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Fairness and the Unselfish Demand for Redistribution by Taxpayers and Welfare Recipients

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We theoretically illustrate how the aversion to unfairness triggers an unselfish though rational demand for redistribution. This leads the well-off to demand positive tax rates and the "poor" to reject extreme progressivity. We prove that the "rich" and the "poor" adjust their demand for redistribution in opposite ways when their sensitivity to fairness increases: while agents with above average expected income raise their demand for redistribution, agents with below average income lower it. We then provide empirical evidence of these behaviors using a nationally representative survey from Italy. The estimates confirm that a stronger aversion to unfair distributive outcomes is associated with a higher support for redistribution by individuals with high income and to a lower demand for redistribution by those with low income.

JEL Classification: H10, H53, D63, D69, Z1

1. Introduction

The demand for redistribution has complex motives that transcend self-interest. The literature has shown that the belief that everyone has the right to fully enjoy the fruits of her work leads to a lower support for progressivity. The effect of this principle, however, can be mitigated by the belief that market competition generates unfair outcomes. If the opinion prevails that one's position on the social ladder mostly depends on luck or unworthy activities such as free riding and rent seeking, a society will demand a greater redistribution to correct income disparities that do not reflect differences in talent and effort (Alesina and Angeletos 2005; Alesina and La Ferrara 2005; Bénabou and Tirole 2006).

Following Alesina and Angeletos (2005), we assume that social injustice can cause disutility according to a subjective sensitivity to fairness. The authors posit that the aversion to unfair market outcomes is associated with other-regarding preference for redistribution that, along with the selfish motives, determines the optimal tax rate of individuals. In a simplified version of the model proposed by Alesina and Angeletos (2005), we first illustrate how the aversion to unfairness generates an unselfish demand for redistribution, leading the well-off to possibly desire positive tax rates and

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the poor to reject extreme progressivity.[1] Second, as a minor development of the emended framework of Alesina and Angeletos (2005), we prove that the well-off and the poor adjust their demand for redistribution in opposite ways, following a change in their sensitivity to fairness. After a positive shock to the aversion to unfair social outcomes, agents with above average expected income raise their demand for redistribution while agents with below average income lower it. Finally, we introduce an element of uncertainty in the model and we assume that some agents do not know (nor do they have a probability distribution on) whether their expected income is above or below the average. We show that, if agents form expectations based on the Laplace principle of insufficient reason as formalized by Milnor (1954), the qualitative results obtained under the perfect knowledge scenario are confirmed. However, the thresholds defining the well-off and the poor are, respectively, higher and lower than the average income.

We provide evidence of these behaviors based on micro data collected by the Bank of Italy in its Survey on Household Income and Wealth. The 2004 wave of this survey includes information about people's opinions and beliefs concerning public spirit, taxation, and redistribution. Following the literature on civic capital and redistributive attitudes, we operationalize individuals' sensitivity to unfair allocations via indicators of the aversion to free riding, an unworthy activity that generates distributive injustice by enabling agents to improve their position at the expense of society (see e.g., Alesina and Angeletos 2005; Guiso, Sapienza, and Zingales 2006, 2010; Algan, Cahuc, and Sangnier 2016).

To provide consistent estimates despite the endogeneity issues related to the study of individual preferences in a section of data, we use a procedure proposed by Wooldridge (2002) that copes with the absence of external identifying information by exploiting instruments derived from a nonlinear first stage. This strategy of identification is not as straightforward and transparent as a random natural experiment. However, it uses the same estimator as conventional IV strategies, which is proved to be consistent, thus helping to correct the endogeneity bias of the estimates.

Our empirical analysis shows that an increase in the aversion to unfair allocations caused by free riding is associated with opposing attitudes toward redistribution depending on income: high-income individuals, in fact, tend to demand more redistribution despite knowing they will bear its cost without enjoying the benefits, while those with low income tend to demand less redistribution even if they would benefit from it without bearing its cost.

This study bridges two strands of the literature. The first examines how the desire for fairness and beliefs about the equality of opportunities influence individual preferences for redistribution (Alesina and Angeletos 2005; Alesina and La Ferrara 2005; Bénabou and Tirole 2006; Dahlberg, Edmark, and Lundqist 2012; Gualtieri, Nicolini, and Sabatini 2019). More in general, our work relates to the literature on the drivers and consequences of redistributive government spending (e.g., Meltzer and Richard 1981; Piketty 1995; Amudeo-Dorantes and Juarez 2015; Barón, Cobb-Clark, and Erkal 2015; Mayer, Lopoo, and Groves 2016; Abbott, Cabral, and Jones 2017; Chong and Gradstein 2017). The second strand investigates how tax morale and the demand for redistribution are affected by various dimensions of social capital such as trust (Daniele and Geys 2015), social participation (Andriani 2016), moral values (Guiso, Sapienza, and Zingales 2006), and civic-mindedness (Algan, Cahuc, and Sangnier 2016; Cerqueti, Sabatini, and Ventura 2019).

[1] For the sake of readability, we will use the terms "aversion to unfairness" and "sensitivity to fairness" as synonyms throughout the article.

We add to these studies by showing that a stronger aspiration to live in a fair society can induce opposing and counter-intuitive changes in the demand for redistribution depending on the individual's position on the income ladder. To the best of our knowledge, this study represents the first attempt to empirically assess the impact of the aversion to unfairness on the demand for redistribution. Our results also add to the social capital literature by extending our knowledge of the possible economic consequences of civic-mindedness, addressed by numerous studies after the seminal work of Putnam, Leonardi, and Nanetti (1993).

The article proceeds as follows: Section 2 presents the theoretical framework. Section 3 describes the data, the empirical strategy, and the results of our empirical analysis. Section 4 draws some concluding remarks.

