Self-Centered Inequity Aversion and the Mass Politics of Taxation

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Abstract

The politics of economic crises brings distributive economic conflict to the fore of national political debates. How policy should be used to transfer resources between citizens becomes a central political question, and the answers chosen often influence the trajectory of policy for a generation. This context provides an ideal setting for evaluating the importance of self-interest and other-regarding preferences in shaping public opinion about economic policy. This article investigates whether self-centered inequity aversion along with self-interest influences individual tax policy opinions. We conduct original survey experiments in France and the United States, and provide evidence that individuals care about both how policy alternatives affect their own interests and how they influence the welfare of others relative to themselves.

Introduction

The politics of economic crises brings distributive economic conflict to the fore of national political debates. How economic activity is to be regulated and how policy should be used to transfer resources between citizens become central political questions and the answers chosen often influence the

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trajectory of policy for a generation or at least until the next crisis. The 2008 "Great Recession" has been no different. Around the world, governments have struggled to arrive at new policies that regulate economic activity more effectively, that provide a stimulus to economic growth, and that address sometimes severe fiscal imbalances. Long-standing economic problems such as inequality, long-term unemployment, and social exclusion have gained significant salience.

This context provides an ideal setting for evaluating the determinants of economic policy preferences and the ways in which inequality shapes political conflict over public policy. We focus on the determinants of public preferences about tax policy. Taxation was and continues to be at the heart of economic policy debates during and after the Great Recession. Tax debates focused both on revenue questions as countries sought to stabilize their finances and on distributive questions as states sought to address high and growing inequality.

Inequality can influence the tax policies adopted by countries in at least three ways. First, it can change the preferences of the voters who are decisive in the policy-making process. As established in Romer (1975) and Meltzer and Richard (1981), an increase in inequality implies a poorer median voter, which would lead to a higher equilibrium tax rate (and lump sum transfer) for purely self-interested reasons.[1] Second, inequality may influence individual preferences about taxation because of the positive or negative externalities that it creates, which also influence individual economic welfare. If, for example, inequality leads to more crime, those with high incomes may find redistribution more efficient than security spending for preserving their property and future consumption.[2] Alternatively, individuals may believe that inequality generates incentives to work and produce that generate higher levels of aggregate economic welfare and individual opportunity.[3] Although these effects are in opposite directions, they both imply that individual preferences for taxes and redistribution may be influenced by preferences about aggregate levels of inequality, even if individuals are self-interested. Third, and of greatest relevance to this study, if individuals have direct preferences for equality or aversion to inequality, greater inequality can lead those individuals to prefer higher levels of taxation and redistribution due to other-regarding considerations.

In the existing literature, there are two general approaches to how this third mechanism may operate. First, individuals may be altruistic and prefer tax and redistributive policies that raise the welfare of other, especially poorer, citizens though the extent of altruism is often thought to vary depending on factors such as ethnic and racial heterogeneity, the structure of inequality, and beliefs about the fairness of the economic and political processes

generating inequality.[4] Second, individuals may simply be inequality averse and have a preference for lower aggregate levels of inequality, again with the magnitude of this effect varying depending on some of the same contextual factors thought to influence altruism. Empirical analyses investigating this effect have primarily focused on why values about equality seem to vary across individuals, time, and countries.[5]

Another possibility combines elements of altruism and inequality aversion but emphasizes the central importance of equity in individuals' evaluations of policy alternatives. Individuals neither have a general concern for others nor do they necessarily care about aggregate levels of inequality. Rather, what matters is the extent to which outcomes reflect equity norms. In this article, we investigate the extent to which inequity aversion in addition to self-interest influences support for alternative tax policies. The theoretical framework that we adopt is based on the premise that individuals are altruistic toward others if their material payoffs are below an equitable benchmark but envious of others whose payoffs are above this level (Fehr & Schmidt, 1999). Specifically, we focus on self-centered inequity aversion for which the equitable benchmark for a given individual is his or her own outcome. In this framework, individuals do not care about inequality generally but are interested in the fairness of their own outcome relative to others (Fehr & Schmidt, 1999). This form of inequity aversion has two distinct parts. *Advantageous inequality aversion* is the loss individuals incur because others have worse material outcomes than they do, whereas *disadvantageous inequality aversion* is the loss individuals incur because others have better outcomes than they do.[6]

This model has been applied to a wide variety of economic and social problems. Its application to questions of tax policy and redistribution has primarily been evaluated in laboratory work. Agranov and Palfrey (2015) estimate in a laboratory setting Fehr–Schmidt inequality aversion parameters in a model of preferences over redistribution. They cannot reject the hypothesis that these social preference parameters are zero, but caution that this result may not hold in a setting that more closely approximates the complex environment of voting over taxes in modern economies. A central contribution of our article is to develop a methodology for estimating these parameters using experimental survey data in national samples that more closely represent the mass politics of tax and redistributive policy making.[7]

We conducted, in 2010, original survey experiments on national samples of individuals in France and the United States. We pursue two different types of empirical strategies in the analysis with these data. First, we evaluate experimentally how variation in the incomes of the beneficiaries of various tax policies influence support for those policies. We show that opinions about tax policy vary systematically with information provided about the

incomes of those affected by policy alternatives. Respondents are generally more supportive of policies that benefit lower income recipients or create costs for higher income recipients. Second, we adopt a specific formalization of self-centered inequity aversion, incorporate this utility function into standard models of tax preferences for which the effect of policy alternatives on one's own income is of primary concern, and estimate structurally an equation of policy preferences. We find that individuals not only care about the effect of tax policy on their own incomes but also exhibit advantageous and disadvantageous inequality aversion. Specifically, our estimates suggest that in France both disadvantageous inequality aversion and advantageous inequality aversion are important determinants of tax policy preferences. In the United States, we find strong evidence of disadvantageous inequality aversion but not advantageous inequality aversion. Taken together, these estimates indicate that self-centered inequity aversion is an important determinant of tax policy preferences in France whereas the evidence for the United Sates is more mixed.

The article contributes to the existing literatures on tax policy preferences and redistributive preferences more generally in at least two ways.[8] First, our formal framework allows us to develop a new research design for studying the role of fairness concerns generally and inequity aversion specifically on tax policy preferences. Previous research on the potential role of other-regarding preferences such as altruism or some general form of inequality aversion has primarily relied on individual-level cross-sectional regressions with very strong identification assumptions and even, for these results, the evidence is often based on indirect indicators open to multiple interpretations. A typical empirical analysis might regress a measure of support for redistributive policies on an attitude measure, such as a belief about the economy or a general measure of psychological orientation, and conclude that the partial correlation between these measures is evidence of some form of altruism or inequality aversion. Examples of indirect evidence include studies that note differences in opinion support across sex or racial categories and infer differences in altruism. Other studies rely on aggregated time series evidence. Our approach is to use the combination of experimental survey data and an estimating equation derived from our theoretical model to structurally estimate both advantageous and disadvantageous inequality aversion parameters.

Second, we present strong evidence that self-centered inequity aversion is important for explaining tax policy preferences in France with more mixed evidence for the United States. This pattern of results suggests in contrast to Agranov and Palfrey (2015) that the Fehr–Schmidt model of inequity aversion may be useful in explaining the mass politics of taxation and redistribution. It also raises the possibility that the importance of self-centered inequity

version varies across countries and that future research applying our methodology to a larger number of countries is necessary to establish a more general pattern and allow for analyses explaining why its importance varies across countries.

The article is organized as follows. In the "Self-Centered Inequity Aversion and Taxation" section, we incorporate self-centered inequity aversion into a formal model of tax policy preferences. Section "Inequity Aversion and Self-Interest in Tax Policy Preferences" describes the surveys and the design of the experiments, reports the basic experimental treatment effects, and presents an empirical analysis estimating the influence of advantageous and disadvantageous inequality aversion on tax opinion formation. We then offer some concluding remarks in the final section.

