject will experience a random event (akin to a natural disaster, job loss, or life-threatening medical condition) that destroys 80% of their earnings from that period. In the third treatment condition, there is an 80% chance that the random disaster event occurs, again destroying 80% of the subject's income. Subjects are fully informed of the nature of the random event and the probability with which it occurs before they begin the experiment.

[3]The penalty is present to discourage random guesses: the expected payoff from a random guess is zero.

Taxes and Redistribution

After five periods of earnings and random losses, the subjects are informed (for the first time) that they may vote on an income redistribution plan for their session. The redistribution setting is very similar to the one described in Meltzer and Richard (1981). Each subject casts a vote in the form of a percentage between 0 and 100; the median percentage becomes the effective tax rate. For future periods, taxes are paid according to the chosen rate before the random event occurs; hence, pre-loss incomes are assessed. Tax revenue is not impacted by the random event; thus, the tax system provides a safeguard against the potential for a random loss of earnings.

The vote that a subject casts serves as our measure of the subject's preference for income redistribution. Note that the median voting mechanism makes sincere voting a (weakly) dominant strategy: voting above or below one's true preference has no effect on the outcome unless one is the median voter, in which case sincere voting is optimal.

Each person in the session is entitled to an equal share of the total tax revenue collected. Those below the mean earnings level gain from the tax (they pay less than they collect), while those above the mean lose (they pay more than they collect). Therefore, higher taxes increase the equality of the income redistribution. After three periods of earnings, taxes, and losses, the subjects are then told that a second vote will be conducted to allow them to change the tax rate.

Note that the subjects are fully aware of all the information necessary to judge the effect of a tax on their self-interest, the benefits and costs that the tax will impose on others, and the change in equality as a result of the tax. While voting, each subject is shown a screen that lists every subject's mean pre-loss and post-loss earnings during the last three periods, with their own record identified, as well as the overall mean earnings.[4] The amount that any

[4]The readouts were listed in descending order to anonymize them and for ease of comparison.

subject stands to gain or lose from a tax is proportional to his/her distance from the overall mean.

Risk Preference Assessment and Survey

At the conclusion of the main portion of the experiment, the subjects also participated in a short lottery experiment designed to assess their preference for risk. We model the risk assessment measure after that conducted by Holt and Laury (2002), where subjects choose between two lotteries, one safe choice that pays either \$2.00 or \$1.60, and one risky choice that pays either \$3.85 or \$0.10. Subjects choose which of the pair of lotteries they prefer in a series of 10 of these different lotteries, with the probability of winning the larger prize (\$2.00 and \$3.85) starting at 10% and increasing in increments up to 100%. The number of risky choices–that is, choices of the more risky lottery–serves as an ordinal measure of a subject's risk aversion.

After the lottery experiment, we also administered a brief survey to the subjects to gather information about the subjects' demographics and attitudes toward income redistribution. The questions, some of which were derived from the General Social Survey and others of which we created, were targeted at the two different dimensions of redistribution noted earlier: we assessed tolerance for inequality, and tolerance for randomly-occurring disruptive events (natural disasters and unemployment). These questions that we used in our analysis are given in an appendix.

Empirical Analysis

We conducted four sessions of each of the three treatments of our experiment, with 11 subjects each, for a total of 132 subjects. Each subject voted twice, giving us a very short (2-period) panel of voting data. As the role of dynamics is limited in such a short panel and we wish to examine whether there are systematic differences between the first and second

