Equity vs. Efficiency vs. Self-Interest: On the Use of Dictator Games to Measure Distributional Preferences

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Abstract

We conduct modified dictator games in which price of giving varies across choice situations, and examine responses to price changes in two contexts — one where dictators divide their own earnings, and another where they divide the earnings of others. Varying the price of giving allows us to decompose social preferences into two components: the level of altruism when the price of giving is one, and the willingness to reduce aggregate payoffs to enhance equity. Changing the source of a dictator's budget impacts her decisions because it affects the weight that she places on others' payoffs. However, we find no impacts on the willingness to trade off equity and efficiency.

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1 Introduction

People are often willing to sacrifice some of their income to increase that of others, and experimental dictator games measure the social preferences which drive such sharing decisions. Individual social preferences provide insights into important economic phenomena such as charitable giving, team production, and political support for redistributive social programs. Yet, several recent studies question the use of dictator games to measure innate preference parameters, suggesting that allocation decisions made in the lab may reveal more about responses to the context and framing of the experiment than they do about altruism. In this paper, we use a within-subjects design in which we vary the price of giving within a dictator game in order to decompose social preferences into two components: a traditional measure of altruism in games where the price of giving is one, and an elasticity of substitution which captures the willingness to sacrifice efficiency to enhance equity.[1] Across multiple decisions within the experiment, we randomly assign subjects to a Taking treatment, varying whether subjects divide their own earned income or another player's earnings, and isolate the effects of this change on the two distinct dimensions of social preferences.[2] We find that the overall level of self-interest — which is typically measured in dictator games when the price of giving is one — is impacted by the Taking treatment. However, our results suggest that individual elasticities of substitution, which identify the willingness to trade off equity and efficiency, are not affected by our change in the source of the dictator's budget.

In any dictator game, subjects divide money between *self* and an anonymous *other* within the experiment.[3] Given the non-strategic environment, dictator games provide an unconfounded measure of altruism. Andreoni and Miller (2002) proposed varying the price of allocating money to *other* within a dictator game, and used responses to price changes to estimate elasticity of substitution *self* and *other*.[4] The elasticity of substitution is of interest because it measures the willingness to reduce the sum of payoffs in order to equalize them. Thus, it is what distinguishes

[1]We use a modified version of the experimental design employed by Andreoni and Miller (2002).

[2]See Ruffle (1998), Greig (2006), List (2007), and Bardsley (2008) for examples of dictator games involving some form of taking from others.

[3]The dictator game was first proposed by Kahneman, Knetsch, and Thaler (1986) and Forsythe, Horowitz, Savin, and Sefton (1994) to explore the motives of first-movers in the ultimatum game. See Camerer (2003) for a summary of early dictator game results.

[4]See Fisman, Kariv, and Markovits (2007) for a more recent example. Charness and Rabin (2002), Engelmann and Strobel (2004), and Bolton and Ockenfels (2006) document the importance of efficiency and equity concerns in allocation decisions.

egalitarians from utilitarians: egalitarians care only about increasing the payoff to the worst off individual, while utilitarians seek to maximize total payoffs, even at their own expense. Varying the price of giving in dictator games allows Andreoni and Vesterlund (2001) to conclude that men and women differ in terms of their willingness to trade off efficiency and equity: women have social preferences which are substantially less elastic than those of men. As a consequence, female subjects appear more generous than men when the price of giving is high, but less generous than men at lower prices.[5]

Varying the price of giving also allows researchers to test the rationality of choices in dictator games using standard revealed preference tests.[6] Encouragingly, Andreoni and Miller (2002) and Fisman, Kariv, and Markovits (2007) find that individual choices in dictator games can be rationalized by an other-regarding utility function that is continuous, strictly increasing, and depends only on the payoffs to *self* and *other*. However, though revealed social preferences within experiments appear consistent with utility maximization, there is substantial evidence that the level of giving observed in dictator games depends on the experimental context. Varying the level of anonymity or asking dictators to divide earned income (instead of windfall income) leads to a substantial reduction in the observed level of dictator game giving.[7] Taken together, these two strands of literature create something of a puzzle: individual social preferences appear rational, but also context-dependent. In light of this evidence, Levitt and List (2007) suggest that the other-regarding utility function may, in fact, depend on the payoffs to *self* and *other* plus a "social norm" which varies across experimental designs.

This raises an important empirical question: which aspects of social preferences are impacted by changes in social norms across experiments, and how? We explore this issue by introducing

[5]In a similar vein, Fehr, Naef, and Schmidt (2006) and Fisman, Kariv, and Markovits (2009) demonstrate that economics majors and Yale law students who received training from economists are more concerned about efficiency than otherwise similar students.