2. Theoretical Framework

We use a simplified version of the setup developed by Alesina and Angeletos (2005) to analyze how aversion to unfair welfare allocations, such as those ones derived from free riding, affects the individual demand for redistribution. Our only simplifications with respect to their assumptions concern the time structure of the model and how individual income is determined. Alesina and Angeletos (2005) assume that agents live for two periods, and that pre-tax life-cycle income depends on talent, investment (in physical or human capital) during the first period of life, effort during the second period of life and a shock that represents either luck or socially unworthy activities. While talent and luck are exogenous, both investment and effort are choice variables. On the contrary, we assume that agents live for one period only, and income is independent of their choices. Given a continuum of agents indexed by $i \in [0, 1]$, individual income of agent i is

$$y_i = A_i + \eta_i,$$

where A_i summarizes agent i's individual features, such as talent and effort, and η_i is a zero-mean independent and identically distributed shock to individual income. The shock can be interpreted as the outcome of unworthy activities such as corruption and free riding. Agents consume their whole income; and their individual features and unworthy activities are uncorrelated, so that Cov $(A_i, \eta_i) = 0$.

Based on Meltzer and Richard (1981), the public sector implements a redistributive scheme where incomes are taxed at rate t, and tax revenues are redistributed evenly among agents. Accordingly, disposable income is given by

$$c_i = (1-t)\, y_i + G, \tag{1}$$

where $G = t\,\bar{y}$, and $\bar{y} = \int_0^1 y_i \, di$.

Following Alesina and Angeletos (2005), individual preferences are given by

$$U_i = c_i - \omega_i \Omega,$$

where Ω captures the disutility caused by social allocations perceived as "unfair," while the parameter ω_i measures individual aversion to "unfairness." A social allocation is unfair when it deviates from what agents should get based on their individual talent and effort $\hat{y}_i = A_i$, for

example, because it is the fruit of free riding. Alesina and Angeletos (2005) assume the specific functional form

$$\Omega = \int_0^1 (c_i - \hat{y}_i)^2 \, di.$$

Given Equation 1, the definition of G, and $\mathrm{Cov}(A_i, \eta_i) = 0$, some manipulations yield

$$\Omega = (1-t)^2 \sigma_\eta + t^2 \sigma_A,$$

where $\sigma_\eta \equiv \mathrm{Var}(\eta)$ and $\sigma_A \equiv \mathrm{Var}(A)$.

Individual expected utility is

$$E[U_i] = E(c_i) - \omega_i \Omega = (1-t)A_i + t\bar{y} - \omega_i \left((1-t)^2 \sigma_\eta + t^2 \sigma_A \right). \tag{2}$$

Agents choose the desired individual tax rate to maximize Equation 2.[2] The tax rate affects individual expected utility in two ways. First, it determines the expected disposable income. Agents gain from a positive tax rate as long as their expected income is less than the mean income: this is the "selfish" motive for desiring redistribution. Expected disposable income is maximized by $t = 1$ when $A_i < \bar{y}$, and by $t = 0$ otherwise. Second, individuals who care about social outcomes may desire a positive tax rate to reduce the "unfairness" of the market allocation. Ω, the disutility caused by unfair allocations, is minimized by $t_\Omega = \sigma_\eta/(\sigma_\eta + \sigma_A)$, which is an increasing function of σ_η: agents demand redistribution as long as it reduces the component of outcomes variability dependent on free riding. In contrast, a higher σ_A reduces the desired tax rate as agents do not want to reduce income dispersion when it is due to talent or effort.

At this point, our analysis departs from Alesina and Angeletos (2005) in two ways. First, while they focus on the optimal tax rate of the agent with median income because they are interested in the actual redistributive policy which will be implemented, we are concerned with the individual tax rate. Second, we analyze how aversion to unfair economic outcomes affects the individual desired tax rate. Alesina and Angeletos (2005) perform several comparative statics exercises on the median income agent's desired tax rate, but they do not study the effects of changes in aversion to unfairness.

The optimal individual tax rate t^* balances the "selfish" and "fairness" motives for redistribution. By maximizing Equation 2 with respect to t, t^* can be readily found as

$$t^* = \frac{\bar{y} - A_i + 2\omega_i \sigma_\eta}{2\omega_i (\sigma_\eta + \sigma_A)}. \tag{3}$$

Agents will demand positive redistribution, $t^* > 0$, if $\bar{y} - A_i + 2\omega_i \sigma_\eta > 0$. There will always be a positive demand for redistribution arising from the aversion to unfair outcomes, as long as there is a possibility of free riding ($\sigma_\eta > 0$). However, a selfish demand for redistribution is positive only for

[2] Notice that our simplification with respect to the time structure of the model does not affect the choice of the desired tax rate. In Alesina and Angeletos (2005), agents live for two periods, choose capital investment in the first one, while in the second one they decide their effort level. The desired tax rate, however, is determined only once between the two periods, after investment decisions are made and before effort is chosen. Therefore, the selection of the optimal individual tax rate does not depend on how many periods individual income is earned over.

agents with below-average expected income ($A_i < \bar{y}$). Agents with an above average expected income will demand redistribution if the fairness motive is stronger than the selfish one, that is, if $2\omega_i\sigma_\eta > A_i - \bar{y}$.

We are interested in assessing the relation between the desired tax rate and aversion to unfair outcomes. We can state the following:

PROPOSITION 1. An increase in the aversion to unfairness increases individual demand for redistribution if and only if $A_i > \bar{y}$.

PROOF. $\frac{dt^*}{d\omega_i} = \frac{A_i - \bar{y}}{2\omega_i^2(\sigma_\eta + \sigma_A)} > 0 \Leftrightarrow A_i > \bar{y}$.

