Distributional Preferences and Political Behavior*

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Abstract

We document the relationship between distributional preferences and voting decisions in a large and diverse sample of Americans. Using a generalized dictator game, we generate individual-level measures of fair-mindedness (the weight on oneself versus others) and equality-efficiency tradeoffs. Subjects' equality-efficiency tradeoffs predict their political decisions: equality-focused subjects are more likely to have voted for Barack Obama in 2012, and to be affiliated with the Democratic Party. Our findings shed light on how American voters are motivated by their distributional preferences.

JEL Classification Numbers: C91, D64.

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1 Introduction

Standard voting models generally assume that individuals vote based on self-interest. Given the large volume of research showing that individuals willingly sacrifice their own payoffs to increase the payoffs of others, it is natural to examine the relationship between distributional preferences and voting decisions, particularly since so many government policies (taxation, social security, unemployment benefits, etc.) have redistributive consequences.

Distributional preferences may naturally be divided into two qualitatively different components: the weight on own income versus the incomes of others (which we term "fair-mindedness") and the weight on reducing differences in income (equality) versus increasing total income (efficiency). Political debates often center on the redistribution of income, and equally fair-minded people may disagree about the extent to which efficiency should be sacrificed to combat inequality.

In the case of the U.S., the two mainstream political parties have come to be associated with very different policies concerning equality-efficiency tradeoffs. The Republican Party has championed lower tax rates and smaller government, and emphasized the resulting efficiency benefits. The Democratic Party has instead defended higher taxes to support more government transfers and services. The differences in redistributive policies between the Democrats and Republicans were on full display during the 2012 campaign. Incumbent Barack Obama had let the Bush-era tax cuts on the wealthy expire and had passed the Affordable Care Act (ACA), which required greater tax revenue to cover the insurance subsidies provided to low-income Americans (for example, through the expansion of Medicaid). Challenger Mitt Romney, by contrast, campaigned on capital gains tax cuts and the repeal of the ACA, both of which would benefit well-off individuals but, Republicans argued, stimulate job creation and economic growth. Thus, while many factors contribute to partisan allegiances in the U.S., it is natural to explore the link between distributional preferences

and support for candidates and parties that advocate greater redistribution.

Whether, in practice, Democratic voters are more willing to sacrifice efficiency — and even their own income — to reduce inequality is an open question. Democrats may simply be those who expect to benefit from government redistribution, as the median voter theorem would suggest, or those who agree with other elements of the party's platform. To evaluate the link between distributional preferences and political decisions, we need to elicit individual preferences in a manner that allows us to distinguish between fair-mindedness and equality-efficiency tradeoffs; we then need a platform that allows us to link such experimentally-elicited preferences to voting data.

In this paper, we use the experimental design of Fisman, Kariv and Markovits (2007) to separately identify fair-mindedness and equality-efficiency tradeoffs. We employ this methodology to elicit the distributional preferences of subjects drawn from the American Life Panel (ALP), a longitudinal survey administered online by the RAND Corporation. The ALP sample consists of more than 5,000 individuals recruited from a broad cross-section of the U.S. population. The ALP makes it possible to conduct sophisticated experiments via the internet, and to combine data from these experiments with detailed individual demographic and economic information. We invited a random sample of ALP respondents to participate in an incentivized online experiment involving monetary tradeoffs between oneself and another American; this allows us to examine the linkage between experimentally-elicited distributional preferences and voting behavior in the 2012 presidential election.

In our experiment, subjects participated in a modified dictator game in which the set of monetary payoffs was given by the budget line $p_s\pi_s + p_o\pi_o = 1$, where π_s and π_o correspond to the payoffs to *self* (the subject) and an unknown *other* (an anonymous ALP respondent not sampled for the experiment), and $p = p_o/p_s$ is the relative price

of redistribution.[1] This design allows us to decompose distributional preferences into fair-mindedness and equality-efficiency tradeoffs: Intuitively, the degree of fair-mindedness is identified through the average share of the budget spent on *self*, while equality-efficiency tradeoffs are identified using responses to price changes.

We estimate individual-level utility functions of the constant elasticity of substitution (CES) form commonly employed in demand analysis, using an approach we describe in more detail in Section 4.1. In the context of our modified dictator game, the CES has the form

$$u_s(\pi_s, \pi_o) = [\alpha \pi_s^\rho + (1-\alpha)\pi_o^\rho]^{1/\rho}$$

where α represents the degree of fair-mindedness (the relative weight on *self* versus *other*) and ρ characterizes equality-efficiency tradeoffs (the curvature of the indifference curves). As we observe above, α is identified from the fraction of income kept by the subject on average, whereas ρ is identified from the sensitivity of income kept to the price of giving. Increasing the average amount spent on *other* indicates greater fair-mindedness. Increasing the fraction of the budget spent on *other*, $p_o\pi_o$, as p increases indicates distributional preferences weighted towards equality (reducing differences in payoffs), whereas decreasing $p_o\pi_o$ when the relative price of redistribution increases indicates distributional preferences weighted towards efficiency (increasing total payoffs). Specifically, any $0 < \rho \leq 1$ indicates distributional preference weighted towards increasing total payoffs, whereas any $\rho < 0$ indicates distributional preference weighted towards reducing differences in payoffs. Our analysis generates individual-level estimates of $\hat{\alpha}_n$ and $\hat{\rho}_n$, allowing us to classify each subject's degree

[1]The modified dictator game was first used by Andreoni and Miller (2002) and further developed by Fisman et al. (2007), who introduced a graphical interface that makes it possible to present each subject with many choices in the course of a single experimental session. Using this graphical interface allows us to analyze behavior at the level of the individual subject, without the need to pool data or assume that subjects are homogenous.

of fair-mindedness and equality-efficiency tradeoffs.