[6]See Afriat (1967) and Varian (1982) for descriptions of the revealed preference tests, and Andreoni and Miller (2002) and Fisman, Kariv, and Markovits (2007) for discussions of their use in analyzing data from dictator game experiments.

[7]For example, Hoffman, McCabe, Shachat, and Smith (1994) and Cherry, Frykblom, and Shogren (2002) find that dictators who earned their positions or their budgets are less generous. Hoffman, McCabe, and Smith (1996) find that dictators are less generous in double-blind experiments, while Charness and Gneezy (2008) show that dictators are more generous when they are told *other*'s last name. List (2007) and Bardsley (2008) find that allowing dictators to either give to or take from *other* decreases giving. Finally, Lazear, Malmendier, and Weber (2010) show that some subjects who share a positive amount in dictator games are willing to pay to avoid entering the game, even though their actions are anonymous.

within-subject variation in whether dictators are giving from their own earnings or taking from *other*'s earnings, and estimate the impact of this Taking treatment on both levels of giving when the price of giving is one and the willingness to trade off payoffs to *self* and *other* in response to price changes.[8] Subjects participated in dictator games in which the price of giving and whether the dictator was "taking" varied across rounds. The experimental design allows us to test the robustness of elasticity measures to changes in the source of the dictator's budget. Our results are consistent with previous work in that we find a significant treatment effect of altering the provenance of the dictator's budget. However, we find that changes in context do not impact the willingness to substitute between *self* and *other* in response to price changes, suggesting that dictator games may reveal true underlying elasticity parameters, or at least the elasticity of substitution is a relatively robust component of individual social preferences.

The rest of this paper is organized as follows: in Section 2, we outline a theoretical framework for interpreting individual choices in dictator games where the price of giving varies; Section 3 details our experimental design and procedures; Section 4 presents results; and Section 5 concludes.

2 Conceptual Framework

In our experiments, the dictator divides a budget of m experimental currency tokens between *self* and *other*. Normalizing the price of tokens for *self* to one and letting p denote the price of tokens for *other*, the dictator's problem is to choose an allocation, (π_s, π_o), subject to the budget constraint $\pi_s + p\pi_o \leq m$. When p is not equal to one, the dictator faces a tradeoff between equity and efficiency. If she is motivated by efficiency considerations, she will direct spending toward the player whose tokens are the least expensive, so as to maximize total payoffs. Equity concerns create an opposing incentive to spend more (less) on *other* as the price of giving rises (falls). Both equity and efficiency motives may interact with self-interest: subjects may be more willing to accept an unequal distribution of payoffs or reduce total consumption if such actions increase their individual return (cf. Bolton and Ockenfels 2006).

Observing allocation choices across a range of prices allows researchers to measure both altruism and the willingness to trade off equity and efficiency, and to classify behavioral types on a spectrum

[8] The words "giving" and "taking" were never stated during the experimental sessions.

from inelastic *maximin* preferences to perfectly elastic *utilitarian* preferences. A dictator with maximin social preferences is an egalitarian — concerned about equalizing final payoffs. As a consequence, the amount she spends on tokens for *other* increases with the price of giving in order to minimize inequality in payoffs. At the other end of the spectrum, a utilitarian spends her entire budget on whichever tokens are cheapest given p, in order to maximize total payoffs. In practice, the behavior of most experimental subjects is neither exactly egalitarian nor exactly utilitarian: many subjects respond to price changes, but not as strongly as the prototypical types. For example, Andreoni and Miller (2002) find that 56.9 percent os subjects have preferences which are in between egalitarianism and utilitarianism.

The constant elasticity of substitution (CES) utility function provides a clear illustration of the relationship between self-interest, equity-efficiency tradeoffs, and individual responses to changes in p. The CES other-regarding utility function can be written as:

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

where α measures the weight on the payoff to *self*, and ρ indicates the willingness to trade off payoffs to *self* and *other* in response to price changes.[9] As α and ρ vary, the CES utility function spans a wide range of social preferences. When ρ is equal to one, the CES utility function represents utilitarian preferences. As ρ goes from one to negative infinity, indifference curves first approach those of the Cobb-Douglas utility function as $\rho \to 0$, and then approach maximin (right angle) indifference curves as $\rho \to -\infty$. For $\alpha \in (0,1)$, the optimal *budget share* that the dictator spends on *other*'s tokens is

$$s^*(p) = \frac{p^{\rho/(\rho-1)}}{p^{\rho/(\rho-1)} + \left(\frac{\alpha}{1-\alpha}\right)^{1/(1-\rho)}} \tag{2}$$

For all ρ less than zero, $s_i^*(p)$ is increasing in p; $s_i^*(p)$ is decreasing in p for ρ between zero and one. This distinction motivates our reduced form empirical test: a positive association between the price of giving and the share of the budget spent on *other*'s tokens indicates that subjects tend toward egalitarianism, while a negative association indicates a focus on maximizing total payoffs.