Relatively rich agents demand more redistribution the greater is their aversion to unfair allocations. The opposite is true for agents with below-average income. The affluents have zero-"selfish" demand for redistribution while their demand for fairness yields the desired tax rate t_Ω. The overall desired tax rate t^* is a (weighted) average of the two effects. When ω_i increases, agents attach a higher weight to the fairness motive so that t^*, by moving closer to t_Ω, increases. In contrast, selfish demand for redistribution for relatively poor agents would require a 100% tax rate. An increase in ω_i increases the weight agents place on the fairness motive. Hence, the overall desired tax rate t^* decreases because it moves closer to t_Ω.

People with above average realized income lose from redistribution. Still, their aversion to social outcomes they deem unfair makes them willing to accept a certain amount of redistribution because they realize that unworthy activities may undeservedly penalize some people. Therefore, an increase in the individual sensitivity to fairness (an increase in ω_i) will lead to a demand for a higher tax rate. In contrast, "poor" agents gain from redistribution and high taxes. However, a strengthening of the belief that people should get what they deserve (again an increase in ω_i), will lead them to restrain their quest for redistribution from the rich and demand a lower tax rate.

Extension: Uncertainty of Mean Income

So far, we have assumed that agents have perfect information on the distribution of individual features, A_i, and in particular that they know its mean value $E[A_i] = \int_0^1 A_i \, di = \bar{y}$. Recent empirical evidence, however, has shown that people may misperceive their position in the income distribution (see Karadja, Mollerstrom, and Seim 2017). In what follows, we remove the hypothesis of perfect information and analyze the relative implications on the relation between the optimal individual tax rate and attitude toward unfairness.

To the purpose, consider two generic income values C and D, such that $C < \bar{y} < D$. They provide a partition of agents into three sets depending on agents' expected income (A_i): agents with $A_i < C$, agents with $A_i \in [C, D]$, and agents with $A_i > D$. We assume that none of the agents knows the exact mean value of income distribution $\bar{y}$, but agents with expected income outside the interval $[C, D]$ expect their income to be either above (if $A_i > D$) or below (when $A_i < C$) average. On the other hand, we assume that agents with expected income close enough to the mean ($A_i \in [C, D]$) cannot tell whether the mean value of the distribution is higher or lower than their expected income, and they expect the mean to be close to their own expected income. In particular, we posit that agents in the set expect the mean value to belong to a neighborhood of their expected income, that is, $E[\bar{y}] \in (A_i - \delta, A_i + \delta)$, with δ some positive scalar, but that a probability distribution (be it objective or subjective) of the mean value over the neighborhood is not available to them. In fact, we are assuming that they operate in a strongly uncertain world. While there is a rich literature on choice

under conditions of strong uncertainty (see, e.g., Etner, Jeleva, and Tallon 2012 for a survey), we adopt the Laplace principle of insufficient reason as formalized by Milnor (1954) to model the way agents formulate their expectations. The principle states that when agents ignore the probability distribution over the possible outcomes of an event, they consider all outcomes equally probable.

If mean income is equally likely to assume any value over the interval $(A_i - \delta,\ A_i + \delta)$, its probability density function is $f(\bar{y} = x) = 1/(2\delta)$. Accordingly, we can calculate the mean income expected value as

$$E[\bar{y}] = \frac{1}{2\delta}\int_{A_i-\delta}^{A_i+\delta} x\ dx = A_i.$$

Under our assumptions, people with expected income in the interval [*C*, *D*] expect to earn an income exactly equal to the mean of the distribution. Our setup can be summarized as follows:

$$\begin{cases} E[\bar{y}] < A_i, & \text{if } A_i > D, \\ E[\bar{y}] = A_i, & \text{if } A_i \in [C, D], \\ E[\bar{y}] > A_i, & \text{if } A_i < C. \end{cases}$$

Consider now the optimal tax rate, t^*. From Equation 3, agents with expected individual income in the [*C*, *D*] interval will chose

$$t^* = t_\Omega = \frac{\sigma_\eta}{\sigma_\eta + \sigma_A}.$$

Since they cannot establish if their expected income is above or below average, their selfish demand for redistribution is zero and their optimal tax rate simply minimizes the disutility caused by unfair allocations. t_Ω is independent of the individual aversion to unfairness, therefore $dt^*/d\omega_i = 0$ when $A_i \in [C, D]$. For agents with expected income such that $A_i > D$, or $A_i < C$ we can state

Proposition 2. An increase in the aversion to unfairness increases (decreases) individual demand for redistribution if and only if $A_i > D$, $(A_i < C)$.

Proof. Substitute $E[\bar{y}]$ to $\bar{y}$ in Equation 3 to find $t^* = \frac{E[\bar{y}] - A_i + 2\omega_i\sigma_\eta}{2\omega_i(\sigma_\eta + \sigma_A)}$. Hence, $\frac{dt^*}{d\omega_i} = \frac{A_i - E[\bar{y}]}{2\omega_i^2(\sigma_\eta + \sigma_A)} > 0 \Leftrightarrow A_i > D$; and $\frac{dt^*}{d\omega_i} = \frac{A_i - E[\bar{y}]}{2\omega_i^2(\sigma_\eta + \sigma_A)} < 0 \Leftrightarrow A_i < C$.

Proposition 2 confirms results stated in Proposition 1. The rich demand more redistribution the higher their aversion to unfairness; the opposite holds true for the poor. However, because of the blurry perception of mean income, the threshold defining the rich is higher, while the threshold defining the poor is lower, than in the case with perfect information and accurate perception of the distribution of income.

The size of the interval where aversion to unfairness does not affect demand for redistribution is an empirical question. We investigate it in the next section.