We illustrate the spectrum of equality-efficiency tradeoffs graphically in Figure 1. The top three panels depict the budget line in a typical dictator game, in which subjects choose an allocation subject to the constraint $\pi_s + \pi_o = 1$ and there is no inherent tradeoff between equality and efficiency. The bottom panels depict budget lines where $p = 2$, so equalizing payoffs reduces the average payoff.

The left panels plot the indifference curves of a subject with utilitarian distributional preferences characterized by the utility function $u_s(\pi_s, \pi_o) = \pi_s + \pi_o$ (i.e., a CES function with $\alpha = 0.5$ and $\rho = 1$).[2] As is apparent from inspection of the utility function, a utilitarian does not value equality: she is indifferent between all allocations on the budget line when $p = 1$ (i.e. her indifference curve lies directly atop the budget line). When the price of redistribution increases — as depicted in the bottom left panel — a utilitarian allocates the entire budget to herself; hence, she is entirely unwilling to pay (either by sacrificing her own payout or by reducing the total payout) for equality. However, this low willingness to pay for equality does not result from a lack of fair-mindedness: she treats *self* and *other* symmetrically, and would allocate the entire endowment to *other* if the price were less than one.

Figure 1 about here.

The right panels of Figure 1 present the other end of the equality-efficiency spectrum: a subject with the Rawlsian utility function function $u_s(\pi_s, \pi_o) = \min\{\pi_s, \pi_o\}$ (i.e., a CES function with $\alpha = 0.5$ and $\rho = -\infty$). A Rawlsian always equalizes the payoffs to *self* and *other*, even when this leads to a substantial reduction in the average payoff. Thus, a Rawlsian has an extremely high willingness to pay for equality, as is apparent in the figure. A subject whose distributional preferences can be represented by a Cobb-Douglas utility function (a CES function with $\alpha = 0.5$ and $\rho = 0$)

[2]We adopt the terminology typically applied to social welfare functions, since it makes the spectrum of equality-efficiency tradeoffs readily interpretable to all economists.

— shown in the middle panels of Figure 1 — falls in between the two extremes.

By estimating individual-level distributional preference parameters in a broad sample of voting-age Americans, we are able to show that Americans are heterogeneous in terms of both fair-mindedness and equality-efficiency tradeoffs. Our main analysis then focuses on the relationship between political decisions and distributional preferences, as captured by estimated CES parameters. Consistent with preferences over equality-efficiency tradeoffs influencing political decisions, we find that $\hat{\rho}_n$ is negatively related to the probability of having voted for Barack Obama in 2012 and also negatively related to the probability of reporting an affiliation with the Democratic Party. By contrast, we do not find a significant relationship between our experimental measure of fair-mindedness, $\hat{\alpha}_n$, and either voting behavior or party affiliation; nor do we find that less fair-minded individuals from low (resp. high) income households are more likely to affiliate with the Democrats (resp. Republicans).[3]

Our findings contribute to our understanding of the determinants of political preferences. While political platforms are multidimensional and the determinants of voter support both complex and multifaceted, we show that underlying equality-efficiency tradeoffs of voters are a potentially important input into individuals' political allegiances. Our particular focus on distributional preferences may also yield insights into the link between voter preferences and tax policy outcomes. As Saez and Stantcheva (2013) emphasize, optimal tax policy will depend on the distributional preferences of voters and taxpayers, and our work provides a first step in characterizing these preferences. Our design is particularly well-suited to this task, as each subject makes tradeoffs between her own payoff and the payoff an individual drawn from the general population of the U.S. (another ALP respondent). This stands in contrast to many experiments, in which subjects are generally matched with someone from their own

[3]Because our measure of household income provides only a rough indicator of the likely beneficiaries of government redistribution, we do not view our results as evidence that self-interest plays no role in political decisions.

community. Further, our experimentally generated measure of distributional preferences is not confounded by subjects' attitudes toward government in general, as is the case for survey-based measures of distributional preferences based on attitudes toward government redistribution (Saez and Stantcheva 2013).

2 Related Literature

Experimental research has been very fruitful in documenting the existence of (non-selfish) distributional preferences and directing theoretical attention toward such preferences. We will not attempt to review the large and growing body of research on the topic. Key contributions include Loewenstein, Thompson and Bazerman (1989), Bolton (1991), Rabin (1993), Levine (1998), Fehr and Schmidt (1999), Bolton and Ockenfels (1998, 2000), Charness and Rabin (2002, 2005), and Andreoni and Miller (2002) among others. Camerer (2003) and Cooper and Kagel (2015) provide a comprehensive discussion of the experimental and theoretical work in economics. The overarching lesson from hundreds of experiments is that people often sacrifice their own payoffs in order to increase the payoffs of (unknown) others, and they do so even in circumstances that do not engage reciprocity motivations or strategic considerations.

Andreoni and Miller (2002) first proposed varying the price of redistribution within a dictator game to identify equality-efficiency tradeoffs. Fisman et al. (2007) extend their modified dictator game by introducing an experimental technique (a graphical computer interface) that allows for the collection of richer individual-level data from dictator game experiments than had previously been possible. This is particularly important given that, as Andreoni and Miller (2002) emphasize, individual preferences are heterogeneous, so behavior must be examined at the individual level

for distributional preferences to be properly understood.[4]