[9] The CES other-regarding utility function has been used by Andreoni and Miller (2002), Cox, Friedman, and Gjerstad (2007), and Fisman, Kariv, and Markovits (2007), among others.

We therefore estimate the reduced form relationship between our experimental Taking treatment on the (log) price of giving, and also the direct effect of Taking on α and ρ.

3 Experimental Design and Procedures

Each subject in the experiment participated in a series of modified dictator games in which she divided money between *self* and *other*. The design was a variant of that used by Andreoni and Miller (2002) and Andreoni and Vesterlund (2001): each experimental session consisted of multiple rounds, and each round constituted a dictator game; the price of giving varied across rounds.[10] In our experiment, the money being divided was earned by either the dictator herself or *other* at the beginning of the round. Thus, dictators faced a series of similar allocation decisions in differing contexts — either "giving" from their own earnings or "taking" from the earnings of other subjects.[11] The experimental design allows us to identify the impact of this Taking treatment on both levels of altruism (when the price of giving was one) and the relative importance of equity (equalizing payoffs) and efficiency (maximizing the sum of payoffs) considerations.

Experimental sessions were structured as follows. At the beginning of every round, subjects were randomly matched. No identifying information was given during or after the experiment.[12] One member of each pair was randomly chosen to be the *earner* for that period, and was given the opportunity to answer a question from the Graduate Record Exam (GRE). All earners received a payment of ten tokens (four dollars), but those who answered correctly were paid an additional amount which was announced at the beginning of the round. These additional payments ranged from 30 to 170 tokens (twelve to 68 dollars).[13]

The amount paid to the earner in the first part of each round then served as the dictator's budget. After the earner entered her response to the GRE question, both players learned whether she had answered correctly and the size of the resulting budget. Both players then proposed a

[10] Sessions 1 and 2 included ten rounds; the remaining six sessions lasted for twelve rounds.

[11] The words "giving" and "taking" were not used during the experiment. The contextual difference derives entirely from the provenance of the dictator's budget. Hence, in contrast to List (2007), the mathematical structure of the dictator's constrained optimization problem is identical in the Giving and Taking rounds.

[12] To guarantee anonymity, individual decisions were linked to randomly-generated player identification numbers rather than player names, so even the experimenter could not link choices within the session to specific individuals.

[13] There is no evidence that earners exerted greater effort when the incentive was larger. In fact, increasing the incentive offered by ten tokens is associated with a 2.6 second decrease in the amount of time spent answering a question and a 0.6 percentage point decrease in the probability of a correct response.

division of the earner's token account. One of these proposed allocations was randomly selected to determine final payouts.[14] Thus, each player made decisions in both rounds where she was the earner and rounds where she was dividing a budget earned by *other*. We refer to rounds in which dictators divided their own earnings as Giving rounds; other rounds are referred to as Taking rounds.

In each round, each subject divided her budget subject to the constraint $\pi_s + p\pi_o \leq m$, where π_s and π_o are the numbers of tokens that she allocates to *self* and *other*, respectively, p is the relative price of *other*'s tokens, and m is her budget. Subjects were asked to divide budgets denominated in terms of their own currency tokens; so, the price of allocating tokens to *self* was always one, while the price of tokens for *other* varied across rounds. The relative price of *other*'s tokens was drawn from the set $\{\frac{1}{3}, \frac{1}{2}, 1, 2, 3\}$. Subjects were allowed to enter any allocation of whole tokens to *self* and *other* that did not exceed the budget constraint.

After all subjects had entered a feasible allocation, the experiment proceeded to the next dictator game round. Subjects were randomly re-matched after every round, and the probability of being the earner in any round was independent of one's status in the previous rounds. At the end of the experiment, one round was randomly selected to determine final payouts. Subjects earned an average of 17.58 dollars in the experiment. No information about the allocation choices of other subjects was revealed until that point in the session.

Experimental sessions were conducted in the Experimental Social Science Lab (Xlab) at the University of California, Berkeley, in May of 2006. Subjects were undergraduate students recruited using the standard Xlab protocol. 144 students participated over the course of eight lab sessions. Experimental instructions are included in the Online Appendix.