Self-Centered Inequity Aversion and Taxation

The implications of self-centered inequity aversion for policy opinions about taxation can be illustrated by considering a simple model of tax policy preferences. Our model has two key features that distinguish it from existing models of taxation. First, we adopt a tax policy instrument that closely mirrors actual income tax policies in advanced industrial democracies in that marginal rates are selected that apply to all income earned above a given threshold. Second, we explicitly incorporate self-centered inequity aversion into individual utility functions. The combination of these features allows us to generate specific predictions about under what conditions, and for whom, self-centered inequity aversion matters for policy opinions and provides a theoretical foundation for our structural estimates in the empirical work.

First, consider the case in which individuals care only about the impact of tax policy on their own after-tax incomes. To illustrate the key ideas, we consider a setting with three different groups of individuals with identical incomes within each group and of equal size. Let w_i be an exogenous wage of individuals in group i, and we index the wage such that $w_i > w_{i-1}$. Note that because all individuals in each group are identical, we use i to index and refer to groups and individuals. Consistent with modern income tax systems, we model a multi-dimensional tax policy that specifies marginal tax rates across the income distribution. Let τ_i be the tax rate imposed on incomes in group i, and $\tau_i \in [0,1]$. $\gamma\tau_i^2$ is the inefficiency lost in taxation for income group i and $\gamma > 0$. Individual i's utility is defined by

$$u_i = T(i) + \frac{1}{3}F(\cdot) - \frac{1}{3}\sum_{i=1}^{3}\gamma\tau_i^2. \tag{1}$$

$T(i)$ is the after-tax income for individuals, and $(1/3)F(\cdot)$ is the per capita lump sum redistributive transfer, where $F(\cdot) = \{\tau_1 w_1 + [\tau_1 w_1 + \tau_2 (w_2 - w_1)] + [\tau_1 w_1 + \tau_2 (w_2 - w_1) + \tau_3 (w_3 - w_2)]\}$. In this equation, the lowest income group has an after-tax income of $T(1) = (1 - \tau_1)w_1$. The middle income group has an after-tax income of $T(2) = (1 - \tau_1)w_1 + (1 - \tau_2)(w_2 - w_1)$. In other words, individuals in this group only pay a tax rate of τ_2 for the part of income that is greater than w_1. In a similar vein, the highest income group has an after-tax income of $T(3) = (1 - \tau_1)w_1 + (1 - \tau_2)(w_2 - w_1) + (1 - \tau_3)(w_3 - w_2)$, and $-1/3 \sum_{i=1}^{3} \gamma \tau_i^2$ is the per capita inefficiency lost from taxation.

Table 1 reports the optimal tax rates, τ_i^{j*}, for each target income group i preferred by each income group j (j like i indexes groups/individuals).[9] The subscript on τ indicates the group to which the tax will be applied and the superscript on τ indicates the group whose policy preferences are being described. As a result of self-interest, individuals in Group 1 prefer no taxes on themselves, and a positive tax rate on Income Categories 2 and 3 (column 1). For individuals in Group 2, they prefer $\tau_1^{2*} = 0$ because part of their income will be taxed at this rate. However, they prefer a positive tax rate on Income Category 3 (column 2). Individuals in Group 3 prefer no taxes for all income categories (column 3). Although this simple baseline model is described primarily to provide a comparison for a model that incorporates self-centered inequity aversion, it is worth noting that this model highlights the possibility that preferences for progressive taxes might be observed even if individuals only consider their own interests, that tax policy preferences generally increase with inequality (differences between w_i's), and that tax preferences generally decrease with greater inefficiency (γ).[10]

To incorporate self-centered inequity aversion as in Fehr and Schmidt (1999), we alter the utility function described above as

$$u_i = T(i) + \frac{1}{3}F(\cdot) - \frac{1}{3}\sum_{i=1}^{3}\gamma\tau_i^2 - \frac{\alpha}{2}\sum_{i \neq j}\max\{T(j) - T(i), 0\} -$$
$$\frac{\beta}{2}\sum_{i \neq j}\max\{T(i) - T(j), 0\}. \tag{2}$$

To account for inequity aversion, we incorporate a social preference term $\left(-(\alpha/2)\sum_{i \neq j}\max\{T(j) - T(i), 0\} - (\beta/2)\sum_{i \neq j}\max\{T(i) - T(j), 0\}\right)$ into the individual's utility function. The term for inequity aversion is equivalent to the specification in Equation 1 in Fehr and Schmidt (1999). $T(i)$ is after-tax income of individual i. As in Fehr and Schmidt, the parameter β measures utility loss from *advantageous inequality* when $T(i) > T(j)$, and

Table 1. Preferred Tax Rates by Income Group Without Self-Centered Inequity Aversion.

Tax on target income group	Preferences of income group		
	1	2	3
τ_1	$\tau_1^{1*} = 0$	$\tau_1^{2*} = 0$	$\tau_1^{3*} = 0$
τ_2	$\tau_2^{1*} = \dfrac{w_2 - w_1}{\gamma}$	$\tau_2^{2*} = 0$	$\tau_2^{3*} = 0$
τ_3	$\tau_3^{1*} = \dfrac{w_3 - w_2}{2\gamma}$	$\tau_3^{2*} = \dfrac{w_3 - w_2}{2\gamma}$	$\tau_3^{3*} = 0$

The subscript on τ indicates the group to which the tax will be applied and the superscript on τ indicates the group whose policy preferences are being described.

the parameter α measures the utility loss from *disadvantageous inequality* when $T(i) < T(j)$. We assume in our theoretical discussion that $\alpha > \beta > 0$, consistent with Fehr and Schmidt (1999). This means that we assume individuals incur a bigger loss from inequality when they are disadvantaged than when they are advantaged, which as Fehr and Schmidt argue is consistent with individuals exhibiting loss aversion in social comparisons. It should be emphasized that this assumption only informs our theoretical discussion and our empirical work will estimate these parameters without relying on the assumption.[11]

The consequences of advantageous and disadvantageous inequality aversion for tax policy preferences can be illustrated by again considering the preferred tax preferences across groups.[12] Table 2 reports the tax rates, τ_i^{j**}, for each target income group i preferred by each income group j.

For income Group 1, the preferred tax rate on Income Categories 2 and 3 is increasing in the disadvantageous inequality parameter α. Moreover, because $(3\alpha + 2)/2 > 1$, $\tau_2^{1**} > \tau_2^{1*}$ and $\tau_3^{1**} > \tau_3^{1*}$. That is, disadvantageous inequality aversion induces the lower income group to prefer higher tax rates for higher income groups than would be preferred if self-interest alone determined policy opinions. Individuals in income Group 1 still prefer a zero tax rate on the lowest income category. For income Group 2, the effect of disadvantageous inequality is similar to that for Group 1. It increases the preferred rate on the highest income group. Because rates are by assumption bounded at zero, advantageous inequality aversion has no impact on the preferences of income Group 2 on the optimal tax on the lowest income category—the preferred tax is still zero. However, the preferred tax rate on Income Category 2 is increasing in advantageous inequality parameter β.[13] Critically, advantageous

Table 2. Preferred Tax Rates by Income Group With Self-Centered Inequity Aversion.