Our paper contributes to several related literatures. We follow in the tradition of other distributional preference experiments that have used subjects drawn from broad cross-sections of the adult population (as opposed to university students). Bellemare, Kröger and van Soest (2008) study distributional preferences in a large and heterogeneous sample of Dutch adults. In their experiment, survey respondents from the CentERpanel participate in ultimatum games. Like the ALP, the CentERpanel implements sophisticated experiments and collects extensive demographic and economic information from its members. Data characterizing subjects' decisions within the experiment, their beliefs about the likelihood that specific ultimatum game offers would be accepted, and their individual characteristics are used to estimate a structural model of inequality aversion (Fehr and Schmidt 1999) in the Dutch population. In our analysis, we restrict attention to dictator games, which allows us to focus on behavior motivated by purely distributional preferences and thus ignore the complications of strategic behavior and reciprocity motivations inherent in response games.[5] Furthermore, our focus is on the link between distributional preferences (both fair-mindedness and equality-efficiency tradeoffs) measured in the laboratory and political decisions in the real world, with the aim of enriching models of voting

[4]Hong, Ding and Yao (2015) extend this work along another dimension, examining how social planners divide an endowment between two anonymous *others* in a generalized dictator game, and further explore the correlates of equality-efficiency tradeoffs in their subject pool of students at Chinese universities. Fisman, Jakiela, Kariv and Markovits (2015b) demonstrate the predictive validity of the preference parameters elicited using Fisman et al.'s (2007) graphical dictator game interface by showing that our experimental measure of equality-efficiency tradeoffs predicts the subsequent career choices of Yale Law School students — more efficiency-focused students are more likely choose careers in corporate law, while more equality-focused students are more likely to work in the non-profit sector. In related work, Fisman, Jakiela and Kariv (2015a) use the same experimental methodology to estimate the impact of the Great Recession on distributional preferences.

[5]Our experimental design also allows us to generate individual-level estimates of distributional preferences, which allows us to avoid making restrictive assumptions about individuals' utility functions and the distribution of unobserved heterogeneity within the population.

and/or political competition. Given our sample of American subjects, we also hope to add to our understanding of redistributive policy formation in the U.S.

Additionally, our experimental findings contribute to a literature that documents and analyzes non-pecuniary motives for redistribution, employing theory and survey survey evidence. Alesina and Angeletos (2005), for example, observe that attitudes toward fairness of redistribution and observed redistributive policies may co-evolve as an equilibrium, whereas in the model of Corneo and Grüner (2000) preferences for redistribution are dictated by social comparisons. Survey-based and experimental evidence finds support for these theories, for example in Corneo and Grüner (2002), which shows that social comparison and public-mindedness (as well as selfish concerns) are determinants of redistributive preferences. Fong (2001) similarly find that a standard model of self-interest fails to explain patterns in the redistributive preferences of Americans. In a similar spirit, Corneo and Fong (2008) shows using survey data that subjects are willing sacrifice their own income to see a just income distribution.

Finally, like Bellemare et al. (2008, 2011), our work also contributes to the rapidly expanding literature characterizing the distributional preferences of the general (non-student) population. Much of this work focuses on cross-country differences in distributional preferences; seminal contributions include Roth, Prasnikar, Okuno-Fujiwara and Zamir (1991), Henrich, McElreath, Barr, Ensminger, Barrett, Bolyanatz, Cardenas, Gurven, Gwako, Henrich, Lesorogol, Marlowe, Tracer and Ziker (2006), and Henrich, Ensminger, McElreath, Barr, Barrett, Bolyanatz, Cardenas, Gurven, Gwako, Henrich, Lesorogol, Marlowe, Tracer and Ziker (2010). Our work is most closely related to papers such as Hermann, Thöni and Gächter (2008) that explore the connections between the distributional preferences of a population and political economic outcomes within that country.

3 Experimental Design

3.1 Subject Pool

We embed an incentivized experiment in the American Life Panel (ALP), an internet survey administered by the RAND Corporation to more than 5,000 adult Americans.[6] To recruit subjects for our experiment, ALP administrators sent email invitations to a random sample of ALP respondents in September of 2013. 1,172 ALP respondents received the email and logged in to the experiment.[7] Of those, 1,043 (89.9 percent) progressed to the incentivized decision problems and 1,002 respondents (85.5 percent) completed the entire experiment; these subjects constitute our subject pool.[8]

Subjects in our experiment are from 47 U.S. states, and range in age from 19 to 91. 58 percent are female. 9 percent of our subjects did not finish high school,

[6]ALP respondents have been recruited in several different ways, including from representative samples of the U.S. population. The initial participants were selected from the Monthly Survey Sample of the University of Michigan's Survey Research Center. Additional respondents have been added through random digit dialling, targeted recruitment of a vulnerable population sample of low-income individuals, and snowball sampling of existing panel members. See the ALP website (https://mmicdata.rand.org/alp/) for information on panel composition, demographics, attrition and response rates, sampling weights, and a comparison with other data sources.

[7]Those ALP respondents for whom complete demographic information was unavailable were not eligible to participate. ALP administrators sent email invitations to a random sample of 1,700 respondents (out of approximately 4,000) for whom a valid email address and complete demographic information was available. We are unable to distinguish subjects who read the invitation email and chose not to participate from those who never received the invitation (for example, because they do not regularly access the email account registered with the ALP).