3. Empirical Evidence

To test the prediction established in Proposition 2, we use a two-stages least squares (TSLS) approach, where the dependent variable is an indicator of individual support for redistribution

and the main explanatory variable is the individual sensitivity to fairness, ω_i, which is instrumented with the fitted probability from a nonlinear first stage. Despite not relying on external information to identify the effect of ω_i, this procedure provides consistent estimates as explained in Wooldridge (2002). Our data and empirical strategy are described in detail in the following sections.

Data

Data are taken from the Survey on Household Income and Wealth (SHIW), which is conducted every two years by the Bank of Italy. In the 2004 wave of the survey, a special section on "public spirit and taxation" was included in the questionnaire, in which respondents were asked to give their opinions about fairness and taxation. Unfortunately, the questions we use for developing our indicators of support for redistribution and aversion to unfairness were asked only in the 2004 wave, thus preventing us from exploiting the panel dimension of the data through a difference-in-differences strategy. The sample includes approximately 8000 households and is representative of the Italian population at the national and regional level. The sample was drawn in two stages (municipalities and households), with the stratification of the primary sampling units (municipalities) by region and demographic size. Within each stratum, the municipalities in which interviews would be conducted were selected to include all those with a population of more than 40,000 inhabitants (self-representing municipalities), while the smaller towns were selected on the basis of probability proportional to size. The individual households to be interviewed were then selected randomly.

The indicator of support for redistribution is built using the 5-point score that respondents gave to the following statements: "The more someone earns, the more (in percentage) he/she should contribute to government spending" and "The Government should levy higher taxes on income (personal and company) and lower taxes on consumption (VAT)." The point scale ranged from 1 ("not at all") to 5 ("very much"). Our dependent variable is a linear combination of the two scores given by the first axis of the two indicators obtained through a principal component analysis (PCA). Higher values measure a stronger support for redistribution.

The aforementioned indicators have often been used to measure the individuals' support for redistribution (e.g., Alesina and La Ferrara 2005; Guiso, Sapienza, and Zingales 2006; Algan, Cahuc, and Sangnier 2016). Algan, Cahuc, and Sangnier (2016) model individuals' support for redistribution as the optimal ratio of consumption by low-income individuals receiving welfare benefits over the consumption of high-income individuals funding the welfare states with their taxes. In the empirical test of the model, the authors measure support for redistribution through the score given by World Values Survey respondents to the following statements: "Incomes should be made more equal" versus "We need larger income differences as incentives." Alesina and La Ferrara (2005) model the level of redistribution desired by individuals as their optimal tax rate, decreasing in their current and future expected income. In their empirical analysis, support for redistribution is measured via the score given by General Social Survey respondents to the statement: "Should the government reduce income differences between rich and poor?" Similar measures were used, for example, in the empirical works of Corneo and Gruner (2002), Guiso, Sapienza, and Zingales (2006), Luttmer and Singhal (2011), and Dahlberg, Edmark, and Lundqist (2012).

There is reason to suspect that our use of 2004 data may entail a measurement bias in our dependent variable, as 2004 was a year of expansion for the Italian economy, which experienced a recovery after a period of moderate downturn in some of the preceding years. There is evidence that

the experience of a recession leads people to believe that success in life depends more on luck than effort, thus prompting a stronger support for government redistribution (Giuliano and Spilimbergo 2014). On the other hand, the decline in uncertainty associated with a phase of economic expansion generally leads people to believe that effort is more relevant than luck and, as a result, decrease consensus for redistributive policies (Giuliano and Spilimbergo 2014; Carreri and Teso 2016; Martén 2017). Overall, this evidence suggests that our estimates are likely to be conservative, as they may be biased by the risk of underestimating support for redistribution.

To measure individual sensitivity to unfair allocations, we use indicators of the aversion to free riding, which Alesina and Angeletos (2005) consider one of the typical sources of unfairness in the distribution of income and wealth. As explained by Guiso, Sapienza, and Zingales (2010), judgments on free riding fully capture the individuals' sensitivity to fairness: "The common features across all these measures is that they are value judgments on activities that result in the appropriation of (possibly limited) private benefits at the expense of (possibly much larger) costs imposed on other members of society" (p. 17). In our empirical analysis, we use responses to the following questions: "Which of the following situations do you think are always justifiable, never justifiable, or justifiable to some extent? Give your answer on a scale from 1 to 10, 1 being "never justifiable" and 10 "always justifiable": (i) not paying for your ticket on public transport; (ii) keeping money you obtained by accident when it would be possible to return it to the rightful owner (e.g., if you found a wallet with the owner's name and address, or if you were given too much change at the supermarket check-out); and (iii) not leaving your name for the owner of a car you accidentally scraped while parking." Given the wording of this question, lower values capture a greater aversion to unfairness. Our indicator of the aversion to unfairness is the arithmetic mean of the (inverted) scores given by respondents to the three statements. As in Alesina and La Ferrara (2005) and Algan, Cahuc, and Sangnier (2016), this indicator is appropriate for testing the relationships described in Proposition 2 in that it enables us to detect how support for the redistribution varies in relation to changes in the individuals' sensitivity to unfair allocations, that is, driven by the appropriation of private benefits at the expenses of others.

We draw from the same survey to control for individuals' sociodemographic characteristics, education, and work status. In some robustness checks, we also account for the tightness of tax surveillance, time preferences, the self-assessed economic well-being of the household, and some characteristics of respondents' area of residence. The SHIW measures the perceived tightness of tax surveillance through the question: "In your opinion, what are the chances of someone being picked for a tax inspection?" on a 5-point scale, where 1 means "very high" and 5 means "practically nonexistent." In this case too, the scale has been inverted in order to have increasing values measuring higher probabilities of being caught.

