Social Insurance and Income Redistribution in a Laboratory Experiment*

Justin Esarey†, Tim Salmon‡, and Charles Barrilleaux§

March 5, 2010

Abstract

Why do some voters support income redistribution while others do not? One obvious answer might be that some benefit while others do not, but such a simple answer is difficult to square with voting patterns. This issue is complicated by the fact that public assistance programs usually have two inextricably entangled effects on society: they equalize wealth, but they also cushion people against the effects of random catastrophic events like natural disasters and serious illnesses. Thus they provide both income maintenance to the poor and social insurance benefits to all economic classes. Each effect appeals to a particular notion of fairness, and each effect also has a distinct impact on voters’ self-interest. We conduct a laboratory experiment to determine how differences in the environment can alter subjects’ preferences for income redistribution and whether individuals’ responses to the environment are related to their self-expressed political ideology. We find that more liberal subjects are more willing than conservatives to support redistribution when there is a moderate chance of random, catastrophic income loss. When the chance of loss is low, or very high, both liberal and conservative subjects follow self-interest and are not guided by ideology. Our findings support the hypothesis that ideology is associated with a person’s willingness to use redistribution to reduce income inequality that is caused by luck, but it is not related to preferences for inequality that are not related to luck.

Introduction

Why do some voters support income redistribution programs, while others do not? Citizen preferences for income redistribution from the haves to the have-nots are complicated. Many people consider public assistance that is directed toward hard-working but unfortunate people who have suffered a setback to be commendable and important for a just and caring nation. On the other hand, many people might see public support for permanently poor or

---

*We thank the National Science Foundation for its generous support of our research (#0720055).
†Assistant Professor of Political Science, Emory University. Corresponding author (jesarey@emory.edu).
‡Associate Professor of Economics, Florida State University.
§LeRoy Collins Professor of Political Science, Florida State University.
working class individuals as more controversial; there is less agreement about whether re-
distribution to these individuals (or, more generally, the equalization of a country’s income
distribution) is a worthwhile 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. Of course,
in both cases, self-interest is also in play: some people stand to benefit and some stand to
lose from such a program, with a person’s benefit in proportion to (a) their income level, (b)
their likelihood of suffering a catastrophic income loss due to a natural disaster, illness, or
some other random event, and (c) their level of aversion to the risks of a catastrophic loss.

Much of the existing theoretical and empirical literature considers the case where the goals
of social insurance and wealth equalization 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).

But for most real-world policy interventions, we believe that both motivations for re-
distribution—providing insurance and equalizing wealth—are involved in support for the
programs in a way that is difficult to separate. As a result, a voter’s preference for public
assistance programs is necessarily an amalgam of two distinct elements: the desire to insure
against misfortune, and the desire to assure an income base for people whose skills or work
efforts result in their being at the lower end of the income distribution.

Consider the cases of welfare (cash payments to the poor) and unemployment insurance
(cash payments to those who have recently lost a job). Traditional welfare programs, which
provide assistance on the basis of poverty, obviously equalize incomes. But welfare also serves
as a form of insurance by providing a floor beneath which income cannot fall, regardless of
misfortune. This secondary insurance role of welfare provides a completely different set
of reasons for voters, including middle-class voters who do not expect to be a part of the
permanent poor, to extend this sort of benefit (Friedman, 1953). Likewise, 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, the working
poor. While unemployment insurance does serve as a safety net for the middle class, most
of the transfers may end up going to the poor, 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. Thus, voters may support such a program because
it satisfies a taste for equality as well as a desire to insulate him/herself and others from the
vicissitudes of the economy.

The two effects of a redistribution program—insurance and income equalization—appeal
to distinct notions of fairness. Insomuch as part of the concept of fairness is equality of
outcome, income redistribution makes society fairer; it levels wealth. Voters may, for this
reason, wish to redistribute income. Social insurance also makes society fairer, but in a
different way: it strengthens the link between effort and outcome by mitigating the effect of
random events that can drastically impact income, like natural disasters. Some voters may
find it unfair that a hard worker ends up with a poor lifestyle because his/her possessions
are destroyed by a hurricane. For the same reason, wealthy voters may feel less entitled
to their higher incomes if they know that only luck enabled them to avoid a catastrophe. In both cases, social insurance may be desired because it helps ensure that citizens receive the *just deserts* of their labor. Of course, both effects of redistribution appeal to a voter’s self-interest: ceteris paribus, richer and risk-acceptant voters should prefer less redistribution while poorer and risk-averse voters should favor it.