[8]The composition of the un-weighted ALP subject pool differs from the U.S. population (as is typical in all surveys based on random samples). In the Online Appendix, we compare our experimental subjects to both the (un-weighted) ALP sample and to the American Community Survey (ACS) conducted by the U.S. Census and representative of the U.S. population in 2012. Like the U.S. population, both our subject pool and the ALP database includes an enormous amount of demographic, socioeconomic, and geographic diversity; moreover, the subsample of 1,002 ALP respondents that constitute our subject pool is remarkably consistent with the entire ALP sample. Throughout our analysis, we re-weight our sample to be representative of the U.S. (adult) population in terms of gender, age, race/ethnicity, and educational attainment.

while 31 percent hold college degrees. 56 percent of subjects are currently employed; the remainder include retirees (17 percent), the unemployed (11 percent), the disabled (8 percent), homemakers (6 percent), and others who are on medical leave or otherwise temporarily absent from the workforce. 68 percent identify themselves as non-Hispanic whites, 18 percent as Hispanic or Latino, and 11 percent as African American. 18 percent live in the Northeast (census region I), 20 percent in the Midwest (census region II), 35 percent in the South (census region III), and 267 percent in the West (census region IV). Our subject pool therefore contains under-represented groups in terms of age, educational attainment, household income, occupational status, and place of residence. As discussed above, all of our results are weighted to be representative of the U.S. population in terms of gender, age, race/ethnicity, and educational attainment, though un-weighted results are nearly identical because the differences between our subject pool and the general population are relatively minor.[9]

3.2 Experimental Procedures

To provide a positive account of individual distributional preferences, one needs a choice environment that is rich enough to allow a general characterization of patterns of behavior; Fisman et al. (2007) developed a computer interface for exactly this purpose. The interface presents a standard consumer decision problem as a graphical representation of a budget line and allows the subject to make choices using a simple point-and-click tool.[10]

In this paper, we study a modified dictator game in which a subject divides an

[9]Un-weighted results are reported in Fisman, Jakiela and Kariv (2014).

[10]The experimental method is applicable to many types of individual choice problems. See Choi, Fisman, Gale and Kariv (2007) and Ahn, Choi, Gale and Kariv (2014), for settings involving, respectively, risk and ambiguity. Choi, Kariv, Müller and Silverman (2014) investigate the correlation between individual behavior under risk and demographic and economic characteristics within the CentERpanel, a representative sample of more than 2,000 Dutch households; that project demonstrated the feasibility of using the graphical experimental interface in web-based surveys.

endowment between *self* and an anonymous *other*, an individual chosen at random from among the ALP respondents not sampled for the experiment. The subject is free to allocate a unit endowment in any way she wishes subject to the budget constraint, $p_s\pi_s + p_o\pi_o = 1$, where π_s and π_o denote the payoffs to *self* and *other*, respectively, and $p = p_o/p_s$ is the relative price of redistribution. This decision problem is presented graphically on a computer screen, and the subject must choose a payoff allocation, (π_s, π_o), from a budget line representing feasible payoffs to *self* and *other*. Responses to price changes allow us to identify equality-efficiency tradeoffs. A subject who increases the fraction of the budget spent on *other* as the relative price of redistribution increases has preferences weighted towards equality (i.e. minimizing differences in payoffs), while a subject who decreases the fraction of the budget spent on *other* as the relative price of redistribution increases has preferences weighted towards efficiency (maximizing the aggregate payoff).[11]

The experiment consisted of 50 independent decision problems. For each decision problem, the computer program selected a budget line at random from the set of lines that intersect at least one of the axes at 50 or more experimental currency tokens, but with no intercept exceeding 100 tokens. Subjects made their choices by using the computer mouse or keyboard arrows to move the pointer to the desired allocation, (π_s, π_o), and then clicked the mouse or hit the enter key to confirm their choice.

At the end of the experiment, payoffs were determined as follows. The experimental program first randomly selected one of the 50 decision problems to carry out for real payoffs. Each decision problem had an equal probability of being chosen. Each subject then received the tokens that she allocated to *self* in that round, π_s, while the randomly-chosen ALP respondent with whom she was matched received the

[11] In a standard dictator experiment (cf. Forsythe, Horowitz, Savin and Sefton 1994), $\pi_s + \pi_o = 1$: the set of feasible payoff pairs is the line with a slope of -1, so the problem is simply dividing a fixed total income between *self* and *other*, and there is no inherent tradeoff between equality and efficiency.

tokens that she allocated to *other*, π_o.[12] Payoffs were calculated in terms of tokens and then translated into dollars at the end of the experiment. Each token was worth 50 cents. Subjects received their payments from the ALP reimbursement system via direct deposit into a bank account. Full experimental instructions are included in the Online Appendix.

4 Decomposing Distributional Preferences

The experiment allows us to analyze behavior at the level of individual subject, testing whether choices are consistent with individual utility maximization and if so identifying the structural properties of the underlying utility function, without the need to pool data or assume that subjects are homogenous. If budget sets are linear (as in our experiment), classical revealed preference theory (Afriat 1967; Varian 1982, 1983) provides a direct test: choices in a finite collection of budget sets are consistent with maximizing a well-behaved utility function if and only if they satisfy the Generalized Axiom of Revealed Preference (GARP). To account for the possibility of errors, we assess how nearly individual choice behavior complies with GARP by using Afriat's (1972) Critical Cost Efficiency Index (CCEI). We find that most subjects exhibit GARP violations that are minor enough to ignore for the purposes

[12]To describe preferences with precision at the individual level, it is necessary to generate many observations per subject over a wide range of budget sets. Our subjects made decisions over 50 budget sets, with one decision round selected at random from each subject to carry out for payoffs. This random selection approach is a standard practice, although it is the subject of ongoing controversy in the literature. If we paid for all rounds, subjects could easily hedge against inequality. The random payoff method prevents such hedging and reveals underlying distributional preferences only under stringent independence conditions. However, hedging relies heavily on the fact that the individual knows the parameters of future budget set. In our experiment, subjects faced a large menu of highly heterogeneous budget sets, and were only informed about the price's random generating process, making it difficult to hedge. Finally, given the novelty of our experimental design, we wished to keep as many aspects of the experiment consistent with prior studies as was possible. The random selection approach is the method used by Andreoni and Miller (2002), among many others.

of recovering distributional preferences or constructing appropriate utility functions. To economize on space, the revealed preference analysis is provided in the Online Appendix.