4 Analysis

In this section, we examine the impacts of our experimental Taking treatment on individual allocation decisions. Subjects assigned to the earner role answered the GRE questions correctly in 667 rounds (out of 824), generating an analysis sample of $1,334$ allocation decisions made by 144 individuals. We expect variation in the source of the dictator's budget to impact allocation

[14] The elicitation procedure is similar to that used by Cappelen, Hole, Sorensen, and Tungodden (2007).

decisions for two reasons. First, dictators are less generous with earned income than with unearned income (Cherry, Frykblom, and Shogren 2002), so allocations in Giving rounds should be less generous than in dictator games involving unearned income. Symmetrically, dictators may respect the "earned property rights" of others, and be more generous in Taking rounds than in neutral dictator games (Fahr and Irlenbusch 2000). Second, dictators may feel reciprocity toward earners who answer GRE questions correctly, and may be more generous as a result.[15] Thus, our estimated treatment effect will capture the combined impacts of these two changes in the nature of the dictator's allocation problem on individual decisions.

4.1 Individual Behavior

Table 1 reports summary statistics on individual decisions in Giving rounds, when the dictator was also the earner, and in Taking rounds, in which dictators divided money earned by *other*. Our main outcome variable is the *budget share* spent on tokens for *other*, defined as $p\pi_o/(\pi_s + p\pi_o)$. The Taking treatment had a clear impact on allocation decisions: subjects spent 12.0 percent of the budget on *other* in Giving rounds, versus 19.0 percent in Taking rounds (p-value < 0.0001).[16] Subjects were somewhat more likely to allocate *self* and *other* equal numbers of tokens in Taking rounds, doing so 9.3 (versus 6.3) percent of the time (p-value 0.069). They were also more likely to spend exactly half the budget on tokens for *other*, doing so in 6.3 percent of Giving rounds and 13.3 percent of Taking rounds (p-value < 0.0001). Subjects were not, however, less likely to spend nothing on *other* in the Taking rounds: dictators kept everything in 59.5 percent of Giving and 59.1 percent of Taking rounds. Figure 1 plots the average *budget share* spent on tokens for *other* as a function of log price. It demonstrates that the amount dictators spent on *other* is increasing in the price of giving, suggesting that, on average, subjects are willing to sacrifice efficiency to preserve a desired payout distribution.

[15] See, for example, Charness and Rabin (2002), though their evidence suggests that positive reciprocity is not a major factor in individual allocation decisions. We might also expect that dictators would feel negative reciprocity toward earners who answer GRE questions incorrectly (Ruffle 1998). Unfortunately, we are unable to explore this using the current experimental design. GRE questions were chosen to be relatively easy, and earners gave the correct response 81 percent of the time. Moreover, since earners were always paid four dollars for incorrect responses, the size of the dictator's budget in Taking rounds proceeding incorrect responses is perfectly correlated with the price of giving, and the constraint on entering whole numbers of tokens severely limited the dictator's choice set for prices below one.

[16] All p-values in this paragraph based on t-tests of equality of means across Giving and Taking rounds.

At the individual level, responses to both the Taking treatment and changes in the price of allocating tokens to *other* are heterogeneous. Figure 2 illustrates several examples of individual choices. Each panel of the figure depicts the set of budgets faced by a specific subject. In Panel A, Player 121 is a clear example of an egalitarian: in both Giving and Taking rounds, her allocations fall along the 45° line. In Panel B, Player 43 is a noisier example of seemingly egalitarian choices. In contrast, Player 46, in Panel C, clearly uses different rules of thumb in the Giving and Taking rounds: whenever she is the earner, she allocates *other* ten tokens; when she is not the earner, she splits the tokens evenly. Thus, Player 46 reveals distinct sets of social preferences in Giving and Taking rounds. Finally, in Panel D, Player 15, falls somewhere in between: she clearly spends a larger share of her budget on *other* in the Taking rounds, but her allocations fall over a wider range than those of Player 46.

Results so far are consistent with previous studies: altering the source of the dictator's budget within a dictator game has a significant impact on allocation decisions, but the impact is heterogeneous. The effect is driven by increases in the size of positive allocations to other players, not by a change in the fraction of players sharing a positive amount. However, there is variation across players in the extent to which choices differ in the Giving and Taking rounds.