Tax on target income group	Preferences of income group		
	1	2	3
τ_1	$\tau_1^{1**} = 0$	$\tau_1^{2**} = 0$	$\tau_1^{3**} = 0$
τ_2	$\tau_2^{1**} = \dfrac{w_2 - w_1}{\gamma}\left(\dfrac{3\alpha + 2}{2}\right)$	$\tau_2^{2**} = \dfrac{w_2 - w_1}{\gamma}\left(\dfrac{3\beta - 2}{4}\right)$	$\tau_2^{3**} = \dfrac{w_2 - w_1}{\gamma}\left(\dfrac{3\beta - 2}{4}\right)$
τ_3	$\tau_3^{1**} = \dfrac{w_3 - w_2}{2\gamma}\left(\dfrac{3\alpha + 2}{2}\right)$	$\tau_3^{2**} = \dfrac{w_3 - w_2}{2\gamma}\left(\dfrac{3\alpha + 2}{2}\right)$	$\tau_3^{3**} = \dfrac{w_3 - w_2}{\gamma}\left(\dfrac{3\beta - 2}{2}\right)$

The subscript on τ indicates the group to which the tax will be applied and the superscript on τ indicates the group whose policy preferences are being described.

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inequality aversion can induce income Group 2 to tax themselves. This result is replicated for income Group 3's preferred tax positions for Income Categories 2 and 3. Advantageous inequality aversion can motivate the highest income group to tax themselves and the preferred rate is increasing in the advantageous inequality parameter.

To summarize, we expect that individual tax policy opinions depend on how tax policies influence the after-tax income of individuals and the extent of advantageous and disadvantageous inequality. The expectation is that there is a preference for policies that equalize income generally, and more specifically that individuals will be less willing to reduce the income of those who earn less than they do—that is, they will exhibit advantageous inequality aversion in their policy opinions—and more willing to reduce the incomes of those who make more than they do—that is, they will exhibit disadvantageous inequality aversion in their policy opinions. Self-centered inequity aversion shapes policy preferences in combination with factors such as the extent of inequality and efficiency costs and, thus, is complimentary to standard accounts of tax policy opinions.

Inequity Aversion and Self-Interest in Tax Policy Preferences

In this section, we use national samples of individuals from France and the United States to provide a series of diverse empirical tests for evaluating the importance of self-centered inequity aversion and self-interest in opinion formation about tax policy. These cases were selected because issues of inequality, tax policy, and redistribution are salient aspects of political debate and, thus, settings in which our policy questions resonate with respondents. Our expectation is that self-centered inequity aversion and self-interest inform policy opinions about taxation across a wide variety of countries and begin testing that proposition by studying France and the United States. One advantage of these cases is that the two countries have very different welfare states and, thus, have the potential to provide an early indication that self-centered inequity aversion is important in explaining individual preferences across countries with significant differences in policy outcomes. That said, future research is required to determine whether the results reported here generalize to other countries.

We pursue two different types of empirical strategies in this section. First, we evaluate experimentally how variation in the incomes of the individuals to be taxed influences support for those policies. We show that opinions about tax policy vary systematically with information provided about the incomes of those affected by policy alternatives. Respondents are generally more

supportive of tax policies that create costs for higher income recipients. Second, we use our model of self-centered inequity aversion to derive an empirical model of tax policy preferences and estimate its parameters. We find strong evidence that individuals exhibit disadvantageous inequality aversion in both countries and more mixed evidence of advantageous inequality aversion, with it being clearly evident in France but not in the United States. Consistent with self-interested concerns, our estimates indicate that, all else equal, individuals are less likely to support taxes on themselves. Finally, we conduct several analyses that evaluate alternative interpretations of our findings.

Main Experimental Design

The empirical analysis in this section is based on evidence from original surveys conducted in 2010. The surveys were conducted over the Internet for a national sample of the French and U.S. adult populations with 2,175 and 2,487 respondents, respectively.[14] The sample in each country is a quota sample with quotas set to target the adult population for employment status (e.g., in the United States, working as an employee, working self-employed, not working on temporary layoff from a job, not working looking for a job, not working retired, not working disabled, not working student, not working other). The quotas were set on employment status to ensure that we had a sample with representative experiences with earning income from both labor and non-labor sources and paying taxes as well as individuals experiencing unemployment during the financial crisis. The samples are representative on the quota characteristics and broadly representative of the adult populations on other observed characteristics such as sex, age, and education, but they are not random samples.[15] As such, we will focus on analyses that either take advantage of the various survey experiments conducted or control for key observable demographic characteristics that might differ in our sample and a random sample. Although it is possible that there are differential treatment effects for the participants in this survey and a random sample of each population, this seems unlikely to be the case.[16] This section describes two sets of experiments on tax policy, which were conducted as part of the survey for each country. The two experiments are presented as alternative and complementary tests to evaluate the robustness of our estimates. The order of these two experiments within each survey, as well as the other experiments conducted as part of the larger instrument, was randomly rotated to avoid contamination across experiments.

The first experiment investigates whether individual policy preferences about increasing income taxes to decrease the budget deficit are sensitive to the income levels at which the tax increase would be applied.

The U.S. version of the question used to elicit support for tax increases was as follows:

> When the U.S. economy recovers from the current economic recession, the Federal government is expected to face a significant budget deficit because it spends more money than it collects. Reducing the deficit requires increased taxes, decreased spending, or both. One proposal being considered to help with the budget deficit once the economy has recovered is to increase income taxes on individuals who earn X dollars or more per year. Do you favor or oppose this tax increase?
>
> IF FAVOR: Do you strongly favor or only somewhat favor this tax increase?
>
> IF OPPOSE: Do you strongly oppose or only somewhat oppose this tax increase?

The value of X was assigned randomly across respondents to be equal to US$40,000, US$80,000, and US$125,000 per year in the United States.[17] These values were chosen so that respondents were considering tax increases for average, high, and very high earners. In terms of the theoretical model presented in the previous section, the experimental manipulation is of the wage or earnings (w_i) of the threshold at which the income tax increase will apply. Experimental variation in the income of the group to be taxed will allow us to estimate the degree of advantageous and disadvantageous inequality aversion exhibited in our respondents' policy opinions. In each case, the assumption is that the additional revenue collected is used to reduce the deficit. An analogous question was asked in the French survey with respondents randomly assigned to consider a tax increase for individuals with monthly incomes greater than or equal to 2,100, 4,200, or 10,000 euros.[18] Average support for such a tax increase in our sample was 57.3% in France 46.8% in the United States.

The second experiment investigates whether individual policy preferences about how progressive the income tax system should be are sensitive to the income levels considered.

The U.S. version of the question used to elicit support for tax progressivity was as follows:

> Do you think individuals with incomes higher than X dollars per year should pay a larger share of their income in taxes than those with low incomes, the same share, or a smaller share?
>
> IF LARGER: Should the share be much larger or somewhat larger?
>
> IF SMALLER: Should the share be much smaller or somewhat smaller?

The value of X was again assigned randomly across respondents to be equal to US$40,000, US$80,000, and US$125,000 per year in the United States and 2,100, 4,200, or 10,000 euros per month in France. Average support for a "larger share" was 57.2% in France and 41.5% in the United States.

Main Experimental Results

For the deficit reduction and income tax experiment, we constructed the variable *Income Tax Opinion* set equal to one for respondents who favor raising income taxes and zero for those opposed.[19]

Table 3 reports the mean estimates for each income treatment category and difference-in-means estimates for each combination of income treatments. The top panel reports results for the United States and the bottom panel reports the results for France. For each country, the initial estimates are for the full sample, the second set of estimates are for respondents with incomes less than 2,100 euros per month for France and US$40,000 per year for the United States, and the third set are for respondents with incomes greater than 10,000 euros per month for France and US$125,000 per year for the United States. The means for the full sample reflect the impact of tax increases on the rates that some respondents will themselves face as well as the impact on other income groups. In contrast, the lower income subsamples would not be directly affected by any of the proposed tax increases whereas higher income subsamples would be affected by all the proposals.