Descriptive statistics are reported in Table 1. Income distribution is asymmetric and positively skewed (it has a long right tail), as the median value is lower than the mean. This is consistent with the empirical distribution of national households' income, as reported by the official statistics for Italy (see Istat 2008). Regarding the preference for redistribution, its distribution is roughly symmetric. The mean value of 3.8 indicates a high preference for redistribution in the sample.

Empirical Strategy

The study of individual behaviors and beliefs in a section of survey data entails relevant endogeneity problems. Sensitivity to unfairness and an individual support for redistribution may both be

Table 1. Descriptive Statistics

	Mean	Standard Deviation
Preference for redistribution (mean)	3.839	0.908
Preference for redistribution (PCA)	−0.00560	1.185
Redistribution item 1	3.846	1.085
Redistribution item 2	3.341	1.061
Sensitivity to fairness	8.762	1.819
Age	50.60	20.51
Income	33.40	29.98
Gender	0.470	0.499
Married	0.589	0.492
Single	0.244	0.430
Separated	0.0379	0.191
Primary school	0.259	0.438
Middle school	0.266	0.442
Vocational secondary school	0.0578	0.233
High school	0.223	0.416
University diploma	0.00816	0.0900
Bachelor degree	0.0741	0.262
Postgraduate	0.00241	0.0491
Employee	0.328	0.470
Self-employed	0.0823	0.275
Unemployed	0.0545	0.227
Tax surveillance	2.713777	0.8940685
Observations	8703	
Income: first quartile: 18.20; median: 27.79; third quartile: 40.91		

Notes: Redistribution item 1 = score given to the statement: "The more someone earns, the more she should contribute to government spending." Redistribution item 2 = score given to the statement: "The Government should levy higher taxes on income (personal and company) and lower taxes on consumption."

driven by common latent features of individuals such as unobservable attitudes and abilities. However, it was not possible to find appropriate instruments in the survey data, nor to retrieve the conditions for a natural experiment to identify the effect of the aversion to unfairness on the individual demand for redistribution.

To obtain consistent estimates despite these issues, we followed Procedure 18.1 in Wooldridge (2002), known as probit-TSLS (Cerulli 2004), which consists of three steps:

1. Estimate an ordered probit model regressing ω on the covariates x. Let us denote the latent individual aversion to unfairness as ω^* taking values in $(-\infty; \infty)$. The observable variable we use to measure ω^* is ω, which takes $J - 1 = 10$ possible values. The latent variable can be modeled as:

$$\omega^* = \beta' x + \varepsilon.$$

We observe $\omega = j$ if $\tau_{j-1} \leq \omega^* \leq \tau_j$, for $j = 1, \ldots, J - 1$, and we assume $\tau_0 = -\infty$ and $\tau_j = \infty$. Thus the probability of $\tau_{j-1} \leq \omega^* \leq \tau_j$ is equal to the probability of $\omega = j$ and can be modeled as:

$$P(\omega = j|x) = \Phi(\tau_j - \beta' x) - \Phi(\tau_{j-1} - \beta' x),$$

where $\Phi(\cdot)$ is the cumulative normal density function of ε. The cut points τ_j and the coefficient vector β can be estimated by maximum likelihood.

2. Work out the fitted probabilities of the ordered probit model, $\hat{P}$, as:

$$\hat{P}(\omega = j|x) = \Phi\left(\hat{\tau}_j - \hat{\beta}'x\right) - \Phi\left(\hat{\tau}_{j-1} - \hat{\beta}'x\right). \tag{4}$$

3. Carry out a linear TSLS of the preference for redistribution on ω and x, using $\hat{P}_i$ as instrument. That is, given the following equation to be estimated:

$$\text{redistribution} = \gamma'x + \lambda\omega + u, \tag{5}$$

where a consistent estimate of λ is obtained by means of TSLS as:

$$\hat{\lambda} = \frac{\text{cov}\left(\text{redistribution}, \hat{P}\right)}{\text{cov}\left(\omega, \hat{P}\right)}. \tag{6}$$

The intuition underpinning this procedure lies in the fact that $\hat{P}_i$ is a nonlinear function of x, implying an imperfect correlation with it. However, it is clearly correlated with ω, so that it can be used as an instrument. The validity of the instrument is not affected by possible misspecification errors made in point 1, namely in the specification of the ordered probit model.

Steps 1–3 are implemented in Stata by the ivtreatreg command (Cerulli 2004). The seminal work by Angrist (2001) showed that in cases like the one under scrutiny, with a discrete dependent variable, the coefficients estimated with a linear TSLS are equal to the marginal effects obtained by using more complex nonlinear instrumental variable models (e.g., biprobit models). In the first stage, we use ordinary least squares (OLS) despite the endogenous variable is discrete, because only OLS estimates can generate residuals that are uncorrelated with fitted values and covariates, thus providing a valid instrumental variable. The same does not hold, instead, for nonlinear discrete models (see Angrist and Pischke 2009).

We are aware that this identification strategy is not as straightforward and transparent as the exploitation of a natural experiment. From a strictly methodological point of view our estimates account for the endogeneity bias in that we used the procedure proposed by Wooldridge (2002). The implicit assumption underpinning this procedure is that nonlinearity as well as internal information may suffice to construct one, or more than one, instrument correlated with the endogenous variable and uncorrelated with the error term. Such an instrument allows us to use the TSLS estimators, which are consistent, meaning that in asymptotic samples it returns the true coefficient of interest. However, how large a sample should be to be defined as asymptotic has never been clarified in the literature.