4.2 Regression Results

Next, we estimate the impact of the Taking treatment on responses to price changes in a regression framework. As discussed above, a positive association between the price of *other*'s tokens and the *budget share* spent on *other* indicates that subjects are willing to reduce the aggregate payoff to avoid inequality, and equity concerns are relatively more salient than concerns about efficiency. A negative association indicates the opposite.

We first regress *budget share* on an indicator for Taking rounds, the log price of sharing, and the interaction between the two (Table 2). We estimate the equation

$$s_{ir} = \beta_0 + \beta_1 T_{ir} + \beta_2 \ln(p_{ir}) + \beta_3 T_{ir} \cdot \ln(p_{ir}) + \epsilon_{ir} \tag{3}$$

where s_{ir} is the budget share that subject i spends on *other* in round r, T_{ir} is an indicator for Taking rounds, p_{ir} is the price of allocating tokens to *other*, and ϵ_{ir} is a mean-zero error term.

Robust standard errors are clustered at the subject level in all specifications. We estimate both a Tobit specification which adjusts for censoring of the dependent variable at zero and one (Table 2, Columns 1 and 5) and an individual fixed effects specification (Table 2, Columns 5 and 6).[17] In Columns 1 and 5, we include the entire sample; in Columns 3 and 7, we omit the 44 subjects who never allocate a positive amount to *other*.

The coefficient on Taking is positive and significant in all specifications, indicating that the Taking treatment increased the *budget share* spent on *other* by between 6.6 and 8.5 percentage points. The coefficient on log price is also positive and significant. The estimated coefficients range from 0.044 to 0.052 across specifications including all subjects, indicating that a change from the lowest possible price to the highest is associated with an increase in the *budget share* spent on *other* of between 9.7 and 11.4 percentage points. The results suggest that, on average, dictators are more concerned with equity than efficiency: as the price of sharing increases, subjects increase the *budget share* on *other* to partially compensate.[18]

Though the coefficient on T_{ir} is positive and significant, there is no evidence that subjects respond to price changes differently when they are dividing *other*'s earnings: the coefficient on the interaction between Taking and the price variable is not significant in any specification, and is always close to zero. Hence, the evidence suggests that the Taking treatment has a significant, positive impact on overall giving, but no impact on the willingness to trade off efficiency and equity.

Next, we examine the interactions between the Taking treatment, self-interest, and equity considerations by testing the hypothesis that levels of giving and responses to price changes are different for values of p above and below one. Equity concerns align with self-interest for prices below one, while efficiency concerns align with self-interest for prices greater than one. We therefore replace the log price variable with two new ones: log price times an indicator for prices below one and log price times an indicator for prices above one. We make a similar replacement of the Taking-price interaction with two new variables, analogously defined.

Results for all subjects are reported in Table 2, Columns 2 and 4; results for the sample of subjects who subjects who ever allocate a positive amount to *other* are reported in Columns 6 and

[17] OLS results are similar, and are omitted to save space.

[18] For comparison, a strict egalitarian would spend 25 percent of her budget on *other* when $p = \frac{1}{3}$ and 75 percent on *other* when $p = 3$; thus, the difference would be 50 percentage points.

8. The coefficients on the log price variables are positive for prices above and below one. However, the interactions between the log price variables and the Taking indicator are never statistically significant, confirming our earlier result.

4.3 CES Parameter Estimates

Next, we estimate the impact of the Taking treatment on CES parameters. The CES parameter α indexes selfishness, while ρ measures the willingness to trade off equity and efficiency in response to price changes. Values of ρ between zero and one indicate an efficiency focus, while values of ρ less than one indicate a concern for equality in payoffs.

When individual preferences can be represented by the CES other-regarding utility function, the *budget share* spent on tokens for *other* is defined by Equation 2. We assume actual decisions reflect these optimal *budget share* plus a mean-zero error term. We pool data from all subjects who ever allocate a positive amount to *other* and estimate the effect of the Taking treatment on α and ρ by non-linear least squares. We estimate

$$s_{ir}^{*}\left(p_{ir}, T_{ir}\right) = \frac{p^{\tilde{\rho}/(\tilde{\rho}-1)}}{p^{\tilde{\rho}/(\tilde{\rho}-1)} + \left(\frac{\tilde{\alpha}}{1-\tilde{\alpha}}\right)^{1/(1-\tilde{\rho})}} + \epsilon_{ir} \tag{4}$$

where s_{ir}^{*} is the *budget share* subject i spends on tokens for *other* in round r, T_{ir} is an indicator for Taking rounds, and $\tilde{\alpha}$ and $\tilde{\rho}$ are the values of the two CES parameters plus an additive term which allows these structural parameters to differ between Giving and Taking rounds:

$$\begin{aligned} \tilde{\alpha} &= \bar{\alpha} + \alpha_{taking} \\ \tilde{\rho} &= \bar{\rho} + \rho_{taking}. \end{aligned} \tag{5}$$

Thus, α_{taking} and ρ_{taking} capture the treatment effect of Taking rounds on the structural parameters.