The task of this paper is to gain insight about how people form preferences for redistribution programs that mix social insurance with income leveling and to determine if individuals with different political ideologies will respond differently to different environments. Recent studies have suggested that a person’s economic ideology, which is well-known to predict support for income redistribution programs, is best thought of as a proxy for that person’s attitude toward the role of luck in life outcomes (Fong, 2001; Alesina, Glaeser and Sacerdote, 2001; Alesina and Angeletos, 2005; Alesina and La Ferrara, 2005). That is, ideology either predicts (a) a person’s belief that poverty is caused by random and unavoidable circumstances, i.e. their belief that the economy rewards people with their just deserts, or (b) their desire to compensate for people for random and unfair losses, i.e. the importance they ascribe to ensuring just deserts. One concern with the results in this line of literature is that when using naturally occurring data to identify these effects there are potentially important endogeneity problems which could limit the strength of conclusions one can draw from the data. There is substantial evidence that voting behavior is directly and indirectly correlated with wealth (Campbell et al., 1960; Miller and Shanks, 1996; Gelman, 2008) and it is therefore unclear which drives the other or whether there is some other unobserved characteristic which drives both simultaneously. To obtain sharper inference on whether ideology or wealth position in society (i.e. self-interest) is determining an individual’s willingness to support redistribution, it would be ideal to break any link between ideology and self-interest that may exist in the naturally occurring data—a difficult task to accomplish in field data (Alesina and Angeletos, 2005; Franzese and Hays, 2008). In a laboratory experiment, by contrast, we can cleanly sever this endogeneity link when observing an individual’s willingness to support redistribution.

Our experiment reveals that a chance of a random and catastrophic loss of income causes liberals and conservatives to express different preferences for income redistribution. Subjects who self-identify as more economically liberal vote for higher tax rates than individuals who report themselves to be more economically conservative, but only when there is a moderate risk of a catastrophic loss of income. When there is no chance for a random loss, conservatives and liberals do not systematically differ in their preference for income redistribution—even though significant economic inequality is still present due to differences in productivity. When the random loss of income is sufficiently probable to affect everyone with near-certainty, so that the self-interested motive for social insurance dominates other considerations, there is also no ideological difference in preference for redistribution.

We cannot ascribe our findings to a difference in beliefs about the causes of poverty: in our experiment, the important role of luck in determining outcomes is objectively known to all. Nor are liberals more risk-averse than conservatives, as we separately measure and control

---

1To 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.
for this characteristic (which we find is largely uncorrelated with ideology). The fact that liberals were no more willing to support redistribution when there was no chance for a random loss suggests that liberals are not more averse to inequality in every circumstance, but only when random influences undermine the link between effort and reward. That is, liberals are more willing than conservatives to use redistribution to reduce economic inequality caused by chance, even when this inequality is largely and unambiguously attributable to chance.

Our findings reinforce the hypothesis that, when it comes to economic issues, conservatives and liberals differ because they disagree about how society should respond to the element of randomness in life outcomes, even when there is no possible disagreement about the degree to which life outcomes are partially random. That is, ideology captures how subjects think about luck: people who think of themselves as liberals tend to agree with the idea that individuals should be sheltered from bad luck, while people who think of themselves as conservative think of bad luck as something to be suffered and good luck as to be something to be enjoyed.

Our results also suggest how people form their opinion about policies with redistributive implications. Ideology can trump self-interest for wealthy liberals, but only when they believe that the program is designed to correct for the randomness of individual outcomes—that is, to more tightly link effort and reward. Conservatives (and especially high earners), by contrast, must be confronted with a high likelihood of personal loss in order to desire income redistribution (for self-interested social insurance reasons). Neither group would be systematically persuaded by appeals to the obnoxiousness of inequalities per se, as conservatives and liberals do not have systematically different preferences for income leveling. Nor would conservatives be convinced by evidence that randomness and chance are determinative of life outcomes: in our experiment, subjects knew for sure that randomness would partially determine their lot, but conservatives still preferred lower levels of redistribution. This more nuanced view of the role of ideology in public opinion formation may prove informative to policymakers, who typically rely on simplified ideological heuristics about the public to inform their decisions (Cook, Barabas and Page, 2002).

Prior Work

Ours is, of course, not the first laboratory study targeted at trying to understand individual preferences for redistribution. A large literature on social preferences attempts to determine how and how much people 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. That is, experimental subjects have a preference for fairness that they express by making choices that deviate from the action that would maximize their self-interest. Inequality aversion provides an explanation for this behavior: subjects are uncomfortable with unequal outcomes and take actions to make them more equal. These experiments do not explore situations where social insurance
and income leveling motives are mixed, as they often are outside of the laboratory.