Overall, the results reported in Table 3 provide substantial evidence that support for income tax increases to balance the budget in each country are influenced significantly by the income levels of those affected by the tax. For example, in the United States, support for a tax increase is about 26 percentage points higher (nearly a 100% increase) when the threshold is set to apply to incomes greater than US$80,000 per year compared with when it is set to apply to incomes greater than US$40,000 per year. The difference between the US$125,000 and US$40,000 thresholds is 32 percentage points. These differences are both substantively and statistically significant. The analogous differences for France are even larger.

The interpretation, however, of these results for assessing the importance of self-interest and inequity aversion is ambiguous. These differences could be exclusively driven by self-interest. A substantial part of the income distribution is populated by individuals with incomes between the treatment incomes and the differences may just reflect different assessments of the desirability of the tax based on whether it will apply to them individually. The mean differences between the full sample and the lower income samples in each country suggest that the impact of tax increases on higher income

Table 3. Estimated Effect of Income Threshold on Support for Income Tax Increases to Reduce the Deficit—United States and France.

United States	Mean estimates by treatment category			Difference estimates		
	US$40K	US$80K	US$125K	US$40K-US$80K	US$40K-US$125K	US$80K-US$125K
Income Tax Opinion Full sample (*n* = 2,487)	0.270 (0.016)	0.528 (0.017)	0.594 (0.017)	-0.258 (0.023) .000	-0.324 (0.023) .000	-0.065 (0.024) .007
Income Tax Opinion Less than US$40K sample (*n* = 1,253)	0.330 (0.023)	0.619 (0.024)	0.657 (0.024)	-0.289 (0.033) .000	-0.327 (0.033) .000	-0.038 (0.034) .261
Income Tax Opinion Greater than US$125K sample (*n* = 168)	0.234 (0.062)	0.214 (0.055)	0.415 (0.062)	0.020 (0.083) .813	-0.181 (0.088) .041	-0.201 (0.083) .017
France	€2.1K	€4.2K	€10K	€2.1K-€4.2K	€2.1K-€10K	€4.2K-€10K
Income Tax Opinion Full sample (*n* = 2,175)	0.280 (0.017)	0.677 (0.017)	0.733 (0.016)	-0.397 (0.024) .000	-0.453 (0.023) .000	-0.056 (0.024) .018
Income Tax Opinion Less than €2.1K sample (*n* = 1,348)	0.332 (0.023)	0.733 (0.020)	0.733 (0.021)	-0.401 (0.031) .000	-0.401 (0.031) .000	0.000 (0.029) 1.000
Income Tax Opinion Greater than €10K sample (*n* = 63)	0.263 (0.104)	0.455 (0.109)	0.545 (0.109)	-0.191 (0.150) .210	-0.282 (0.150) .068	-0.091 (0.154) .557

Columns 1 to 3 report mean estimates for *Income Tax Opinion* by treatment category and the standard error of the estimate in parentheses. Columns 4 to 6 report difference-in-means tests, the standard error in parentheses, and *p* value assuming unequal variances.

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respondents reduces overall support. It is worth noting though that the sensitivity of opinion to the tax threshold is evident in the lower income subsamples in both countries that would not be directly affected by the tax. Our theoretical model highlights that, nevertheless, these differences might be predicted with purely self-interested policy preferences because the marginal benefit of taxing wealthy citizens is higher (see Table 1). That said, it should also be noted that the model suggests that if individual opinions are influenced by self-centered inequity aversion, there is a stronger expectation for preferences in support of higher taxes on high incomes and relatively lower taxes on low incomes as observed in our data. An arguably more discerning comparison can be made by considering the high income groups, our model highlights that only in the case in which policy preferences are influenced by self-centered inequity aversion is there any expectation that high earners will also prefer progressive rates (see Table 2). Our results for high income respondents in both countries are consistent with this prediction with the caveat that the estimates for this group are less precise because there are fewer respondents.[20]

For the tax progressivity experiment, we constructed the variable *Progressive Tax Opinion* set equal to one for respondents who favor individuals with incomes above the threshold paying a larger share of their income in taxes and zero for those who favor the same share or a smaller share.[21]

Table 4 reports the mean estimates for each income treatment category and difference-in-means estimates for each combination of income treatments. The top panel reports results for the United States and the bottom panel reports the results for France.

The results reported in Table 4 follow the same broad pattern as the deficit reduction and income tax increase experiment. In both countries, support for progressivity in the tax system increases as the income threshold under consideration increases. The magnitude of the differences across treatment groups is broadly similar to that in the first experiment. The most noticeable difference is that the difference between the high and medium income treatment groups is larger and more precisely estimated in the progressivity experiment. It is again worth noting that the sensitivity to the income threshold is observed both in the full sample and in the lower income sample that would not be directly affected by greater progressivity above the threshold. Furthermore, it is again the case that respondents in the lower income sample are generally more supportive of progressivity, which is consistent with the prediction that at least some opposition to progressivity is due to self-interest and the impact of higher taxes on relatively higher income respondents. The results for the high income groups follow the same general pattern as in the first experiment but preferences for higher taxes on the wealthy are only

Table 4. Estimated Effect of Income Threshold on Support for Progressive Income Taxation—United States and France.

United States	Mean estimates by treatment category			Difference estimates		
	US$40K	US$80K	US$125K	US$40K-US$80K	US$40K-US$125K	US$80K-US$125K
Progressive Tax Opinion Full sample (n = 2,487)	0.247 (0.015)	0.439 (0.017)	0.557 (0.017)	-0.192 (0.023) .000	-0.310 (0.023) .000	-0.118 (0.024) .000
Progressive Tax Opinion Less than US$40K sample (n = 1,253)	0.307 (0.023)	0.526 (0.024)	0.622 (0.024)	-0.220 (0.033) .000	-0.316 (0.033) .000	-0.096 (0.034) .005
Progressive Tax Opinion Greater than US$125K sample (n = 168)	0.292 (0.066)	0.328 (0.061)	0.322 (0.061)	-0.036 (0.090) .688	-0.030 (0.090) .737	0.006 (0.086) .946
France	€2.1K	€4.2K	€10K	€2.1K-€4.2K	€2.1K-€10K	€4.2K-€10K
Progressive Tax Opinion Full sample (n = 2,175)	0.276 (0.017)	0.647 (0.018)	0.778 (0.015)	-0.371 (0.024) .000	-0.502 (0.023) .000	-0.131 (0.023) .000
Progressive Tax Opinion Less than €2.1K sample (n = 1,348)	0.305 (0.022)	0.710 (0.022)	0.803 (0.019)	-0.405 (0.031) .000	-0.498 (0.029) .000	-0.093 (0.029) .001
Progressive Tax Opinion Greater than €10K sample (n = 63)	0.235 (0.106)	0.500 (0.109)	0.667 (0.098)	-0.265 (0.152) .090	-0.431 (0.145) .005	-0.167 (0.147) .263

Columns 1 to 3 report mean estimates for *Progressive Tax Opinion* by treatment category and the standard error of the estimate in parentheses. Columns 4 to 6 report difference-in-means tests, the standard error in parentheses, and *p* value assuming unequal variances.

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clearly discernible in the French sample. The overall pattern of the treatment effects in Table 4 is broadly what we would expect if self-centered inequity influenced tax policy opinions. Nonetheless, it is important to keep in mind that our model suggests that progressivity in tax preferences may be observed even if respondents are purely self-interested. It is also the case that other models of other-regarding preferences might yield similar predictions. Given these potential competing interpretations of the experimental results, we probe the results of these experiments further to determine the extent to which they provide evidence for the importance of advantageous and disadvantageous inequality aversion in addition to self-interest in the formation of tax policy opinions and we turn to that task in the next section.

Estimation of Inequity Aversion Parameters

The approach that we take in this section is to use our theoretical model of self-centered inequity aversion and tax preferences to derive an empirical model of policy preferences and estimate the advantageous inequality and disadvantageous inequality parameters.