Parameter estimates are reported in Table 3. The sample includes data from 912 decisions made by 100 subjects. In Column 1, we omit the α_{taking} and ρ_{taking} parameters and estimate $\bar{\alpha}$ and $\bar{\rho}$ without adjusting for the impact of the Taking treatment. Both estimated parameters are statistically significant. As expected, the estimated value of $\bar{\alpha}$, 0.892, suggests that subjects put substantially more weight on the payoff to *self* than on the payoff to *other*. Nonetheless, we can reject the hypothesis that $\bar{\alpha}$ is equal to one (p-value 0.0009). The estimated value of $\bar{\rho}$ is -0.684, indicating that subjects tend to value equity over efficiency, a finding which is consistent with our reduced form results.

In Column 2, we estimate the specification including α_{taking} and ρ_{taking}. Though the estimated values of $\bar{\alpha}$ and $\bar{\rho}$ are qualitatively similar, controlling for the Taking rounds increases the estimated levels of selfishness and equity orientation. The estimated α_{taking} is significantly different from zero, indicating that the Taking treatment leads to a reduction in selfishness. The estimated value of ρ_{taking} is positive, suggesting that subjects are more concerned with efficiency in Taking rounds than Giving rounds. However, ρ_{taking} is not statistically significant. Thus, the CES estimates confirm the reduced form results: the Taking treatment does not have a significant impact on the elasticity of substitution between payoffs to *self* and *other*. The Taking treatment appears to impact the weight placed on others, but not the willingness to sacrifice efficiency to enhance equity.

5 Conclusion

In this paper, we explore the impact of a change in the source of the dictator's budget set on both altruism and elasticity of substitution between *self* and *other*. By varying the price of giving within a dictator game, we are able to explore responses to changes in p while varying the dictator game context. Consistent with prior work, we find that dictators' preferences for giving are dependent on the context of their choices. However, changes in the provenance of dictators' budgets affect only the weight dictators place on the payoff to *other*, and not the willingness to trade off equality and efficiency.

The paper builds on an extensive literature exploring the use of dictator games to measure distributional preferences, and also contributes to debates about the validity of these measures. Distributional preferences matter in a variety of real-world settings — for example, tax policy, charitable giving, and wage contracting; most such situations involve a combination of giving, taking, and enforcing transfers between third parties. Identifying aspects of distributional preferences which are robust to changes in context, and those which are not, can help bridge the gap between the lab and the field, and can also provide insights into the potential uses of experimental preference measures to inform policy debates.

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Table 1: Summary Statistics

Treatment:	GIVING	TAKING	DIFF.
Budget share to *other*, $p\pi_o/(\pi_s + p\pi_o)$	0.120	0.190	-0.070***
	(0.013)	(0.010)	(0.013)
Allocates zero to *other*	0.595	0.591	0.004
	(0.027)	(0.019)	(0.027)
Budget share to *self* and *other* equal	0.063	0.133	-0.070***
	(0.016)	(0.013)	(0.016)
Tokens to *self* and *other* equal	0.066	0.093	-0.027*
	(0.015)	(0.011)	(0.015)

Significantly different from zero at 99 (***), 95 (**), and 90 (*) percent confidence level. Standard errors in parentheses.