4.1 The CES Utility Specification

Our subjects' CCEI scores are sufficiently close to one to justify treating the data as utility-generated, and Afriat's theorem tells us that the underlying utility function, $u_s(\pi_s, \pi_o)$, that rationalizes the data can be chosen to be increasing, continuous and concave. In the case of two goods, consistency and budget balancedness imply that demand functions must be homogeneous of degree zero. If we also assume separability and homotheticity, then the underlying utility function, $u_s(\pi_s, \pi_o)$, must be a member of the constant elasticity of substitution (CES) family commonly employed in demand analysis (see the introduction for the specific form of the CES in our setting).[13] The CES specification is very flexible, spanning a range of well-behaved utility functions by means of the parameters α and ρ. The parameter α represents the weight on payoffs to *self* versus *other* (fair-mindedness), while ρ parameterizes the curvature of the indifference curves (equality-efficiency tradeoffs).

When $\alpha = 1/2$, a subject is fair-minded in the sense that *self* and *other* are treated symmetrically. Among fair-minded subjects, the family of CES utility functions spans the spectrum from Rawlsianism to utilitarianism as ρ ranges from $-\infty$ to 1. In particular, as ρ approaches $-\infty$, $u_s(\pi_s, \pi_o)$ approaches $\min\{\pi_s, \pi_o\}$, the maximin utility function of a Rawlsian (illustrated in Figure 1); as ρ approaches 1, $u_s(\pi_s, \pi_o)$ approaches that of a utilitarian, $\pi_s + \pi_o$ (also illustrated in Figure 1). Hence, both the

[13]The proper development of revealed preference methods to test whether data are consistent with a utility function with some special structure, particularly homotheticity and separability, is beyond the scope of this paper. Varian (1982, 1983) provides combinatorial conditions that are necessary and sufficient for extending Afriat's (1967) Theorem to testing for special structure of utility, but these conditions are not simple adjustments of the usual tests, which are all computationally intensive for large datasets like our own.

Rawlsian and the utilitarian utility functions, as well as a whole class of intermediate fair-minded utility functions, are admitted by the CES specification.

More generally, as we observed in the introduction, different values of ρ give different degrees to which equality is valued over efficiency. Any $0 < \rho \leq 1$ indicates distributional preference weighted towards efficiency (increasing total payoffs) because the expenditure on the tokens given to *other*, $p_o\pi_o$, decreases when the relative price of giving $p = p_o/p_s$ increases, whereas any $\rho < 0$ indicates distributional preference weighted toward equality (reducing differences in payoffs) because $p_o\pi_o$ increases when p increases. As ρ approaches 0, $u_s(\pi_s, \pi_o)$ approaches the Cobb-Douglas utility function, $\pi_s^{\alpha}\pi_o^{1-\alpha}$, so the expenditures on tokens to *self* and *other* are constant for any price p — a share α is spent on tokens for *self* and a share $1-\alpha$ is spent on tokens for *other*.[14]

The CES expenditure function is given by

$$p_s\pi_s = \frac{g}{(p_s/p_o)^r + g}$$

where $r = \rho/(\rho - 1)$ and $g = [\alpha/(1-\alpha)]^{1/(1-\rho)}$. This generates the following individual-level econometric specification for each subject n:

$$p_{s,n}^i\pi_{s,n}^i = \frac{g_n}{(p_{s,n}^i/p_{o,n}^i)^{r_n} + g_n} + \epsilon_n^i$$

where $i = 1, ..., 50$ indexes the decision round and ϵ_n^i is assumed to be distributed normally with mean zero and variance σ_n^2. We normalize prices at each observation and estimate demand in terms of expenditure shares, which are bounded between zero and one, with an *i.i.d.* error term.[15] We generate individual-level estimates $\hat{g}_n$

[14] In Fisman et al. (2015a), we show how the fraction of tokens kept by subjects varies as a function of α and ρ parameters, to highlight how it is possible to identify each parameter separately.

[15] For perfectly consistent subjects, there exists a (well-behaved) utility function that choices maximize (as implied by Afriat's Theorem) so the error term in our individual-level

and $\hat{r}_n$ using non-linear Tobit maximum likelihood, and use these estimates to infer the values of the underlying CES parameters $\hat{\alpha}_n$ and $\hat{\rho}_n$.

To emphasize that α and ρ capture distinct — and largely independent — elements to individuals' distributional preferences, we observe that our estimates of individuals' parameters are largely uncorrelated: the correlation between the deciles (to limit the influence of outliers) of ρ and α is -0.06, a relationship that is virtually identical for both subjects who voted for Obama (correlation of -0.05) and those who did not (correlation of -0.07).

4.2 The Distributional Preferences of Americans

Table 1 provides a population-level summary of the parameter estimates. We classify subject n as fair-minded if $\hat{\alpha}_n$ is between 0.45 and 0.55; we classify subject n as selfish if $\hat{\alpha}_n > 0.95$.[16] Using this criterion, we estimate that 30.9 percent of the U.S. population is fair-minded, while only 16.7 percent is selfish ($\hat{\alpha}_n > 0.95$). Thus, fair-minded subjects outnumber selfish ones by approximately 2 to 1. We estimate that 58.8 percent of the U.S. population is equality-focused, having $\hat{\rho}_n < 0$. However, a relatively small proportion of the population (only 12.6 percent) is both fair-minded and equality-focused: fair-minded subjects are less likely to be equality-focused than than those whose estimated $\hat{\alpha}_n$ parameters characterize them as either selfish or intermediate ($0.55 < \hat{\alpha}_n < 0.95$).