We start with the extended individual utility function in our model, Equation 2, introduce an error term, ε_i, and specify its distribution. The error term should be thought to be composed primarily of those factors influencing opinion about the tax rate not included in our model. We assume that ε_i is normally distributed and that it enters the function additively.

We further simplify the model in several ways. First, we omit the term $1/3F(\cdot)$, which is the per capita lump sum transfer. Because this transfer does not vary across individuals, it will be captured by the constant in the estimating equation. In a similar vein, we also omitted the disutility from inefficiency in taxation, $-1/3\sum_{i=1}^{3}\gamma\tau_i^2$, which also does not vary across individuals and will be captured by the constant. Second, the survey question forces respondents to focus on one group of individuals at a time and so we consider only income differences between the individual and the individuals in the income group for which the tax is to be applied. Third, we substitute pre-tax income for post-tax income. The tax rate τ_i changes the ratio of the estimates for α and β and so this substitution only changes the scale of α and β parameters. This is also the case for the estimated coefficient for income, w_i.[22] Given these assumptions, we have the following model:

$$Z_i(\tau) = \phi_1 w_i - \alpha\Big[\max\{w_j - w_i, 0\}\Big] -$$
$$\beta\Big[\max\{w_i - w_j, 0\}\Big] + \varepsilon_i, \text{ where } i \neq j. \tag{3}$$

Let z_i^F be the utility to individual i from introducing higher tax rates and z_i^O be the utility to individual i from the status quo policy without higher tax rates. We assume that our survey respondents answer our question favoring or opposing higher tax rates by selecting the policy option that yields the highest utility. Let $Y^* \equiv z_i^F - z_i^O$. If $y^* > 0$, the individual favors higher tax rates and otherwise will be opposed. Furthermore, let $y_i = 1$ if $y^* > 0$ and $y_i = 0$ otherwise. Y^* is the difference between two normally distributed variables and is itself normally distributed. As such, the probability that an individual favors $P(Y^* > 0) = P(Y = 1)$ or opposes $P(Y^* \leq 0) = P(Y = 0)$ higher tax rates can be derived from the standard normal cumulative distribution function (CDF). This yields

$$P(Y=1) = \Phi\left(\phi_0 + \phi_1 w_i - \alpha\left[\max\left\{ w_j - w_i, 0 \right\} \right] - \beta\left[\max\left\{ w_i - w_j, 0 \right\} \right] \right), \quad (4)$$

where $\Phi(\cdot)$ is the standard normal CDF and ϕ_0, ϕ_1, α, and β are parameters to be estimated. We model the differences in utility under the new tax rate and the status quo by allowing α, β, and ϕ to vary across the two conditions with $\alpha^F(\beta^F, \phi^F)$ differing from $\alpha^O(\beta^O, \phi^O)$ because of the change in after-tax incomes due to the new tax rate. In Equation 4, $\alpha = \alpha^F - \alpha^O$, $\beta = \beta^F - \beta^O$, and $\phi = \phi^F - \phi^O$ as only the difference is identified.

To estimate the parameters of this model, we use responses from both the deficit reduction and income tax increase experiment and the progressive tax experiment. The dependent variables are *Income Tax Opinion* and *Progressive Tax Opinion* as defined above. The initial estimating equation is

$$P(Y=1) = \Phi\left(\begin{array}{c} \phi_0 + \phi_1 \textit{Personal Income Greater} + \\ \alpha \textit{Disadvantageous Inequality} + \\ \beta \textit{Advantageous Inequality} \end{array} \right). \quad (5)$$

We estimate this equation as a probit and report heteroskedastic-consistent standard errors. *Disadvantageous Inequality* and *Advantageous Inequality* are defined as implied in Equation 4. *Disadvantageous Inequality* is equal to the income threshold in the tax question considered by the respondent minus the income of the respondent if that difference is positive and is equal to zero if not. *Advantageous Inequality* is equal to the income of the respondent minus the income threshold in the tax question considered by the respondent if that difference is positive and is equal to zero if not. *Personal Income Greater* is equal to one if the respondent's income is greater than the income threshold in the tax question and zero if not. We also estimate and present results with additional control variables for demographic characteristics

including gender, age, and education as well as state fixed effects in the U.S. specifications.[23]

The first hypothesis is that $\alpha > 0$ because if the respondent's income is below the threshold at which the tax increase (or progressivity) would apply, the tax increase will lower the after-tax returns to individuals with salaries greater than the respondent reducing his or her loss from disadvantageous inequality. The second hypothesis is that $\beta > 0$ because a tax increase (or progressivity) above the threshold will apply both to lower income groups and to the respondent but since the respondent has a higher income, the overall impact is to reduce differences in after-tax incomes and, thus, his or her loss from advantageous inequality. The third hypothesis is that $\phi_1 < 0$ because *Personal Income Greater* indicates that the proposed tax applies to the respondent and if it does, this reduces the respondent's after-tax income.

Table 5 reports the main results for the increase in the income tax experiment. The coefficient estimates for the disadvantageous inequality parameter are as predicted and statistically significant across both specifications in France and the United States. For Model 1 in the United States, the estimated probit coefficient, α, for the variable *Disadvantageous Inequality* is equal to 0.0072 with a standard error of 0.0008. This indicates that, all else equal, individuals are more supportive of income tax increases, the greater the difference between a respondent's own income and the threshold of the income tax increase. The magnitude of the disadvantageous inequality effect is substantial. To get a sense of the substantive magnitude of this estimate, the effect of increasing the *Disadvantageous Inequality* measure from 0—the value assigned to the variable when the respondent has an income greater than or equal to the treatment threshold—to 38.3—a one standard deviation increase—on the probability of supporting the tax increase, holding all other variables at their means is 0.107 (standard error of 0.012). This means that the probability of favoring the income tax change increases about 11 percentage points, which is about a 23% increase from the overall mean of the *Income Tax Opinion* measure. The analogous quantity for Model 3 in the French case is 0.133 (standard error of 0.013) and suggests that disadvantageous inequality has a similarly large substantive effect on tax opinion in France.

The coefficient estimates for the advantageous inequality parameter are positive as predicted but only substantively and statistically significant in the French data. For Model 3 in France, the estimated probit coefficient, β, for the variable *Advantageous Inequality* is equal to 0.048 with a standard error of 0.024. The magnitude of the effect is substantively important. The effect of increasing the *Advantageous Inequality* measure from 0—the value assigned to the variable when the respondent has an income less than or equal to the

Table 5. Support for Income Tax Increases to Reduce Budget Deficit—United States and France, Probit Estimates.

	Probit model estimates			
	United States	United States	France	France
	Model 1	Model 2	Model 3	Model 4
	Coefficient estimates	Coefficient estimates	Coefficient estimates	Coefficient estimates
Disadvantageous Inequality, α	0.0072	0.0074	0.1003	0.1029
	(0.0008)	(0.0009)	(0.0099)	(0.0099)
	.000	.000	.000	.000
Advantageous Inequality, β	0.0004	0.0009	0.0483	0.0640
	(0.0017)	(0.0018)	(0.0242)	(0.0246)
	.813	.614	.046	.009
Personal Income Greater, ϕ_1	−0.4853	−0.5318	−0.7432	−0.8303
	(0.1072)	(0.1114)	(0.1085)	(0.1115)
	.000	.000	.000	.000
Demographic controls	No	Yes	No	Yes
State fixed effects	No	Yes	No	No
Log-likelihood	−1,582.6	−1,506.2	−1,330.8	−1,293.8
Observations	2,479	2,414	2,162	2,118

The table reports the results of probit regressions for the variable *Income Tax Opinion* on *Disadvantageous Inequality, Advantageous Inequality*, and various control variables. For each model, the table reports the probit coefficient estimates for each variable, their heteroskedastic-consistent robust standard errors in parentheses, and *p* values. A constant term is included in each regression but not reported in the table.

treatment threshold—to 1.43—a one standard deviation increase—on the probability of supporting the tax increase, holding all other variables at their means is 0.027 (standard error of 0.013). This means that the probability of favoring the income tax policy change increases 2.7 percentage points (about 4.7% of the overall mean).