Once clarified the consistency of the estimates, two issues arise from the theoretical model. First, the whole econometric procedure must be repeated twice, once for the rich and once for the poor. Second, the model predicts the existence of a threshold, or cutoff, in the distribution of income, entailing that $dt^*/d\omega_i$ is positive for incomes above the threshold and negative for incomes below the threshold. The theoretical framework in section 2 predicts that the threshold

is the mean value of income. Nevertheless, people around the mean income can hardly be aware of whether their income falls above or below the threshold. They do not know whether they will benefit from redistribution and they may not act according to our theoretical predictions because they cannot properly formulate their selfish demand for redistribution. In "Extension: Uncertainty of Mean Income," we model the limited awareness of the agents around the mean about their position on the social ladder by assuming they do not have an accurate perception of the distance between their expected income and the mean. They choose under conditions of strong uncertainty, which they solve by adopting the Laplace principle of insufficient reason (as formalized by Milnor 1954) to form their expectations. In the empirical analysis we operationalize this assumption by excluding from the sample people near the mean income, which approximately falls at the 62nd percentile, as the predicted effect for these individuals is so low it may be drowned out by noise. More specifically, we look above the 75th percentile and below the 50th, while leaving out the people whose income is between the 50th and the 75th.

As TSLS can be biased in small samples due to weak instrument problems, meaning the correlation with endogenous regressors is low and/or the number of instruments greatly exceed the number of endogenous variables, we also repeat the steps 1–3 by using a different estimator, the limited information maximum likelihood (LIML), which accounts for this possible bias.[3] The LIML estimator has the advantage of having the same large-sample distribution as TSLS while providing finite-sample bias reduction, although less precise. A number of estimators reduce the bias in overidentified TSLS models, but an extensive Monte Carlo study by Flores-Lagunes (2007) suggests that LIML does at least as well as the alternatives in a wide range of circumstances. To our aim, all we need to know is that the LIML estimates provide us with a sort of robustness check of the baseline and for further details we refer the interested reader to Angrist and Pischke (2009, section 4.6) and the literature cited therein.

Results

Tables 2 and 3 report results obtained using the 50th and the 75th percentiles for defining low and high incomes, that is, individuals above the 75th are considered as having a high income and those below the 50th as having a low income. Model 1 estimates the relationship between sensitivity to fairness and support for redistribution controlling for individuals' sociodemographic characteristics and income. In Model 2, we add education dummies to our covariates. Model 3 also accounts for work status dummies. In Model 4, we also include the perceived tightness of tax surveillance.

Results fully support the theoretical predictions. Consistently with Proposition 2, support for redistribution is significantly and negatively associated with sensitivity to fairness in the low-income group. For those above the 75th percentile, fairness has a positive and statistically significant association with support for redistribution. Statistical significance slightly drops in Model 4 also accounting for the perceived likelihood of a tax audit, which is significantly and negatively correlated with preferences for redistribution in both groups. This latter result can be interpreted in light of the literature on trust and the welfare state (Bjørnskov and Svendsen 2013; Algan, Cahuc, and Sangnier 2016; Cerqueti, Sabatini, and Ventura 2019). Bjørnskov and Svendsen (2013) show that there is a

[3] Intuitively, while TSLS uses all the available instruments together, the LIML estimator provides an estimate of the desired coefficient using one instrument at a time and then combining the estimates.

Table 2. Sensitivity to Fairness and Preferences for Redistribution—TSLS Estimates

Outcome: PCA of the Two Items Measuring Support for Redistribution

	(1)		(2)		(3)		(4)	
	<50%	>75%	<50%	>75%	<50%	>75%	<50%	>75%
Fairness	−0.375***	0.370***	−0.358***	0.768***	−0.328**	1.059***	−0.330**	0.343** (0.174)
	(0.110)	(0.123)	(0.110)	(0.223)	(0.127)	(0.286)	(0.133)	
Gender	−0.00293	0.0214	−0.00948	0.0259	0.0201	0.0417	0.0203	0.0287
	(0.0441)	(0.0551)	(0.0438)	(0.0687)	(0.0441)	(0.0836)	(0.0438)	(0.0549)
Age	−0.0002	0.0044**	0.000201	0.00169	−0.0004	0.00455	−0.0003	0.00427*
	(0.00166)	(0.00214)	(0.00171)	(0.00295)	(0.00174)	(0.00383)	(0.00173)	(0.00241)
Married	0.0154	0.0111	0.00260	0.155	0.00831	0.281	0.00430	0.0361
	(0.0678)	(0.132)	(0.0680)	(0.177)	(0.0685)	(0.210)	(0.0686)	(0.139)
Single	−0.0111	0.124	−0.0101	0.344	−0.0124	0.517*	−0.00486	0.121
	(0.0959)	(0.172)	(0.0952)	(0.235)	(0.0939)	(0.288)	(0.0933)	(0.184)
Divorced	0.0778	0.0582	0.0558	0.407	0.0933	0.671	0.0891	0.00964
	(0.117)	(0.232)	(0.118)	(0.351)	(0.118)	(0.441)	(0.117)	(0.250)
Income	0.00809	−0.003***	0.00666	−0.003***	0.00508	−0.003***	0.00497	−0.002***
	(5.25e-06)	(6.34e-07)	(5.22e-06)	(7.67e-07)	(5.48e-06)	(8.87e-07)	(5.54e-06)	(5.79e-07)
Primary school			0.0654	0.562**	0.0831	0.516*	0.0671	0.162
			(0.0661)	(0.220)	(0.0674)	(0.267)	(0.0678)	(0.171)
Middle school			0.0563	0.154	0.0978	−0.0799	0.0904	−0.0177
			(0.0657)	(0.162)	(0.0725)	(0.218)	(0.0727)	(0.144)
Vocational school			0.149	0.242	0.207*	−0.00189	0.199*	0.00502
			(0.104)	(0.189)	(0.106)	(0.249)	(0.107)	(0.164)
High school			0.189**	0.174	0.248***	−0.102	0.240***	−0.0665
			(0.0803)	(0.152)	(0.0880)	(0.215)	(0.0875)	(0.141)
University diploma			0.00253	0.365	0.0707	0.0875	0.0596	0.111
			(0.331)	(0.304)	(0.317)	(0.381)	(0.321)	(0.242)
Bachelor degree			−0.0199	0.0618	0.0563	−0.268	0.0182	−0.139
			(0.148)	(0.164)	(0.153)	(0.235)	(0.152)	(0.151)
Postgraduate			0.953***	0.235	1.006***	−0.243	0.942***	0.182
			(0.263)	(0.354)	(0.277)	(0.454)	(0.115)	(0.322)