Table 1 about here.

regression analysis can only stem from misspecifications of the functional form. For less than perfectly consistent subjects, the error term also captures the fact these subjects compute incorrectly, execute intended choices incorrectly, or err in other ways. Disentangling these sources of noise is beyond the scope of this paper.

[16]We obtain similar results using other thresholds to identify subjects' types, or if we use statistical tests to classify types. CDFs of the estimated preference parameters are presented in the Online Appendix.

Exploiting the detailed demographic and economic data available on ALP subjects, we examine the correlates of the estimated $\hat{\alpha}_n$ and $\hat{\rho}_n$ parameters in a regression framework. OLS estimates (reported in the Online Appendix) suggest that African Americans are more fair-minded than the rest of the sample; however, the association is not statistically significant after implementing a correction for the false discovery rate (which is necessary because we consider a wide range of demographic and socioeconomic factors that might be associated with the degree of fair-mindedness).[17] Turning to our estimated $\hat{\rho}_n$ parameters, we find that younger people, employed people, and those from lower-income households display greater efficiency focus, while women show greater equality focus. However, after implementing the multiple test correction, only the association with age remains statistically significant at conventional levels (Benjamini-Hochberg q-value 0.010).[18]

While observable attributes have predictive power in the data, we find that marked heterogeneity in distributional preferences remains within each demographic and economic group: observable attributes explain only about four percent of the variation in CES parameters. Thus, though some groups appear more efficiency-focused than others, these between-group differences are modest relative to the tremendous variation in efficiency orientation within the demographic and socioeconomic categories in our sample.

[17] In the Online Appendix, we report OLS coefficients and standard errors from regressions of the CES parameters, $\hat{\alpha}_n$ and $\hat{\rho}_n$, on 16 different demographic and socioeconomic characteristics. We also report Benjamini-Hochberg q-values, which correct for the false discovery rate (Benjamini and Hochberg 1995, Anderson 2008).

[18] The q-values associated with the other three variables are all reasonably close to marginal significance, however. The Benjamini-Hochberg q-value associated with both the female indicator and the indicator for coming from a lower-income household is 0.109. The q-value associated with the indicator for being employed is 0.116.

5 Distributional Preferences and Political Behavior

Turning now to our main analysis, we test whether distributional preferences, as measured in our experiment, predict support for political candidates who favor redistribution. We explore the link between equality-efficiency tradeoffs and political behavior by looking at voting decisions in the 2012 presidential election.[19] Our main dependent variable is an indicator for voting for Democrat Barack Obama, a relatively pro-redistribution party and candidate, rather than Republican Mitt Romney. We focus on the 766 subjects who participated in ALP modules exploring participants' choices in the 2012 election and who report voting for either Barack Obama or Mitt Romney, re-weighted to be representative of the United States population in terms of gender, age, race/ethnicity, and educational attainment.[20] We include a range of demographic controls to account for the fact that, for example, African Americans overwhelmingly voted for Obama for reasons that are plausibly distinct from their distributional preferences. Interestingly, without controls, the relationship between measured distributional preferences and voting is insignificant in all regressions, reflecting the fact that groups such as African Americans and low income individuals tend to support Democratic candidates, but are also more efficiency-focused in our experiments. We employ a linear probability model with an indicator variable for having voted for Obama as the outcome.[21] Since the distribution of $\hat{\rho}_n$ is highly skewed, we report results for three measures of equality-efficiency tradeoffs: the estimated $\hat{\rho}_n$ parameter; $\hat{\rho}_n$ deciles; and ρ_{high}, an indicator for being efficiency-focused

[19] Data on voting behavior in the 2008 election is not available for most of our subjects, in part because the ALP sample is regularly refreshed with new respondents, and because most studies recruit only a small fraction of ALP respondents (so the overlap between our randomly-chosen subjects and those who participated in other studies is limited).

[20] Unfortunately, no information is available on the voting behavior of the 48 subjects who participated in the relevant ALP survey module but did not report casting a ballot for a major party candidate, so we cannot classify the candidates that they supported as being either for or against redistribution.

[21] Probit results are nearly identical.

in the sense of having an estimated $\hat{\rho}_n$ of at least 0.

In the first three columns of Table 2, we present specifications that include demographic controls and state fixed effects, showing results for each of the three transformations of $\hat{\rho}_n$.[22] In all three specifications, the experimentally-elicited measure of equality-efficiency tradeoffs is statistically significant, indicating that efficiency-focused subjects are less likely to have voted for Barack Obama. The most straightforward coefficient to interpret is that on ρ_{high} in Column 3, which indicates that efficiency-focused subjects (with $\hat{\rho}_n \geq 0$) are 7 percentage points less likely to have voted for Obama than Romney. To provide a benchmark for the magnitude of this effect, we include (in the Online Appendix) the full set of regression coefficients from specifications with and without the inclusion of ρ_{high} as a covariate. We observe, for example, that the impact of ρ_{high} is greater than the effect of gender (0.044), and only marginally smaller than the impact of moving from medium to high income (-0.102). It is also of note that the coefficient on FEMALE declines somewhat with the inclusion of ρ_{high}, indicating that some amount of the gender voting gap can be directly accounted for by distributional preferences.

Table 2 about here.

In Columns 4 through 6 we repeat our analyses while controlling for the degree of fair-mindedness. Results are nearly identical: efficiency-focused subjects are significantly less likely to have voted for Barack Obama in 2012. Moreover, we do not observe an association between the degree of fair-mindedness and the likelihood of voting for Obama. In Panel B of Table 2, we omit nearly selfish subjects who allocate an average of more than 99 percent of the tokens to *self* because estimates of $\hat{\rho}_n$ are

[22] As expected, including state fixed effects increases power substantially. Results are directionally similar but not consistently significant when state fixed effects are omitted. Results are similar in magnitude and significance when standard errors are clustered at the state level.

quite noisy for these individuals. As expected, reducing the level of measurement error in the independent variable of interest generates estimates that are slightly larger in magnitude, leading to marginally higher levels of statistical significance across all specifications.