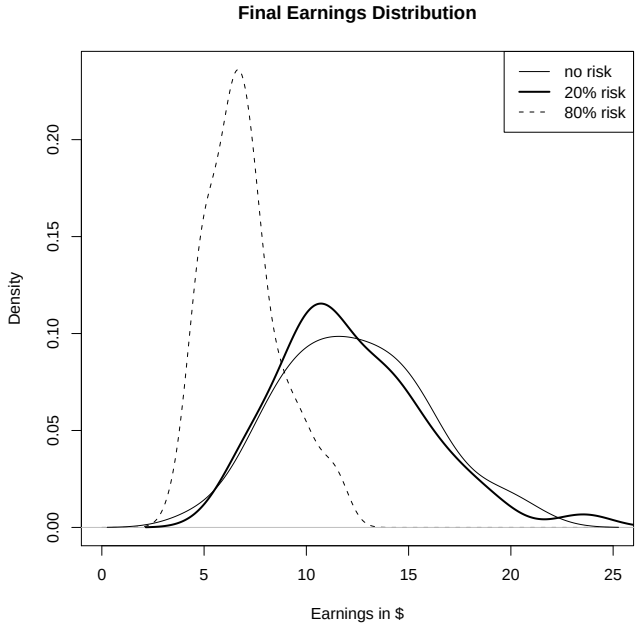

Figure 1: Distribution of Final Earnings, by Treatment

voting decision, we split the samples by voting decision and examine them separately.

Descriptive Statistics

A kernel density plot of subjects' earnings is shown in Figure 1. Subjects earned an average of \$10.48 ($\sigma = 3.98$) during the production and redistribution portion of the experiment.[5] As shown in the figure, both the no-loss and low-risk (20% chance of loss) treatments had a similar average earning level (\$12.35 and \$12.18 respectively) with similar variance in earnings, while the high-risk treatment (80% chance of loss) had a much lower earnings level (\$6.92) and lower variance due to the random loss. Thus, the high-risk treatment had the effect of decreasing inequality as well as average earnings.

On average, subjects voted for a 40.73% tax rate ($\sigma = 30.43$) during their first opportunity, and for a 41.89% rate ($\sigma = 34.47$) during their second opportunity. The distribution

[5]This figure does not include the \$10 show up fee, nor a small additional amount earned during the risk assessment lottery experiment.