(Continues)

Table 2. Continued

Outcome: PCA of the Two Items Measuring Support for Redistribution								
	(1)		(2)		(3)		(4)	
	<50%	>75%	<50%	>75%	<50%	>75%	<50%	>75%
Employee					−0.0707	0.317***	−0.0695	0.210**
					(0.0661)	(0.123)	(0.0661)	(0.0816)
Self-employed					−0.345***	−0.0267	−0.266**	−0.0271
					(0.117)	(0.139)	(0.117)	(0.0947)
Unemployed					−0.0730	0.303	−0.0762	0.230
					(0.0970)	(0.304)	(0.0969)	(0.201)
Tax surveillance							−0.217***	−0.268***
							(0.0244)	(0.0397)
Constant	3.109***	−3.616***	2.895***	−7.464***	2.666**	−10.28***	3.252***	−2.780
	(0.993)	(1.189)	(0.984)	(2.126)	(1.132)	(2.722)	(1.183)	(1.726)
Observations	4352	2175	4352	2175	4352	2175	4352	2175
$p(F)$	0	0	0	0	0	0	0	0
p (Sargan's J)	0.450	0.964	0.422	0.131	0.718	0.0643	0.159	0.680

Notes: Robust standard errors in parentheses. Income coefficient * 1000. Additional controls: regional dummies.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

positive association between social trust and welfare spending across countries. According to the authors, a citizen who thinks that others can be trusted supports redistribution more as he is less concerned with the risk of free riding intrinsic to universal and simple access to public goods and services. Algan, Cahuc, and Sangnier (2016) show that, in countries with limited civic-mindedness and extensive welfare states, like Italy, redistribution is mostly supported by "uncivic" individuals who hope to benefit from welfare expenditure without bearing its cost, as they plan to cheat on taxes whenever they can. Cerqueti, Sabatini, and Ventura (2019) theoretically show that the tightness of tax surveillance and the severity of the penalties for cheaters are associated with a lower demand for redistribution by noncivic-minded individuals. Our finding suggests that the tightness of tax surveillance can discourage uncivic individuals from selfishly demanding more redistribution with the purpose of claiming welfare benefits they are not entitled to.

Support for the redistribution significantly decreases with income in the high-income group. As explained in section 2, demand for redistribution is, in fact, driven by a selfish and an unselfish motive. Though the unselfish motive might mitigate the affluent's aversion for redistribution depending on the individual's sensitivity to fairness, the coefficient of income (which determines the selfish motive) is likely to remain negative for the rich, in line with the previous literature (e.g., Meltzer and Richard 1981; Corneo and Gruner 2002). A €10,000 increase in income is significantly associated with a 2 percentage points lower likelihood to support redistribution for relatively rich agents. This result is consistent with the predictions of the model establishing that, for relatively rich agents, an increase in the aversion to unfairness is associated to a higher demand for redistribution.

Low-income individuals, on the other hand, will likely continue to gain from redistribution without bearing its costs even after limited increases in their income (i.e., increases that are not high enough to enable a move to a higher percentile of the distribution). These results are consistent with the seminal work of Meltzer and Richard (1981), claiming that voters at the median of the income distribution should vote for higher levels of taxes and redistribution, and with previous empirical findings that, ceteris paribus, richer people are more likely to demand less redistribution (Corneo and Gruner 2002; Alesina and La Ferrara 2005; Powdthavee and Oswald 2014; Yamamura 2014).

The coefficients of the work status dummies also offer interesting insights. Self-employment is negatively correlated to support for redistribution. Its coefficient is significant at the 1% and 5% levels for the low-income group, respectively, in Models 3 and 4, and not statistically significant for the affluent. Self-employment has traditionally been associated with greater economic individualism

Table 3. Sensitivity to Fairness and Preferences for Redistribution

	TSLS Estimates		LIML Estimates	
	Low Income (<50%)	High Income (>75%)	Low Income (<50%)	High Income (>75%)
Fairness	−0.330** (0.133)	0.343** (0.174)	−0.355** (0.146)	0.347* (0.179)
Constant	3.252*** (1.183)	−2.780 (1.726)	3.466*** (1.297)	−2.816 (1.770)
Observations	4352	2175	4352	2175
p(F)	0	0	0	0
p (Sargan's J)	0.159	0.680	0.166	0.680

Notes: Outcome variable: first axis from the PCA performed on the two items measuring support for redistribution. Robust standard errors are in parentheses. Additional controls: sociodemographic characteristics, education, work status, income, surveillance.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

and concomitant resistance to the welfare state (see among others the seminal work of Wilensky 1975 and the empirical evidence in Torgler 2003; Alesina and La Ferrara 2005; Luttmer and Singhal 2011; Guillaud 2013). What is interesting in our empirical findings is that self-employed in the first two quartiles of the income ladder are also shown as being averse to redistribution. These individuals may oppose redistributive policies because they rationally expect to move to higher quartiles in the future, as suggested by Bénabou and Ok (2001).