We further explore the relationship between equality-efficiency tradeoffs and political behavior by replicating our specifications using an indicator for alignment with the Democratic Party as an outcome variable. These specifications include 528 subjects who participated in ALP modules on politics and identified themselves as either Republicans or Democrats.[23] We report our results in Table 3. All estimated coefficients on $\hat{\rho}_n$ and its transformations are negative and (at least marginally) statistically significant, suggesting that more efficiency-focused subjects are less likely to be Democrats. After controlling for individual characteristics and geographic fixed effects, the estimated coefficient on $\hat{\rho}_{high}$ suggests that efficiency-focused subjects are 11.0 percentage points less likely to be Democrats. We again provide the full set of regression coefficients in the Online Appendix, both with and without ρ_{high} as a covariate. For the dependent variable of DEMOCRAT, the impact of $\hat{\rho}_n$ is large relative to other covariates.

Table 3 about here.

Overall, our results strongly suggest that the political decisions of Americans are motivated by their equality-efficiency preferences, and not just their own self-interest or their views of government. However, this pattern only emerges after one accounts for the fact that poorer Americans and minorities are, overall, substantially more focused on efficiency than the rest of the population.

[23]Results are similar when we include the 217 additional subjects who participated in the politics module and identified themselves as Independents. 55 subjects participated in the module but indicated their party affiliation as "other," so their parties cannot be classified as more or less equality-focused than the Democrats.

In our final piece of analysis, we explore the relationship between fair-mindedness and political behavior, paralleling our analysis of the link between equality-efficiency tradeoffs and political preferences. Results are reported in Table 4. We first test whether relatively more fair-minded Americans are inclined to support candidates who favor greater redistribution. Across all specifications, we find no significant relationship between our experimental measure of fair-mindedness, $\hat{\alpha}_n$, and either voting behavior or party affiliation across all specifications. This insignificant effect could be masking the opposing effects of self-interest on voting behavior for different subpopulations: a self-interested low-income individual should favor Democrats, while the opposite should be the case for a self-interested high-income individual.[24] Interestingly, we do not find support for this view in the data: the correlation between fair-mindedness and political preferences does not differ significantly by subject income. This suggests that Americans may not vote for redistributive policies purely out of (monetary) self-interest.[25]

Table 4 about here.

6 Conclusion

In this paper, we analyze the relationship between experimentally-derived measures of social preferences and political decisions. In our main analysis, which takes into account the fact that poorer Americans and minorities are substantially more focused

[24] An extensive literature explores the extent to which voters support policies that are in their own perceived short-run and long-run economic interests. See, Alesina and La Ferrara (2005) and the references cited therein.

[25] Prior work, for example Fong and Oberholzer-Gee (2011), also emphasizes that giving in dictator games is influenced by the income of the recipient. Differences in fair-mindedness between Republicans and Democrats may have emerged if our experiment involved low-income subjects because of different notions of deservingness of the poor (Gilens 2009). While our experiment is not designed to detect such differences, we also believe it reflects an element of distributional preferences that is distinct from fair-mindedness, i.e., the symmetric treatment of $self$ and a comparable $other$.

on efficiency overall, we find that efficiency-equality tradeoffs predict support for Republican candidate Mitt Romney in the 2012 election. Our results thus provide a link from underlying distributional preferences to voter preferences over policy outcomes. These results emphasize that individuals may not, as in the standard median voter model, vote for redistributive policies that serve their own interests, but may in fact have preferences over the income distribution itself.

Our findings may thus be useful in providing a positive explanation of public support for policy issues related to redistribution. Most standard models of self-interested political preferences predict that the increase in income inequality observed in the United States over the last few decades should have led to greater support for government redistribution. However, no such shift has been observed in survey data (Kuziemko, Norton, Saez and Stantcheva 2013). Our findings partially explain this: voters are motivated by their distributional preferences, so they may not vote for redistributive policies which would make them better off individually.[26]

[26]Redistributive decisions depend on recipient attributes, and in particular ought to be a function of recipient income. In other work-in-progress, we study how distributional preferences vary based on the income of *other*, and with the degree of inequality between *self* and *other*. Introducing information about actual incomes into our experimental setup is perhaps the most important step toward understanding the distributional preferences most relevant to policy preferences and voting behavior, simply because views about how much income ought to be redistributed depend crucially on the initial incomes of the potential recipients of redistribution.

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Table 1: Classifying Distributional Preferences

	Fair-Minded	Intermediate	Selfish	All Subjects
Equality-Focused	12.6	35.4	10.8	58.8
Efficiency-Focused	18.3	17.0	5.9	41.2
All Subjects	30.9	52.4	16.7	100.0

The numbers indicate the percentage in each cell (weighted to be representative of the United States population in terms of gender, age, race/ethnicity, and educational attainment). We classify a subject as fair-minded if $0.45 < \hat{\alpha}_n < 0.55$; a subject is classified as selfish if $\hat{\alpha}_n > 0.95$. We classify a subject as equality-focused (resp. efficiency-focused) if $\hat{\rho}_n < 0$ (resp. $\hat{\rho}_n > 0$). We obtain similar results using statistical tests to classify individual types.