The difference between France and the United States in the results for the importance of advantageous inequality aversion in explaining tax policy preferences is interesting. Possible explanations include differences in beliefs among those with higher incomes about why some individuals have higher incomes than others. If higher income individuals in France are, for example, more likely to believe that luck played an important role in their relative economic success than individuals in the United States (Alesina & Angeletos, 2005; Piketty, 1995), we would expect to observe more advantageous inequality aversion in France

than the United States. Alternatively, different levels of concern among those with higher incomes about the welfare of the poor—which in turn may be due to ethnic or racial heterogeneity—could explain this difference (Alesina & Glaeser, 2004). Another possibility is that inequality aversion is a basic social preference determined by socialization and that this process generates systematic cross-country differences in the toleration of inequality, particularly among those who do relatively well. Although investigating these alternative explanations as well as others would be interesting, we would need estimates of inequality aversion from a much larger set of countries to begin to evaluate the mechanism and so we leave this for future research.

In the income tax increase to reduce the budget deficit experiment, it is also important to note the estimates for ϕ_1 indicating the extent to which being exposed to the proposed tax increase influences opinion about the policy proposal. Across both specifications in France and the United States, the estimates for ϕ_1 are negative, substantively large, and statistically significant. For example, in the United States, the difference between being subject to the tax and not being subject to the tax decreases the probability of supporting the proposal by 18.6 percentage points in the Model 1 specification. In France, using the Model 3 specification, the equivalent quantity is 28.8 percentage points.

Table 6 reports the results for the progressive income tax experiment. Qualitatively, these estimates are quite similar to those for the income tax increase and deficit reduction experiment. Across both specifications for each country, the estimates for α and ϕ_1 are in the expected directions and substantively and statistically significant. The results are strongly consistent with the suggested role for both disadvantageous inequality aversion and self-interest. The estimates for β are again more mixed. The estimates for the United States are positive but small and statistically insignificant. The estimates for France are positive, substantively significant, and statistically significant for Model 4 that includes additional control variables.

Overall, the estimates in Tables 5 and 6 provide robust evidence that disadvantageous inequality aversion has an important effect on policy opinions about raising taxes in France and the United States and that advantageous inequality aversion is clearly evident in the French case. Taken together, this implies strong evidence of self-centered inequity aversion in France but not in the United States. It is important to note that evidence of disadvantageous inequality aversion alone for tax preferences is consistent with both a model of simple self-interested preferences—where the extent of income differences matters for the preferred tax rate—and the self-centered inequity aversion framework—where the extent of income differences is weighed even more heavily. That said, the French evidence is clearly consistent with

Table 6. Support for Progressive Income Tax—United States and France, Probit Estimates.

	Probit model estimates			
	United States	United States	France	France
	Model 1	Model 2	Model 3	Model 4
	Coefficient estimates	Coefficient estimates	Coefficient estimates	Coefficient estimates
Disadvantageous Inequality, α	0.0073	0.0076	0.1385	0.1400
	(0.0009)	(0.0009)	(0.0103)	(0.0103)
	.000	.000	.000	.000
Advantageous Inequality, β	0.0013	0.0012	0.0376	0.0455
	(0.0017)	(0.0018)	(0.0239)	(0.0251)
	.464	.502	.117	.007
Personal Income Greater, ϕ_1	−0.3966	−0.3849	−0.4099	−0.4520
	(0.1082)	(0.1101)	(0.1022)	(0.1058)
	.000	.000	.000	.000
Demographic controls	No	Yes	No	Yes
State fixed effects	No	Yes	No	No
Log-likelihood	−1,571.6	−1,513.3	−1,306.3	−1,275.1
Observations	2,479	2,425	2,162	2,118

The table reports the results of probit regressions for the variable *Progressive Tax Opinion* on *Disadvantageous Inequality, Advantageous Inequality*, and various control variables. For each model, the table reports the probit coefficient estimates for each variable, their heteroskedastic-consistent robust standard errors in parentheses, and *p* values. A constant term is included in each regression but not reported in the table.

self-centered inequity aversion and more generally with the importance of other-regarding considerations in explaining opinion formation about tax policy. At the same time, the findings provide a substantial reminder that a role for other-regarding preferences does not imply that self-interest does not also matter for economic policy opinions.[24]

Does Income Mobility Explain Results?

One concern about the survey evidence described above is that respondents' policy preferences could be shaped by their expected upward or downward income mobility above and below the income tax thresholds. This possibility is particularly relevant for interpreting our parameter estimates for disadvantageous inequality. It could be that for individuals below the threshold at

which the tax will be applied, those with incomes further from the threshold are less optimistic that they will eventually have incomes above the threshold and, thus, are more willing to support higher taxes. It is less clear that income mobility considerations could account for the predicted positive effect of advantageous inequality on support for higher taxes.

To address this alternative, we conducted two additional survey experiments in both France and the United States.[25] Both experiments elicit respondent support for policies that will influence the incomes of others working in specific industries but not directly affect the income of the respondent. The first experiment targets workers in the banking sector with greater regulation whereas the second experiment targets workers in a hypothetical industry with greater trade protection. In each case, we argue that it is not plausible to think that the results are driven by the possibility that respondents of different incomes are going to be working in the affected sectors in the future. The point of these experiments is to bolster our interpretation of the role of inequity aversion in our main tax policy analyses by ruling out an account emphasizing mobility. The remainder of this section focuses on describing the results of the banking regulation experiment and briefly describes the results from the trade experiment. A full discussion of the trade results are reported in the online appendix.

The banking regulation experiment asks respondents to consider the introduction of increased regulations and randomly assigns a frame for the average income of workers in the banking industry. We exclude all respondents working in the financial sector from our analysis so that the proposed regulation arguably only has an impact on the after-tax incomes of others.

The U.S. version of the question used to elicit support for increased banking regulation was as follows:

> The average income for workers in the U.S. banking industry is X dollars per year. The Federal government is considering increased regulations on this industry. Some economists argue that these regulations will reduce financial innovation which helps the economy grow while others argue that it will reduce the risk of financial crises. Do you favor or oppose these new banking regulations?
>
> IF FAVOR: Do you strongly favor or only somewhat favor new banking regulations?
>
> IF OPPOSE: Do you strongly oppose or only somewhat oppose new banking regulations?

where X was set at either US$50,000 or US$100,000 per year in the United States and €3,000 or €6,000 in France. These values were chosen to indicate

an "above average" and "high" income for the banking sector. Either value is plausible depending on the exact definition of the banking sector and class of workers that one considers.

For the banking regulation experiment, we constructed a measure of support for increased regulation, *Bank Regulation Opinion*, which is set equal to one for respondents who favor increased regulation and zero for those opposed.[26]

Table 7 reports the mean estimates for each treatment category and difference-in-means estimates for each combination of treatments. These results provide substantial evidence that support for increased regulation in both countries is influenced by the average wage of workers in the industry. In the United States, support for increased regulation is about 8 percentage points higher when the primed average income for the industry is US$100,000 per year compared with when the prime is US$50,000 per year. The difference for France is almost precisely the same magnitude. These treatment effects are broadly consistent with self-centered inequity aversion and are not easily explained by expectations about income mobility.