For example, many researchers have found that subjects in the ultimatum game—a game in which one subject proposes a division of an endowment, 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 finding 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).

But inequality aversion can be a function of the context of the experiment: Hoffman et al. (1994) found that responders in an ultimatum game were more willing to accept smaller proposals when the proposer had won his/her position in a competition rather than having it randomly assigned. This behavior is consistent with the just deserts view of fairness: people who feel that outcomes are less strongly linked to merit are less willing to accept inequality. We believe that this kind of preference for fairness acts in concert with what could be called blanket inequality aversion (the desire to level incomes under all circumstances) to motivate support for income redistribution via the mechanism of social insurance.

Another line of research (Frohlich and Oppenheimer, 1990; Scott et al., 2001; Michelbach et al., 2003) builds on these insights but is aimed more directly at determining whether individuals value equitable income distributions more highly than inequitable ones. The general finding of 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 cannot say whether individuals would still prefer equity when not behind the Rawlsian veil—that is, when reducing inequality might be in conflict with their own well-being. Krawczyk (2010) combines this idea with the insight from Hoffman et al. (1994) by examining a situation in which individuals vote on tax rates to be used in redistributing money which the subjects will later earn according to randomized lotteries with unequal chances. The study includes a treatment in which the unequal chances of winning were randomly allocated versus when there was a random component and a component based on the performance of the individual on a knowledge quiz. The author finds that, indeed, subjects vote for lower taxes when know they will be engaging in some effort related to earning the prize.

A few experiments have zeroed in more closely on the income redistribution setting in which we are interested. For example, Tyran and Sausgruber (2006) found that the voting patterns of subjects assigned to poor, middle-class, and rich income levels choosing whether to redistribute experimental income from the rich group to the poor group closely matched the theoretical expectations of Fehr and Schmidt’s inequality aversion theory (Fehr and Schmidt, 1999). Klor and Shayo (2007) found that subjects were willing to vote for income redistribution on the basis of their social ingroup’s well-being, even when their group’s interest was opposed to their own, suggesting that preference for redistribution might be dependent on the context of the situation but not delving into the social insurance motivation. Esarey, Salmon and Barrilleaux (2009) found that the amount a subject stood to
gain or lose was the main determinant in their vote for redistributive taxation, while survey measures of their economic ideology were not strong predictors. All of these experiments provided no social insurance motivation for redistribution, choosing to focus on the income equalization effect of redistribution, and as a consequence all study aspects of what we called pure inequality aversion.

To determine why some voters support income redistribution programs and some do not, we need to set up an experiment where redistribution simultaneously levels incomes and provides social insurance, just as it usually does outside the laboratory. Then, we must be able to disentangle the two fairness motivations (blanket inequality aversion and just deserts) for redistribution from each other and from self-interest. To that end, we conduct a laboratory experiment where we have the power to (a) exogenously vary the presence of random losses of income, thereby determining the strength of the insurance motivation for redistribution, and (b) precisely measure each voter’s self-interest for income redistribution, so as to separate its impact from fairness-related motivations.

Hypothesis Development

Individual preferences for redistribution are driven by a number of individual and contextual factors. Existing research suggests that the desire for redistribution is driven by (1) self-interest and (2) a preference for fairness, including the desire for equality and the desire to ensure just deserts, that in turn underlies ideological attitudes. In this section, we will sketch out our theoretical expectations for behavior in a simple redistribution experiment that will form the basis for our predictions.

The Meltzer and Richard (1981) model, which describes preferences for income redistribution in the absence of risk, is a good place to begin. In their 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 $(1 - \pi)$, and one in which a person does suffer this loss, with probability $\pi$. In the first state of the world, a person $i$ expects to earn $k_i$ dollars and pay $\tau k_i$ 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 $\tau \mu$, 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 $n$.

Under the assumption of risk neutrality, a person’s total utility function is:

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

(1)

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 a person’s net earnings will be less than the average, and therefore a greater probability of random losses should increase preference for taxation for reasons of self-interest. That is, higher the probability of a random loss, the more that all people (including high earners) will favor income redistribution for self-interested reasons of insurance.