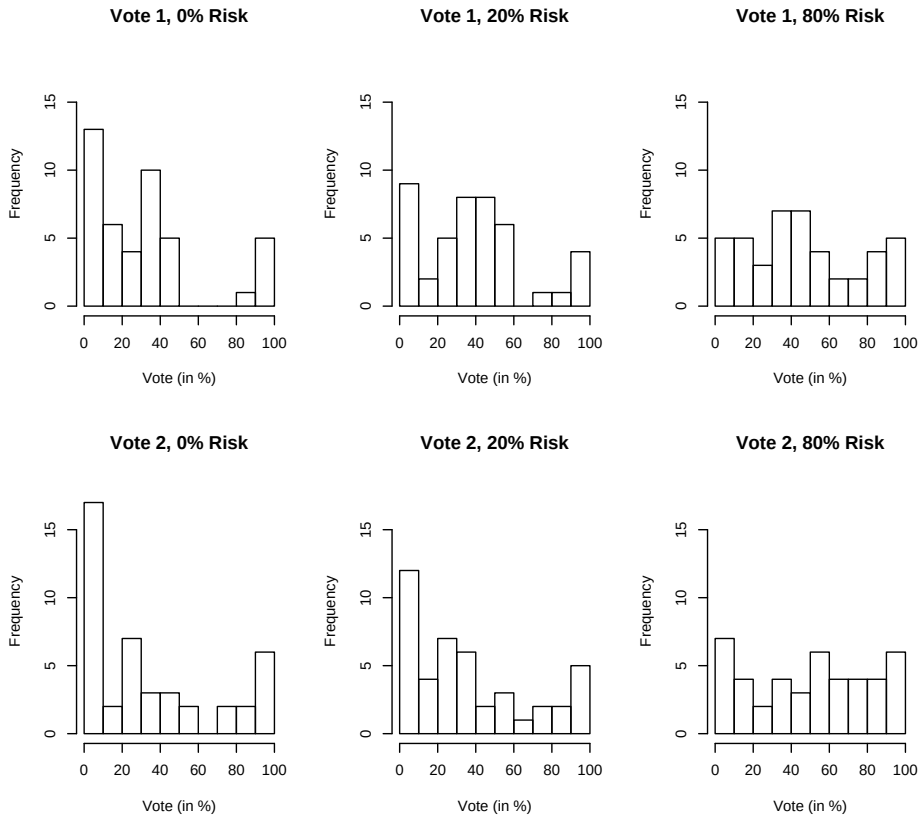

Figure 2: Distribution of Votes, By Treatment

of votes, broken out by treatment, is displayed in Figure 2. Qualitatively, it appears that increasing risk of disaster tends to move the distribution of votes away from a bimodal distribution, with concentrations at 0% and 100%, toward a more uniform distribution. There seems to be only minor change in overall distribution from the first vote to the second, a conclusion further bolstered by Figure 3, a scatter plot of first and second votes by individual. The fitted logistic regression line shows a tendency for subjects to slightly moderate their preferences (on average) over time, but to remain close to where they originally were.

Regression Analysis

There are several factors that we believe will determine a subject's preference for taxation in this experiment: a subject's self-interest, self-reported ideology, attitude toward assisting the victims of random chance, and the risk of a random loss. We use measures of these

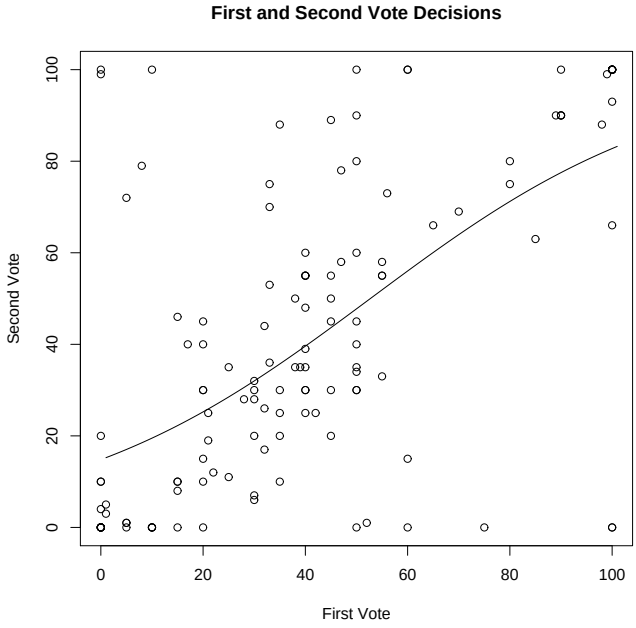

Figure 3: Plot of First and Second Vote Decisions

factors in a regression model to determine whether they are related to subjects' vote choices.

Variables

The dependent variable, vote, is bounded between 0 and 100; no change in an independent variable can push the vote beyond these boundaries. To deal with these boundary concerns, we employ a logistic model with the following form:

$$vote = \frac{1}{1 + \exp(-X\beta)}$$

where X contains explanatory variables and β fitted coefficients. As explained in the development of the deterministic choice model from which the base comparative static predictions were derived, for the empirical analysis we require an extension of that model which allows for probabilistic choice. This model can be seen as a direct extension of the previous one by assuming that the utility function defined before contains a random component. This will lead to votes on tax rates between the extremes of 0 and 100 when the expected utility dif-

ferential between those extremes is small but as their preferences become stronger in either direction and $X\beta$ becomes more extreme, the choices of an individual will tend towards the extremes exactly as predicted by the deterministic model analyzed before.

A subject's self-interest is measured by the distance between his/her own earnings at the time the vote choice was made and the overall session mean earnings of all subjects in that session (*Distance from Average*). Subtracting the session average from a person's earnings normalizes earnings and allows us to compare sessions to one another. Both own earnings and mean session earnings were averaged over the last three periods. Recall that subjects had access to their own earnings, the mean session earnings, and the earnings of every other subject in their session at the time the vote choice was made.

To obtain a measure of intrinsic preference for taxation, we use an index of five survey questions.[6] The questions loaded strongly on a single principal component (*Conservatism*), which we extracted using principal components analysis (PCA).[7] The questions asked were measures of the subjects' attitudes toward wealth accumulation, taxes, and income inequality as well as their partisanship and political ideology. Each question was coded so that a larger number indicated a more conservative response, and questions loaded on the principal component in the expected way. All our results are robust to alternative measurement approaches not employing PCA, such as simple additive indexes, and excluding certain questions.[8]

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[6]See the appendix for a list of the survey questions we used to construct our measures.