To bolster our interpretation, we again estimate the advantageous and disadvantageous inequality aversion parameters, β and α, in a structural model. Our estimating equation is

$$P(Y = 1) = \Phi \begin{pmatrix} \phi_0 + \alpha Disadvantageous\ Inequality + \\ \beta Advantageous\ Inequality \end{pmatrix}. \quad (6)$$

This equation is almost identical to that derived for the income tax increase and progressive tax experiments. The difference is simply that the respondent's own income drops out of the derivation because it is unaffected by the proposed regulations.[27] The dependent variable is *Bank Regulation Opinion* and the model is estimated as a probit with heteroskedastic-consistent standard errors. *Disadvantageous Inequality* is defined as in the other experiments except that the "other" income level is determined by the treatments for the bank regulation experiment. The first hypothesis is that $\alpha > 0$ because increased banking regulations will lower incomes in the banking sector and to the extent that respondents exhibit disadvantageous inequality aversion in their preferences, lowering these bankers' incomes increases the utility of individuals who have incomes lower than the threshold. The second hypothesis is that $\beta < 0$ because increasing banking regulations will lower incomes in the banking sector, and for a respondent with an income above the average of this sector, this will result in a utility loss if that individual is influenced by advantageous inequality aversion. We report each set of results with a specification based on the theoretical model only (Models 1 and 3) and a specification with additional demographic control variables (Models 2 and 4).

Table 7. Estimated Effect of Average Wage on Support for Increased Banking Regulation—United States and France.

	Mean estimates by treatment category		Difference estimates
	Middle wage	High wage	
United States	US$50,000	US$100,000	Middle high
Bank Regulation Opinion	0.614 (0.014)	0.696 (0.013)	−0.081 (0.019) .000
Number of observations	1,167	1,229	
	Middle wage	High wage	
France	€3,000	€6,000	Middle high
Bank Regulation Opinion	0.774 (0.013)	0.855 (0.011)	−0.081 (0.017) .000
Number of observations	1,113	1,038	

Columns 1 and 2 report mean estimates for *Bank Regulation Opinion* by treatment category and the standard error of the estimate in parentheses. Column 3 reports difference-in-means tests, the standard error in parentheses, and *p* value assuming unequal variances.

Across all four specifications reported in Table 8 for each country, the estimates for the *Disadvantageous Inequality* parameter, α, are positive and statistically significant. This result is consistent with our hypothesis that disadvantageous inequality influences opinion about economic policies and is not easily explained by income mobility arguments. Moreover, in this case, as opposed to taxes, it is also not easily explained by self-interest. The estimates for the *Advantageous Inequality* parameter, β, vary in sign across the two cases and are not statistically significant. These results are consistent with the tax experiments for the United States but inconsistent with the findings for France. One possible reason for the later inconsistency is that the banking industry is not viewed as disadvantaged, regardless of the value of the treatment. This seems particularly credible given the trade-policy results that we discuss below.

One additional result for the banking regulation analysis merits attention. The specifications in Table 8 for Models 2 and 4 include an indicator variable as in the tax analyses for whether or not the respondent's income is above the

Table 8. Support for Increased Banking Regulation—United States and France, Probit Estimates.

	Probit model estimates			
	United States	United States	France	France
	Model 1	Model 2	Model 3	Model 4
	Coefficient estimates	Coefficient estimates	Coefficient estimates	Coefficient estimates
Disadvantageous Inequality, α	0.0038	0.0042	0.0962	0.1147
	(0.0009)	(0.0011)	(0.0199)	(0.0219)
	.000	.000	.000	.000
Advantageous Inequality, β	−0.0016	−0.0017	0.0019	0.0260
	(0.0012)	(0.0015)	(0.0221)	(0.0317)
	.171	.252	.930	.413
Demographic controls	No	Yes	No	Yes
State fixed effects	No	Yes	No	No
Log-likelihood	−1,522.1	−1,454.4	−1,016.7	−980.5
Observations	2,389	2,326	2,138	2,095

The table reports the results of probit regressions for the variable *Bank Regulation Opinion* on *Disadvantageous Inequality, Advantageous Inequality*, and various control variables. For each model, the table reports the probit coefficient estimates for each variable, their heteroskedastic-consistent robust standard errors in parentheses, and *p* values. A constant term is included in each regression but not reported in the table.

treatment income. In the case of the tax experiments, the theoretical expectation was that self-interested considerations would lead respondents above the threshold to have more negative views of tax increases. For the banking regulation analysis, there is not such an expectation and indeed the parameter estimates for the variable indicating whether the respondent's income is above the treatment income are small and statistically insignificant. This bolsters our previous interpretation of our negative estimates for the tax experiments as consistent with self-interest considerations influencing policy opinions.

In addition to the bank regulation experiment, we also conducted a trade-policy experiment in each country, which was also focused on sectors and does not lend itself to an income mobility explanation for the disadvantageous parameter estimates. The online appendix reports the results of these analyses. The estimates suggest that both advantageous and disadvantageous inequality influence sector-specific trade-policy opinions in France and the United States.[28]

Conclusion

Mass political behavior in the midst of an economic crisis provides a unique lens for studying distributive political conflict and the determinants of political opinion and behavior. This article points to any one of the millions of citizens who have voted, marched, or rioted to advocate or protest one policy position or another in their national political debate on how best to respond to the crisis and asks why did those citizens take the positions that they did and why did they often seem so invested in the debate. It seems likely that self-interest plays an important role in answering these questions. Having often already lost much in the crisis itself, individual citizens are acutely aware of the consequences of policy change on their individual welfare. Moreover, economic crises are often periods of significant policy change with long-lasting distributional consequences. In short, with so much at stake, it would be surprising if self-interest did not inform policy opinions and behavior in the national debate. However, the theater of these political debates suggests the possibility that other considerations may also be central to determining the positions that citizens take and their behavior in the political process. The German or U.S. taxpayer or Greek or Spanish civil servant is not outraged simply because they will lose from some new policy under consideration though that may be part of the story. Rather, their policy position and outrage is in part because the policy alternative under consideration either resonates or is in conflict with their sense of fairness.

In this article, we investigate how one specific understanding of fairness—self-centered inequity aversion—influences individual policy opinions about tax policy in the context of an economic crisis. We argue that attitudes about inequality—both advantageous and disadvantageous inequality—can lead to systematic differences in support for higher income taxes. Individuals consider not only how policy alternatives affect their own interests but also how they affect the incomes of others relative to their own.

Our estimates suggest that in France both disadvantageous inequality aversion and advantageous inequality aversion are important determinants of tax policy preferences. In the United States, we find strong evidence of disadvantageous inequality aversion but not advantageous inequality aversion. Taken together, the results for France are strongly consistent with self-centered inequity aversion whereas the findings for the United States are more mixed for tax policy suggesting that the importance of self-centered inequity aversion may vary across countries and issue areas. Even for France, it should be noted that it is possible that another form of inequality aversion or some other other-regarding mechanism is generating the pattern of preferences observed across the experiments. We have provided evidence

that some of the most likely alternatives do not fit the data as well as the influence of self-centered inequity aversion, but we have not exhausted the alternatives. Exploring new experiments and analyses to evaluate alternative mechanisms further seems a productive task for future research.

The implications of our findings are important for understanding the larger political determinants of economic policy making in addition to understanding the motivations of voters over distributional issues. Self-centered inequity aversion helps explain why income tax policies have generally evolved to be progressive in most countries around the world. If there is cross-national variation in this effect, it may also help explain why some countries adopt more progressive tax systems than others. Self-centered inequity aversion also implies that we should expect an increase demand for more progressive tax policies when inequality increases—this effect essentially multiplies the effects of increased inequality predicted by purely self-interested models (e.g., Meltzer & Richard, 1981). To some extent, we see these expectations borne out in contemporary policy debates. Generally, as inequality has increased, many countries have experienced calls for more progressive tax policies. More specifically, the evidence in this article that self-centered inequity aversion is more clearly evident in France than the United States may help account for the sense that French politics has seen a greater push toward more progressive taxation in response to the economic crisis and increasing inequality and social exclusion. That said, as Bonica, McCarty, Poole, and Rosenthal (2013), Scheve and Stasavage (2010, 2012, 2016), and many others have argued, in practice, democracy and inequality have not been sufficient conditions for countries to adopt high taxes on the wealthy. It may be that inequity aversion supports progressive taxation to some degree but is not a sufficiently powerful fairness norm in most countries to induce policy makers to implement highly progressive tax systems.