Risk aversion will also increase the demand for high taxes for self-interested reasons. Consider the gap between income when a random loss occurs and when it does not:

$$((1 - \tau)k_i + \tau \mu) - ((1 - \tau)(1 - r)k_i + \tau \mu) = k_ir(1 - \tau)$$

One can observe that taxation shrinks this gap. Risk averse persons are willing to accept smaller expected payoffs in exchange for greater certainty in those payoffs, and thus greater risk aversion should tend to increase the demand for redistributive taxation.

These basic expectations are modified by the addition of a preference for fairness. Inequality aversion implies the addition of a penalty for variance in incomes:

$$u_i = (1 - \pi) ((1 - \tau)k_i + \tau \mu) + \pi ((1 - \tau)(1 - r)k_i + \tau \mu) - \alpha \sum_{i=1}^{N}((1 - \tau)k_i - (1 - \tau)\mu)^2 \quad (2)$$

This penalty, measured by the $\alpha$ parameter, might be asymmetric depending on whether the income is beneficial or harmful to one’s own self-interest (Fehr and Schmidt, 1999). Income redistribution lowers variance in incomes, and thus intermediate levels of taxation $\tau$ may be preferred for those whose self-interest is unaffected or negatively affected by redistribution.

The just deserts conception of fairness implies that preference for taxation should be proportional to the degree of randomness present in outcomes:

$$u_i = (1 - \pi) ((1 - \tau)k_i + \tau \mu) + \pi ((1 - \tau)(1 - r)k_i + \tau \mu) + \beta(\pi, r)\tau \quad (3)$$

Here, $\beta(\pi, r)$ is a function of taxation that monotonically increases in the probability of a loss $\pi$ and the size of that loss $r$. That is, the greater the probability of a random loss of income $\pi$ or the size of the loss $r$, the greater the benefit $\beta$ that a voter derives from redistributive taxation (on top of whatever self-interested benefits the voter also receives).

We want to determine the conditions under which the ideological difference in redistribution attitudes is activated. In terms of our model, we believe on the basis of past research (Fong, 2001; Alesina, Glaeser and Sacerdote, 2001; Alesina and Angeletos, 2005; Alesina and La Ferrara, 2005) that $\beta$ (but not $\alpha$) can be measured by a person’s economic ideology. Esarey, Salmon and Barrilleaux (2009) have already found that ideology cannot predict preferences for redistribution in an environment without random income losses (i.e., where $\beta = 0$ by design because $\pi = 0$), giving us further reason to suspect that a just deserts notion of fairness underlies the ideological divide on income redistribution.

In field data, it may be difficult to tell the difference between a preference for redistribution driven by inequality aversion (equation 2) and a preference driven by the desire for just deserts (equation 3). A person with either type of fairness preference will want income redistribution in proportion to the number of poor people and their degree of poverty. Some will want it because they believe $\pi$ and $r$ are large, de-linking effort and outcomes and resulting

\[2\text{Specifically, a random loss will move someone below the earnings average whenever whenever } \frac{\mu}{1 - r} < k.\]
in unfair inequality. Others simply want to mitigate inequality, regardless of the source. At best, separating these effects would require a very detailed view of the subject’s beliefs about the extent of economic inequality, their beliefs about the reasons for that inequality, and their attitude toward the various reasons for inequality, each of which (especially the last) would be difficult to measure. At worst, these factors would all be endogenous to one another and thus difficult to partition into their distinct effects on behavior (Alesina and Angeletos, 2005; Franzese and Hays, 2008).

To be able to separate these effects from each other and from self-interest, we propose to experimentally control $\pi$, comparing conditions where it is zero (there is no risk of random loss of income) to conditions where it is non-zero to see whether there are systematic differences in preferences across these conditions. Our primary hypothesis is that liberals will be more likely than conservatives to favor income redistribution in environments with a moderate probability of a significant income loss, but no difference will exist when this probability is zero (and hence only inequality aversion concerns apply) or when this probability is very high (and hence self-interest concerns dominate fairness concerns).

Research Design

If we could conduct an ideal test of our hypothesis, 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. The experiment was conducted using the zTree software package for conducting experiments (Fischbacher, 2007). The specific instructions that we used to run our experiment are included
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. 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.

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.

---

3 The supplement is available at http://userwww.service.emory.edu/~jesarey/research.htm
4 The penalty is present to discourage random guesses: the expected payoff from a random guess is zero.
5 It is important to note that our treatment varies the efficiency of the economic system (the proportion of funds lost to random events) simultaneously with probability of loss, an unavoidable consequence of the fact that we wish to study the effect of increasing loss probability while holding the degree of loss constant. We consider one potential implication of this fact in our conclusion.
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. The amount that any 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. The computer program randomly picks one of these 10 lotteries to be actually played and the cash prize paid out in order to incentivize the subjects to take the choices seriously.