[7]The index was extracted using the `pca` command in Stata 10.1. Only one component (the one we use as *Conservatism*) had an eigenvalue greater than one.

[8]In one alternative measure, we simply coded the responses to our five survey questions on a range of -1 (least conservative) to 1 (most conservative), then added the responses together to form an index. In another measure, we used only an additive index of the two questions asking directly about party identification and conservative/liberal ideology. Our results are substantively identical for both of these alternative measures.

The same process was used to extract the principal component with the highest eigenvalue from four survey questions about subjects' attitudes toward assisting disaster victims (*Disaster Assistance*) and three questions about assisting the unemployed (*Unemployment*).[9] Responses were coded so that higher numbers indicated less agreement with assistance (consistent with the *Conservatism* measure), and each question loaded on the principal component as expected.

The treatment condition of the experiment–that is, whether there was a 0%, 20%, or 80% risk of a loss of 80% of earnings–is included as a set of dummy variables in the regression, with the 0% risk treatment serving as the reference category. Consistent with our theoretical prediction, we interact the treatment condition with *Distance from Average* to determine whether the risk of a disastrous income loss dampens the influence of self-interest. We also included a series of interactions between the treatment variables and our survey measures of preference for taxation, as indicated by our theory.

Finally, we employed the data gathered from the lottery choice portion of the experiment to measure the risk attitudes of the subjects by counting the number of risky choices the subjects made–that is, the number of times they picked the higher-variance lottery. The resulting variable, which varied from 0 to 10, is an indicator of the subject's risk tolerance (*Risk Preference*). More risky choices indicates a higher tolerance for risk.

Results

The results for the first and second vote decisions are listed in Tables 1 and 2, respectively.

Both hypotheses about the role of self-interest in decision-making are confirmed by the model. Those with greater earnings tend to favor lower taxes, while those with lesser earnings tend to favor higher taxes. However, this effect disappears in the treatments involving a risk of loss: the positive interaction coefficient makes the total effect of distance from

[9]In both cases, the questions loaded primarily on a single component: only one had an eigenvalue greater than 1.

average statistically insignificant in both voting decisions, and close to zero in the second vote decision.

As expected, increasing risk of a random earnings loss tends to increase a subject's preference for redistributive taxation, presumably because of the insurance benefit it provides. This effect is not statistically significant in the case of the 20% risk treatment, however, and actually *decreases* in size from the first to the second vote. Thus, for low levels of risk, it appears that social insurance is not considered necessary: the laboratory society that we created is willing to tolerate this level of risk.

We report only interactions on *Conservatism* in tables 1 and 2, as disaster assistance and unemployment had no statistically significant influence on voting behavior even with these terms added to the model.[10] As the regressions make clear, a subject's economic ideology is not a significant influence on their preference for income redistribution in the no-risk (0%) or high-risk (80%) treatments. However, in the moderate risk (20%) treatment, the total coefficient[11] on *Conservatism* is $-.374\,(\sigma = .185,\, p = .045)$ for the second vote data.

Our results indicate that ideological attitudes are a guide for voting behavior (and, consequently, for income redistribution preferences) when risky losses are neither absent nor (nearly) certain, but instead when they are present but reasonably unlikely. Note that ideology is not proxying for risk attitudes or beliefs about assisting those affected by random events (unemployment and natural disasters), as these alternative explanations are controlled for and neither is statistically significant.

In light of past evidence and of the alternative explanations that we have excluded, we believe that ideology acts as a filter through which our subjects viewed the role of chance in

[10] *Unemployment*80%* was statistically significant at the .05 level in a regression on the second vote decision, but the total effect of unemployment attitudes was still statistically insignificant in all treatments.