Authors' Note

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Supplementary Material

Supplementary material for this article is available in the appendix in the online edition. Replication files are available on Dataverse Replication Archive: https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/H11ITR" Currently the link is connected to "Replication Archive

Notes

1. See, for example, Scheve and Stasavage (2016) for a historical analysis of the role of inequality in influencing tax policy and Agranov and Palfrey (2015) for laboratory experimental evidence on this relationship.
2. See Rueda and Stegmueller (in press).
3. See, for example, Ballard-Rosa, Martin, and Scheve (in press) on the correlation between beliefs about the efficiency effects of taxation and income tax preferences.
4. On ethnic and racial heterogeneity, see, for example, Gilens (1999), Luttmer (2001), Alesina and Glaeser (2004), and Duch and Rueda (2014); on the structure of inequality, see Lupu and Pontusson (2011) and Dimick, Rueda, and Stegmueller (in press); and on fairness, see Fong (2001), Alesina and Angeletos (2005), and Scheve and Stasavage (2010, 2012, 2016). See also Cavaille and Trump (2015) for how these factors might be different for policy instruments that either tax or transfer resources.
5. See, for example, Bartels (2008), Kuziemko, Norton, Saez, and Stantcheva (2015), McCall (2013), and Page and Jacobs (2009).
6. Throughout the article, we use Fehr and Schmidt's original terminology for the overall model and its component parts.
7. Dimick et al. (in press) also study Fehr–Schmidt preferences in the analysis of redistributive preferences using survey data from the United States but they do not estimate the advantageous and disadvantageous inequality aversion parameters of the model as we do here.
8. See Alesina and Giuliano (2011) for a review of research on preferences over redistribution and Kuziemko et al. (2015) for a review of work on tax policy opinions. In addition to the factors discussed here, previous empirical work has focused on economic experiences (Margalit, 2013), beliefs about income

mobility (Alesina & La Ferrara, 2005), the specificity of labor-market skills (Iversen & Soskice, 2001), the correlation of low income and economic insecurity (Rehm, Hacker, & Schlesinger, 2012), the relative importance of insurance versus redistributive motives (Barber, Beramendi, & Wibbels, 2013), competing social identities (Shayo, 2009), and religion (Huber & Stanig, 2011; Scheve & Stasavage, 2006; Stegmueller, 2013).

9. See the online appendix for further details of derivation of preferred tax rates. We assume $\tau_i \in [0,1]$ and $\gamma > 0$, and, thus, rule out negative taxes.

10. These predictions echo some of the main ideas in the foundational models in this literature such as Romer (1975) and Meltzer and Richard (1981).

11. See Sobel (2005) and Fehr and Schmidt (2006) for reviews of self-centered inequity aversion and other models of social-preferences. Note that empirically the claim is not that all individuals are averse to inequality but that there are at least a significant proportion of individuals who are and that this preference has an important effect on opinion and behavior.

12. In the analysis presented, we assume that the combination of the magnitude of the differences in income across groups and the extent of inefficiencies from high tax rates are such that the set of tax policies under consideration does not change the ordering of group income.

13. More specifically, if $\beta > 2/3$, preferred taxes increase as β increases and if $\beta \leq 2/3$, preferences do not vary with β because they are bound at zero.

14. The surveys were conducted by Qualtrics, www.qualtrics.com. The design was reviewed and granted an exemption by Yale University's Human Subjects Review Committee.

15. The U.S. sample had a somewhat higher proportion of women, had a bit more middle-aged respondents with fewer respondents below 35, and was more highly educated. The French sample had fewer respondents above 55 and more below 40, and was a bit more highly educated. See Online Appendix Tables A1 and A2 for descriptive statistics.

16. One important piece of evidence consistent with the argument that the experimental results reported here are likely to be the same as for a random sample of the U.S. population is that the trade-policy experiment discussed in the online appendix is a replication of Lü, Scheve, and Slaughter (2012), which did use a random sample and the results across the two experiments are quite similar.

17. We conducted several types of balance tests, each of which indicated that the observed characteristics of the respondents were balanced across treatment groups. See Online Appendix Tables A3 and A4 for further details.

18. Monthly, rather than yearly, incomes were used in France because incomes are more commonly known and discussed in monthly terms in France. Standard survey questions about income are typically asked on an annual basis in the United States and a monthly basis in France and we have followed this practice in constructing our survey experiments.

19. We also constructed an alternative measure *Income Tax Opinion 2*, which, is set equal to 1 for respondents who oppose raising income taxes strongly, 2 for

respondents who oppose raising taxes somewhat, 3 for respondents who favor raising income taxes somewhat, and 4 for those who favor raising income taxes strongly. All the results reported in the article are qualitatively the same using this measure. See Tables A5 and A6 in the online appendix.

20. More precisely, there are a sufficient number of high income respondents to precisely estimate differences in the United States. For France, the magnitude of the differences is larger but the test is somewhat underpowered. We also estimated differences across treatment categories controlling for sex, age, and education. These estimates are reported in Table A9 in the online appendix and closely mirror those reported in Table 3. Table A10 replicates the results in Table 4 controlling for sex, age, and education.

21. We also constructed an alternative measure *Progressive Tax Opinion 2*, which, is set equal to 1 for respondents who favor a much smaller share, 2 for respondents who favor a somewhat smaller share, 3 for respondents who favor the same share, 4 for those who favor a somewhat larger share, and 5 for those who favor a much larger share. All the results reported in the article are qualitatively the same using this measure. See Tables A7 and A8 in the online appendix.

22. Given this assumption, it is also implied that tax changes do not alter the relative ordering of income groups, and subsequently, we can order income groups using pre-tax income.

23. See Appendix Tables A18 and A19 for specifications that control for additional demographic variables such as race and marital status and in some specifications partisanship and/or ideology. We note that neither partisanship nor ideology is likely an appropriate control variable in these regressions as it is likely a consequence of the redistributive preferences we are trying to measure.

24. The idea that individuals prefer economic outcomes for others that do not depart too far from their own outcomes raises the question of how sharply they use their own outcomes as a point of reference. In this section, we assume that losses from self-centered inequity aversion arise from sharp comparisons with their own outcome but it may be that individuals only care about outcomes that depart substantially from their own. In the online appendix (see Table A11), we explore various fuzzy thresholds as alternative model specifications, and test whether such models fit the data better than our original models. We show that our original model specification offers better fit with our data than alternative model specifications with fuzzy thresholds.

25. These experiments were conducted in summer 2010 as part of the surveys described above.

26. We also constructed the variable *Bank Regulation Opinion 2*, which is set equal to 1 for respondents who oppose increased regulation strongly, 2 for respondents who oppose increased regulation somewhat, 3 for respondents who favor increased regulation somewhat, and 4 for those who favor increased regulation strongly. The results reported here are replicated for the *Bank Regulation Opinion 2* measure.

27. We exclude all respondents working in the banking sector from the analysis.

28. See also Lü et al. (2012) for additional trade-policy opinion evidence. The online appendix section "Paying for Equality" reports results of an additional

experiment, which directly evaluates a more general observable implication of our framework—that individuals will be willing to choose tax system alternatives that require themselves to pay higher taxes if those alternatives reduce relative income differences.

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