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

---

6The readouts were listed in descending order to anonymize them and for ease of comparison.
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.\footnote{This figure does not include the $10 show up fee, nor a small additional amount earned during the risk assessment lottery experiment.} 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 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.

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 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,
Figure 2: Distribution of Votes, By Treatment

Vote 1, 0% Risk

Vote 1, 20% Risk

Vote 1, 80% Risk

Vote 2, 0% Risk

Vote 2, 20% Risk

Vote 2, 80% Risk
we employ a logistic model with the following form:

\[ \text{vote} = \frac{1}{1 + \exp(-X\beta)} \]

where \( X \) contains explanatory variables and \( \beta \) fitted coefficients. This model can be seen as a probabilistic extension of our theoretical framework: assume that the utility functions we defined also contain a randomly distributed error component. This error component will lead to votes on tax rates between the extremes of 0 and 100 when the expected utility differential between those extremes is small; in other words, when a subject perceives little systematic difference in his/her preferences for high and low taxes, these individuals’ choices are more strongly governed by random influences. As their preference for taxation becomes stronger in either direction and \( X\beta \) becomes more extreme, the choices of an individual will tend towards 0 or 100 percent taxes as predicted by the deterministic framework.

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 economic ideology, we use an index of five survey questions. The questions loaded strongly on a single principal component (Conservatism), which we extracted using principal components analysis (PCA). 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 to excluding certain questions.

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). 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

---

8See the appendix for a list of the survey questions we used to construct our measures.
9The 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.
10In 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.
11In both cases, the questions loaded primarily on a single component: only one had an eigenvalue greater than 1.
Table 1: Logistic Model, Vote 1

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

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.

regression, with the 0\% risk treatment serving as the reference category. We included a series of interactions between the treatment variables and our survey measures of preference for taxation, as indicated by our theory. We also interact the treatment condition with \( \text{Distance from Average} \) to determine whether the risk of a disastrous income loss dampens the influence of pre-loss differences in income, as we anticipated.

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 (\( \text{Risk Preference} \)). 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. We report only interactions on \( \text{Conservatism} \), as attitudes toward disaster assistance and unemployment had no statistically significant influence on voting behavior even with these terms added to the model.\(^{12}\)

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, conservatives tend to vote for less redistribution than liberals in the moderate risk treatment. The total coefficient\(^{13}\) on \( \text{Conservatism} \) in this treatment is

\(^{12}\text{Unemployment}^*80\% \) 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.

\(^{13}\)The total coefficient is calculated using the formula \[ \frac{\partial G^{-1}(y)}{\partial \text{Conservatism}^*\text{Treatment}} = \beta_{\text{Conservatism}} + \beta_{\text{Conservatism}^*\text{Treatment}^*\text{Treatment}} \] (Brambor, Clark and Golder, 2006).
Table 2: Logistic Model, Vote 2

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

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

-.374 (\( \sigma = .185, p = .045 \)) for the second vote data. The same relationship exists in the first vote data, though more weakly: the coefficient is smaller (-.196) and less statistically significant (\( \sigma = .156, p = .211 \)). Thus, the ideological difference among subjects in this treatment seems to strengthen as subjects gain experience with the experimental environment.

Logit coefficients are informative, but do not speak directly to the quantity of interest that we are studying: vote choice. Thus, we use methods similar to those described in King, Tomz and Wittenberg (2000) to determine how a subject’s vote choice would change as their economic ideology changed, holding other characteristics at their mean.\textsuperscript{14} For each treatment, we determine how much a subject’s vote choice is predicted to change when Conservatism moves from its 25th percentile to its 75th percentile; the results are depicted in Figure 3. In the 20% risk treatment, we determine that a change in Conservatism from the 25th percentile to the 75th percentile is associated with a 16.9 percentage point decline in the second vote (95\% CI=[-32.3\%, -1.34\%]), a substantively meaningful change in behavior: conservatives want substantially lower tax rates, and hence substantially less income redistribution, compared to liberals in this treatment. As noted before, the ideological difference among subjects in this treatment strengthened over time: when Conservatism changed from the 25th percentile to the 75th percentile, a subject’s first vote in the 20% risk treatment fell by 9.38 percentage points (95\% CI=[-23.5\%, 4.48\%]) when other variables were held at their mean. Changes in Conservatism were not associated with statistically significant changes in vote choice for either of the other two treatments.