Table 2: Impacts of Taking Treatment on Allocation Decisions

Sample:	All Subjects				Non-Selfish Subjects			
Specification:	Tobit		Fixed Effects		Tobit		Fixed Effects	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Taking round	0.085^{**}	0.119^{**}	0.066^{***}	0.06^{***}	0.096^{***}	0.113^{**}	0.094^{***}	0.085^{***}
	(0.034)	(0.05)	(0.012)	(0.016)	(0.031)	(0.048)	(0.017)	(0.022)
Log price of giving	0.052^{**}	.	0.044^{***}	.	0.073^{***}	.	0.063^{***}	.
	(0.026)		(0.011)		(0.026)		(0.015)	
Taking × log price	0.007	.	-0.008	.	-0.008	.	-0.01	.
	(0.031)		(0.014)		(0.031)		(0.02)	
Log price × less expensive	.	0.026	.	0.049^{***}	.	0.055	.	0.071^{***}
		(0.04)		(0.013)		(0.037)		(0.018)
Log price × more expensive	.	0.077^{*}	.	0.038^{**}	.	0.091^{**}	.	0.055^{**}
		(0.045)		(0.015)		(0.042)		(0.023)
Taking × log price × less expensive	.	0.061	.	-0.018	.	0.018	.	-0.024
		(0.067)		(0.019)		(0.062)		(0.029)
Taking × log price × more expensive	.	-0.046	.	0.003	.	-0.035	.	0.004
		(0.078)		(0.025)		(0.075)		(0.037)
Constant	-0.129^{**}	-0.145^{**}	0.122^{***}	0.126^{***}	0.076^{*}	0.065	0.18^{***}	0.185^{***}
	(0.055)	(0.058)	(0.006)	(0.009)	(0.041)	(0.046)	(0.009)	(0.012)
Observations	1334	1334	1334	1334	912	912	912	912
R^2	.	.	0.651	0.651	.	.	0.579	0.579
Pseudo R^2	0.011	0.011	.	.	0.029	0.029	.	.

Significantly different from zero at 99 (***), 95 (**), and 90 (*) percent confidence level. Robust standard errors clustered at the subject level. The dependent variable in all specifications is the *budget share* spent on *other*, $p\pi_o/(\pi_s+p\pi_o)$. Non-Selfish Subjects are those who ever allocate a positive amount to other.

Table 3: CES Model

Dependent Variable:	Budget Share	
	(1)	(2)
$\bar{\alpha}$	0.892***	0.941***
	(0.031)	(0.031)
$\bar{\rho}$	-0.684***	-0.821**
	(0.233)	(0.343)
α_{taking}	.	-0.132***
		(0.039)
ρ_{taking}	.	0.394
		(0.333)
Observations	912	912
R^2	0.48	0.495

Significantly different from zero at 99 (***), 95 (**), and 90 (*) percent confidence level. Robust standard errors clustered at the subject level. All specifications are non-linear least squares. The dependent variable in all specifications is the *budget share* spent on *other*, $p\pi_o/(\pi_s + p\pi_o)$. The sample is restricted to subjects who ever allocate a positive amount to other.

Figure 1: Average Partner Budget Share by ln (Price)