Table 3 reports the results of the fully specified model in which the control variables are considered all together and compares it with results obtained with the LIML estimator. Coefficients reported in the first two columns refer to the TSLS estimates, while those in last two columns refer to LIML estimates. There are no systematic differences between TSLS and LIML estimates. We also controlled for region fixed effects in all the regressions. For the sake of robustness, we picked two of the generated instruments in order to make the computation of the Sargan's J test feasible without weakening the power of the test (Roodman 2009). As reported in Table 2, it is not possible to reject the null of validity of the instruments at 10%. Diagnostics of under-identification have also been performed and it is not possible to accept the null of under-identification at the conventional levels.

Following Angrist (2001), we interpret the estimated coefficients with the linear TSLS as marginal effects. The association between sensitivity to fairness and preferences for redistribution has an economically relevant size that counterbalances the "selfish" effect of income. In the baseline specification (Table 2), a one-point strengthening of the sensitivity to fairness is associated with a 34% points higher likelihood of supporting redistribution for the well-off and with a 33% points lower likelihood for the poor.

As a further robustness check, we also controlled for (i) the characteristics of respondents' area of residence (e.g., whether it is urban or rural). (ii) The perceived economic well-being of the household, as measured on a 6-point scale with the question: "Is your household's disposable income enough for you to get through the month?" Ceteris paribus, individuals experiencing financial difficulties could be more favorable to welfare spending. (iii) Respondents' time preferences, measured through responses to the question: "If you had a windfall equal to your household's net monthly income would you spend the lot," or "save a small part," "save about half," "save most of it," and "save the lot." Low-time preferences could be related to a stronger willingness to pay higher taxes for having bigger public protection schemes in return. In all cases, the results do not change and the coefficients of the additional covariates are not statistically significant.

The marginal effect of the sensitivity to fairness is sizeable and comparable to that of self-employment. Overall, these results illustrate how the aversion to unfair allocations is associated with unselfish attitudes toward redistribution: the well-off tend to demand more redistribution even if they will bear its cost without enjoying its benefits, while individuals earning a low income tend to demand less redistribution even if they will benefit from it without bearing its cost.

4. Conclusions

In this study, we studied the interplay between sensitivity to fairness and the individual demand for redistribution. First, we theoretically illustrated how the aversion to unfairness can trigger an unselfish support for redistribution. An increase in the aversion to unfairness can lead the affluent to demand more redistribution even if they will bear its cost without sharing its benefits, and the poor to desire less redistribution thereby renouncing to the advantages related to higher

social spending. This theoretical result also held when we introduced an element of uncertainty in the model by assuming that agents with expected income relatively close to the mean do not know whether their expected income is above or below the average. However, in this refinement, the thresholds defining the well-off and the poor are, respectively, higher and lower than the average income.

We then found evidence of this behavior in a representative sample of Italian taxpayers. The empirical analysis confirmed that an increase in the aversion to unfair allocations is associated with opposing attitudes toward redistribution depending on income. Support for redistribution is associated with sensitivity for fairness in a negative way in the low-income group and in a positive way in high-income individuals. The association is always statistically significant. The size of the marginal effects is economically relevant and seems to be stronger than that of income. Of course we do not intend to establish any normative presumption equating fairness with support for big governments and high welfare spending. Rather, we show that beliefs about fairness can interact with income in determining the individual preferences for redistribution in ways that were not previously theorized and tested in the literature.

From a strictly methodological point of view our estimates account for the endogeneity bias in that we used the procedure proposed by Wooldridge (2002). We are aware we lack a clear identification mechanism standing from external information. Our identification relies on the implicit assumption that nonlinearity as well as internal information may suffice to construct instruments correlated with the endogenous variable and uncorrelated with the error term. The limited availability of information on individual opinions and beliefs about civic spirit and taxation in Italy—which was only collected once, in the 2004 wave of the SHIW—prevents us from exploiting a difference-in-differences strategy and to control for the possible role of the business cycle. This suggests caution in the interpretation of the coefficients as revealing causal relationships. Nevertheless, the evidence that people demand less redistribution in phases of economic expansion suggests that our estimates may be conservative, as 2004 was a year of recovery in which GDP, consumption, and investments grew at positive and sustained rates (at least by the Italian standards of the last two decades). Our theoretical analysis offers empirically testable predictions of the different roles of fairness in support for redistribution across low- and high-income groups. These predictions can be generalized, and tested, in any context. The meaning of unfairness and the prevailing beliefs about the sources of income distribution certainly vary across cultural and institutional scenarios. Our proxy of the sensitivity to fairness, given by the aversion to unworthy activities, is an indicator that can be assessed in any context. The empirical evidence we present in the article is fully compatible with our theoretical reasoning and also revealed interesting insights concerning, for example, the size of the influence exerted by the selfish and unselfish motives for desiring redistribution. Our empirical analysis addressed a specific case study, Italy, which always posed a puzzle to public economists for the combination of extended welfare state programs and limited public spirit and civic-mindedness. Our results certainly call for further empirical tests in countries with different levels of social welfare expenditures and aversion to free riding and rent seeking.Understanding the drivers of redistributive preferences has important policy implications because the proportion of people supporting redistribution in turn is a good predictor of the share of GDP spent on social welfare across countries (Guiso, Sapienza, and Zingales 2006). Further theoretical and empirical investigations are needed also in light of the recent rise in demand for redistributive policies by antiestablishment movements in the wake of the recent economic crisis, as, in line with the prior literature, our findings suggest that demand for redistribution is strongly driven not only by selfish

motives (i.e., the hope to personally benefit from public welfare spending) but also by a genuine concern with the fairness of social competition.

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