We therefore conclude that our hypothesis is confirmed: economic ideology is associated with preference for redistribution in cases with a moderate probability of a catastrophic

\textsuperscript{14}Because Clarify is not designed to work after the \texttt{nl} command in Stata, we implemented the procedure manually using 5000 draws from the distribution of coefficients from our model. When examining the effect of ideology in one treatment, we set other treatment dummies and their interactions to 0.
Predicted differences were calculated via simulation using the models in Table 1 (left panel) and Table 2 (right panel). The plot depicts the difference in predicted vote choice when comparing those at the 25th percentile of Conservatism to whose at the 75th percentile, holding all other variables at their mean (and all other treatment variables at zero).

income loss, but not in cases with zero or near-certain probability of a loss. Note that ideology is not proxying for the willingness to assist those affected by random events (unemployment and natural disasters), as these alternative explanations are controlled for and neither is statistically significant. We stress that conservatives were not more risk-acceptant than liberals in our experiment; not only is risk aversion separately controlled for, but these attributes are not statistically related in our sample. 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.

Two other findings of our experiment are worthy of note. First, we find that wealth has the expected relationship with preference for redistribution: 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 average statistically insignificant in both voting decisions, and close to zero in the second vote decision. This finding simply confirms the existence of self-interest motivations in these treatments: the stronger the existence of a random probability of a loss, the stronger the social insurance motivation to provide redistribution, and the more the rich and poor agree that they have a mutual interest in

---

15 Using Conservatism as the dependent variable, OLS regression reveals a coefficient of .0320 on Risk Preference, \( p = 0.651 \).
providing that insurance.

Second, increasing the 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 believe that our findings emphasize the role of economic ideology as a filter through which our subjects viewed the role of chance in determining outcomes. In cases where losses are absent or (nearly) certain—that is, when the role of chance in outcomes is minimal—our subjects simply followed their self-interest, providing social insurance when it is universally needed, engaging in straightforward class conflict over redistribution when social insurance is not a factor. But 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.

Conclusion

In this paper, we sought to determine the factors that are 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 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 low-earning subjects who stood to gain from it—regardless of their other characteristics or attitudes. When there was a high probability of a loss, both high earners and low earners supported higher redistributive taxes as a means of insuring themselves against the loss, again regardless of their other characteristics or attitudes. When the loss probability was moderate, though, liberals were more willing to support income redistribution than conservatives.

We interpret our findings as evidence that, consistent with findings from observational studies (Fong, 2001; Alesina, Glaeser and Sacerdote, 2001; Alesina and Angeletos, 2005; Alesina and La Ferrara, 2005) and past experiments (Krawczyk, 2010), economic ideology is not a measure of a subject’s desire to level incomes, but instead a reflection of individual attitudes toward the role of luck in determining individual outcomes; elements in our experimental environment triggered these differences. Liberals are 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 comparatively less willing to support redistribution in these cases, not because they do not believe that the
shocks are not random—our subjects know that they are—but because they do not believe that the harm caused by these random shocks is a communal problem to be solved at the expense of those not affected.

What do our findings imply about public support for redistributive policies, like social security and universal health care coverage? If our findings hold, liberals will support policies that dampen the impact of luck on life outcomes, (sometimes) even when these policies work against their self-interest, but will not be systematically persuaded by appeals to equality of outcome as an end in itself. Conservatives, on the other hand, will tend to support redistribution only when they personally benefit—either because they are poor, or because they believe there is a high probability that they will require social insurance coverage. Conservatives would not be persuaded by evidence that life outcomes are partially random: in our experiment, when outcomes were known to have a strong random component, conservatives still preferred lower levels of redistribution.

There is an alternative way to interpret our findings that is worth considering: it is possible that the reason that our moderate loss treatment triggers an ideologically divergent response lies in the reduced efficiency of that treatment. As the probability of loss increases across our treatments, by necessity more money is lost without social insurance. Liberals may be more sensitive than conservatives to these losses and vote for higher taxes as a result. The prior literature in this field gives us strong reasons to suspect that it is indeed the presence of luck—the probability of loss—that activates the ideological difference, and we think this the more likely explanation for our data. But no matter what underlying psychological mechanism is responsible for the differential response to our treatment, we have certainly demonstrated an interesting and novel finding: changes in the need for social insurance trigger responses in the lab consistent with the ideology of the subjects, finding a key element to the laboratory environment to invoke ideological based preferences. With this established, we look forward to future work that can further disentangle the multiple motivations of the subjects.

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  

References