Table 2: OLS Regressions of the Likelihood of Voting for Obama in 2012 on $\hat{\rho}_n$

Specification:	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)	OLS (6)
Panel A: All Subjects						
$\hat{\rho}_n$	-0.007**	.	.	-0.007**	.	.
	(0.003)			(0.003)		
Decile of $\hat{\rho}_n$	.	-0.014**	.	.	-0.014**	.
		(0.006)			(0.006)	
ρ_{high} (i.e. $\hat{\rho}_n \geq 0$)	.	.	-0.07**	.	.	-0.069*
			(0.035)			(0.035)
$\hat{\alpha}_n$	.	.	.	0.074	.	.
				(0.094)		
Decile of $\hat{\alpha}_n$	.	.	.	.	0.002	0.001
					(0.006)	(0.006)
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
State of Residence FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	766	766	766	766	766	766
Panel B: Non-Selfish Subjects						
$\hat{\rho}_n$	-0.007**	.	.	-0.007**	.	.
	(0.003)			(0.003)		
Decile of $\hat{\rho}_n$	.	-0.018***	.	.	-0.018***	.
		(0.006)			(0.006)	
ρ_{high} (i.e. $\hat{\rho}_n \geq 0$)	.	.	-0.084**	.	.	-0.088**
			(0.036)			(0.037)
$\hat{\alpha}_n$	.	.	.	0.015	.	.
				(0.097)		
Decile of $\hat{\alpha}_n$	.	.	.	.	-0.003	-0.004
					(0.007)	(0.007)
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
State of Residence FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	734	734	734	734	734	734

Robust standard errors in parentheses. Sample weighted to be representative of the United States population in terms of gender, age, race/ethnicity, and educational attainment. Demographic controls are gender, age, race/ethnicity, education level, employment status, marital status, and religion (the specific variables included in Tables A2 and A3 in the Online Appendix), plus controls for respondents who are missing data on race (2), household income (5), or religious affiliation (8).

Table 3: OLS Regressions of the Likelihood of Being a Democrat on $\hat{\rho}_n$

Specification:	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)	OLS (6)
Panel A: All Subjects						
$\hat{\rho}_n$	-0.006*	.	.	-0.007*	.	.
	(0.003)			(0.003)		
Decile of $\hat{\rho}_n$	.	-0.021***	.	.	-0.021***	.
		(0.008)			(0.008)	
ρ_{high} (i.e. $\hat{\rho}_n \geq 0$)	.	.	-0.11**	.	.	-0.108**
			(0.044)			(0.045)
$\hat{\alpha}_n$	.	.	.	0.077	.	.
				(0.119)		
Decile of $\hat{\alpha}_n$	.	.	.	.	0.006	0.004
					(0.008)	(0.008)
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
State of Residence FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	528	528	528	528	528	528
Panel B: Non-Selfish Subjects						
$\hat{\rho}_n$	-0.006*	.	.	-0.006*	.	.
	(0.003)			(0.003)		
Decile of $\hat{\rho}_n$	.	-0.025***	.	.	-0.025***	.
		(0.008)			(0.008)	
ρ_{high} (i.e. $\hat{\rho}_n \geq 0$)	.	.	-0.126***	.	.	-0.128***
			(0.046)			(0.048)
$\hat{\alpha}_n$	.	.	.	0.013	.	.
				(0.122)		
Decile of $\hat{\alpha}_n$	.	.	.	.	-0.001	-0.002
					(0.008)	(0.009)
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
State of Residence FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	505	505	505	505	505	505

Robust standard errors in parentheses. Sample weighted to be representative of the United States population in terms of gender, age, race/ethnicity, and educational attainment. Demographic controls are gender, age, race/ethnicity, education level, employment status, marital status, and religion (the specific variables included in Tables A2 and A3 in the Online Appendix), plus controls for respondents who are missing data on race (2), household income (5), or religious affiliation (8).

Table 4: OLS Regressions of Political Outcomes on $\hat{\alpha}_n$

Dependent Variable:	Voted for Obama in 2012				Identifies as a Democrat			
Specification:	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: All Subjects								
$\hat{\alpha}_n$	0.046	.	.	.	0.047	.	.	.
	(0.092)				(0.116)			
Decile of $\hat{\alpha}_n$	.	0.003	.	.	.	0.006	.	.
		(0.006)				(0.008)		
Above median $\hat{\alpha}_n$	.	.	0.014	0.006	.	.	0.023	0.008
			(0.036)	(0.052)			(0.045)	(0.064)
$\hat{\alpha}_n\times$ lowest income quartile	.	.	.	-0.039	.	.	.	-0.001
				(0.079)				(0.105)
$\hat{\alpha}_n\times$ highest income quartile	.	.	.	0.078	.	.	.	0.059
				(0.091)				(0.112)
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State of Residence FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	766	766	766	766	528	528	528	528
Panel B: Non-Selfish Subjects								
$\hat{\alpha}_n$	-0.008	.	.	.	-0.011	.	.	.
	(0.097)				(0.121)			
Decile of $\hat{\alpha}_n$	.	-0.0007	.	.	.	0.002	.	.
		(0.007)				(0.008)		
Above median $\hat{\alpha}_n$	.	.	0.004	-0.001	.	.	0.014	-0.009
			(0.036)	(0.052)			(0.046)	(0.064)
$\hat{\alpha}_n\times$ lowest income quartile	.	.	.	-0.04	.	.	.	0.032
				(0.08)				(0.106)
$\hat{\alpha}_n\times$ highest income quartile	.	.	.	0.069	.	.	.	0.062
				(0.094)				(0.117)
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State of Residence FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	734	734	734	734	505	505	505	505

Robust standard errors in parentheses. Sample weighted to be representative of the United States population in terms of gender, age, race/ethnicity, and educational attainment. Demographic controls are gender, age, race/ethnicity, education level, employment status, marital status, and religion (the specific variables included in Tables A2 and A3 in the Online Appendix), plus controls for respondents who are missing data on race (2), household income (5), or religious affiliation (8).

Figure 1: Prototypical Fair-minded Distributional Preferences