[11] The total coefficient is calculated using the formula $\frac{\partial G^{-1}(y)}{\partial \text{Conservatism}} = \beta_{\text{Conservatism}} + \beta_{\text{Conservatism*Treatment}} * \text{Treatment}$ (Brambor, Clark and Golder, 2006).

Table 1: Logistic Model, Vote 1

	beta	SE	p-value
Distance from Average	-1.47	.741	.050
Conservatism	.110	.139	.429
Disaster Assistance	-.0284	.100	.778
Unemployment	-.0921	.100	.359
20% Risk Treatment	.343	.300	.256
80% Risk Treatment	.692	.295	.021
Distance*20%	1.40	.868	.110
Distance*80%	.862	.842	.308
Conservatism*20%	-.306	.203	.133
Conservatism*80%	-.0924	.196	.639
Risk Preference	.0490	.0656	.457
Constant	-.954	.349	.007

Logistic model estimated using nl in Stata 10.1. $n = 132$, $R^2 = .691$. Standard errors are clustered on session. All p-values are two-tailed.

Table 2: Logistic Model, Vote 2

	beta	SE	p
Distance from Average	-2.02	.665	.003
Conservatism	.135	.164	.412
Disaster Assistance	-.165	.117	.161
Unemployment	-.00393	.111	.972
20% Risk Treatment	.0970	.353	.784
80% Risk Treatment	.787	.341	.023
Distance*20%	2.06	.790	.010
Distance*80%	1.73	.771	.027
Conservatism*20%	-.509	.239	.035
Conservatism*80%	-.218	.223	.330
Risk Preference	.0368	.073	.616
Constant	-.838	.400	.036

Logistic model estimated using nl in Stata 10.1. $n = 132$, $R^2 = .671$. Standard errors are clustered on session. All p-values are two-tailed.

determining outcomes. Thus, in cases where losses are absent or (nearly) certain, ideology played no role in their preference for income redistribution. When chance plays a major role in determining one's income–lucky individuals can avoid losses altogether in the 20% treatment, while unlucky individuals may face repeated losses–liberals respond by demanding greater income redistribution to compensate the unfortunate for their losses. Conservatives, by contrast, are more comfortable with these randomly-determined disparities.

We stress that we are *not* arguing that conservatives are more risk-acceptant than liberals in our experiment. Indeed, these attributes are not statistically related in our sample.[12] In our experiment, liberals and conservatives differ in their tolerance for risk imposed on *others*, not on themselves. More conservative subjects were more likely to believe that other subjects should have to live with the impact of random shocks to their well-being rather than have these shocks smoothed by a social safety net.

Conclusion

In this paper, we sought to determine what factors were influential in determining a person's preference for income redistribution programs in cases where the motives of equality and social insurance are mixed, as they often are in actual government policies. We built on existing theory, extending that theory to encompass the common circumstance wherein a redistribution program serves both as mechanism to equalize incomes and as a social insurance plan against catastrophic income loss.

Conducting a laboratory experiment, we found that subjects' preferences for taxing and redistributing income are strongly influenced by the amount they stand to gain or lose. This finding is in line with standard theoretical expectations (Meltzer and Richard, 1981). However, this relationship weakens when a random income loss is possible. We also found

[12]Using *Conservatism* as the dependent variable, OLS regression reveals a coefficient of .0320 on *Risk Preference*, $p = 0.651$.

that increasing the probability of a loss increases support for redistribution, also consistent with prior findings (Kim, 2007). Risk preferences and self-reported attitudes toward disaster assistance or unemployment were not influential determinants of preference for redistribution.

Finally, we found that ideological attitudes toward income redistribution were important determinants of subjects' preferences for income redistribution, but only when the risk of a catastrophic income loss was neither absent nor certain. When there was no possibility of a loss, most support for redistribution came from subjects earning less than average regardless of their other characteristics. When there was a high probability of a loss, all subjects were willing to vote for higher redistributive taxes, again regardless of their other characteristics. When the loss probability was moderate, though, all those who were earning less than average and liberals earning more than average were willing to support redistribution, while conservatives earning above average were not.