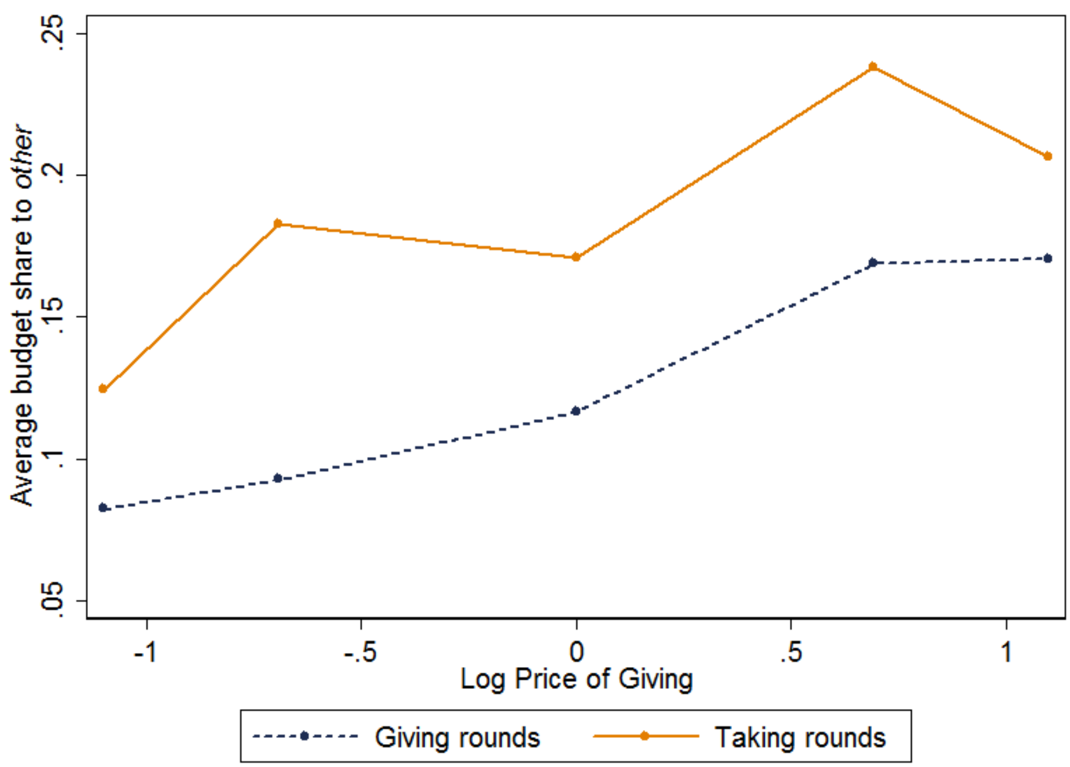
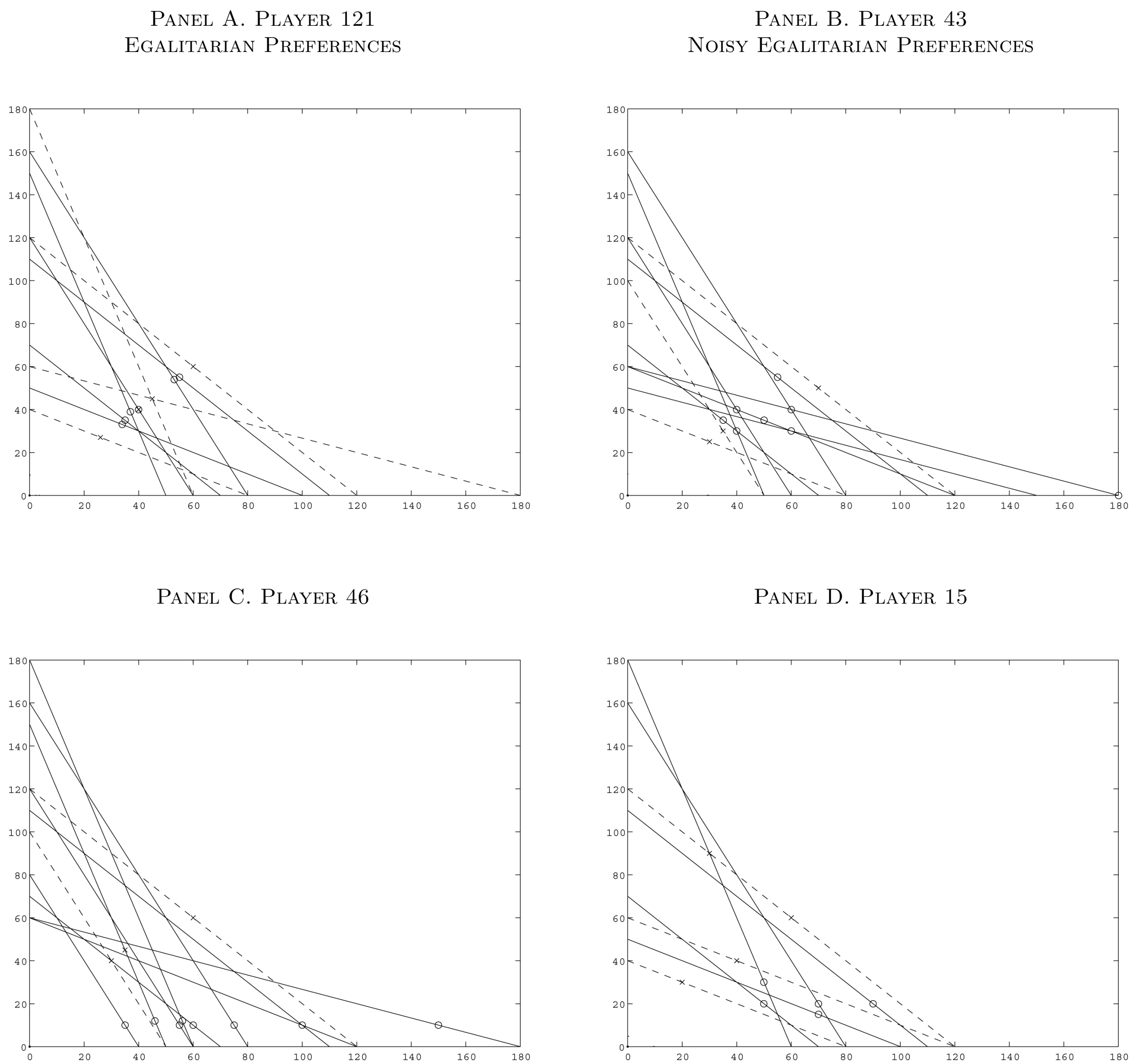


Figure 2: Budget Sets and Choices of Individual Players



Legend

○ Giving Decisions × Taking Decisions

X-Axis: Dictator token amounts
Y-Axis: Partner token amounts