We interpret our findings as evidence that, consistent with some prior work by others, ideology is primarily a reflection of individual attitudes toward the role of luck in determining individual outcomes and that elements in the experimental environment can trigger these differences. Liberals are generally viewed as being willing to support redistribution when those in need are the victims of bad luck or circumstances beyond their control, and are more likely to interpret income shocks in that framework. Conservatives are still unwilling to support redistribution (at least when they are well off relative to the average) even when there is a moderate random component in the determination of income. This observed differential response in our experiment meshes with an existing argument (Alesina, Glaeser and Sacerdote, 2001; Alesina and Angeletos, 2005; Alesina and La Ferrara, 2005) that economic ideology is primarily a reflection of individual attitudes toward the role of luck in determining individual outcomes.

Appendix: Survey Questions

The following appendix lists the survey questions that we used to measure various personal characteristics in the experiment.

Conservatism

1. Please react to the following statement: "In a free society, it is all right if a few people accumulate a lot of wealth and property while many others live in poverty."

   (a) Strongly Agree

   (b) Agree

   (c) Neither Agree nor Disagree

   (d) Disagree

   (e) Strongly Disagree

2. If the government had a choice between reducing taxes or spending more on social programs like health care, social security, and unemployment benefits, which do you think it should do? (We mean all taxes together, including social security, income tax, sales tax, and all the rest.)

   (a) Reduce Taxes

   (b) Spend More on Social Programs

3. Some people earn a lot of money while others do not earn very much at all. In order to get people to work hard, do you think large differences in pay are:

   (a) Definitely Necessary

   (b) Necessary

   (c) Neither Necessary nor Not Necessary

(d) Not Necessary

(e) Definitely Not Necessary

4. Generally speaking, do you usually think of yourself as a Republican, a Democrat, and Independent, or what? IF YOU ARE A REPUBLICAN: Would you call yourself a strong Republican or a not so strong Republican? IF YOU ARE AN INDEPENDENT: Do you think of yourself as closer to the Republicans or closer to the Democrats? IF YOU ARE A DEMOCRAT: Would you call yourself a strong Democrat, or a not so strong Democrat?

   (a) Strong Republican

   (b) Not so strong Republican

   (c) Independent/Closer to the Republicans

   (d) Independent/Neither

   (e) Independent/Closer to the Democrats

   (f) Not so strong Democrat

   (g) Strong Democrat

5. In politics today, do you think of yourself as a conservative, as middle of the road, as a liberal, or do you not think of yourself in these terms?

   (a) Conservative

   (b) Middle of the Road

   (c) Liberal

   (d) Don't Think in These Terms

Disaster Assistance

1. When a natural disaster strikes an individual's home, tax money should be used to help that person deal with the consequences.

   (a) strongly agree

   (b) agree

   (c) neither agree nor disagree

   (d) disagree

   (e) strongly disagree

2. Most victims of natural disasters could have foreseen that a disaster would happen to them.

   (a) strongly agree

   (b) agree

   (c) neither agree nor disagree

   (d) disagree

   (e) strongly disagree

3. Most people are financially able to move their residence to an area at low risk for natural disasters.

   (a) strongly agree

   (b) agree

   (c) neither agree nor disagree

   (d) disagree

   (e) strongly disagree

4. Tax money should be used to help defray the price of home insurance in areas with high risk of disaster.

   (a) strongly agree

   (b) agree

   (c) neither agree nor disagree

   (d) disagree

   (e) strongly disagree

Unemployment Assistance

1. When a person loses his or her job, tax money should be used to help that person deal with the consequences.

   (a) strongly agree

   (b) agree

   (c) neither agree nor disagree

   (d) disagree

   (e) strongly disagree

2. Most unemployed persons are to blame for their own unemployment.

   (a) strongly agree

   (b) agree

   (c) neither agree nor disagree

   (d) disagree

   (e) strongly disagree

3. Most unemployed persons are capable of quickly getting a suitable new job.

   (a) strongly agree

   (b) agree

   (c) neither agree nor disagree

   (d) disagree

   (e) strongly disagree

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