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Do distributional preferences reverse on a dollar? An experiment

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In settings where *other-regarding* motives are likely to be (and some would argue, *should be*) at the forefront of our minds, how much of our behavior can still be explained by narrow pecuniary self-interest by itself? In an experiment, subjects are asked to vote between two income distributions that have diametrically opposed effects on the group as a whole. Even in such a setting, I find that self-interest still appears to dwarf the combined effects of other-regarding motives in influencing the votes of the vast majority of subjects.

Keywords: Self-interest, Fairness, Efficiency, Inequality-aversion

JEL Classifications: D64, D63, D60

1 Introduction

Social scientists, especially economists, understandably, have devoted much of their attention to trying to quantify the importance of self-interest relative to other-regarding motives in how people make potentially altruistic or redistributive actions. Researchers interested in pursuing this task usually turn to ultimatum games (see Oosterbeek et al. (2004)), dictator games (see Engel (2011)), and public good games (see Andreoni (1995); hereafter, I refer to these three games collectively as UDP games).

Guth et al. (1982), using ultimatum games; and Kahneman et al. (1986), using dictator games; pioneered the use of UDP games. Since then, hundreds of researchers have used UDP games to show that the decision-making process of human beings is extremely complex and,

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I am deeply grateful to those at the Department of Economics of the Ohio State University for graciously allowing me to use their experimental lab along with their subject pool. Special thanks to Dr. Paul Healy, Kirby Nielsen (a graduate student at the time of the experiment), and Bethany Cady (student lab manager at the time). Thanks also to Cameisha Williams and Alexandra Edrington for helping to proofread the manuscript, and to two graduate assistants (Luke Miller and Ryan Wolffe), who helped with conducting the experiment sessions.

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therefore, cannot be reduced to a single factor or motive, not even one as powerful as self-interest.

In a within-subject and between-subjects-designed experiment, I use a large-group, majority-vote game to add to the existing literature on the importance of self-interest relative to other motives. I do so by focusing attention on how subjects choose between two distributions of income, where each distribution has obvious and significant other-regarding consequences. The experimental setting for this research differs from the standard UDP design along, at least, one significant dimension. In UDP games and most experiments that examine redistributive preferences and motives, subjects are usually placed in groups of two to five people (see, for example, Gee et al. (2017) and Höchtl et al. (2012)). This one-to-few context is consistent with real-world experiences in which we make individual choices regarding charitable donations to organizations, causes, panhandlers, relatives, friends, or even foes. However, UDP games generally do a subpar job of mimicking real-world macroeconomic-policy situations where individuals are required to vote on issues that impact a very large number of people.

The setting in Durante et al. (2014) comes the closest to the real-world situations that I try to approximate in this experiment. They use a twenty-subject setting along with a more representative level of possible payout (income) inequality than most experiments of its type. My experiment has one key point of departure from Durante et al. (2014). But this single departure generates two separate but related implications that I believe create an important contribution to this strand of literature. As is the case in many of the other experiments on voting over redistribution of income, Durante et al. (2014) ask subjects to choose a tax rate from a finite but non-negligible set of options (in their case, 0% to 100% in increments of 10%). This type of choice set definitely has the advantage of allowing subjects to make decisions at (or close to) the margin, which in turn, allows the researchers to be able to estimate marginal effects and marginal willingness to sacrifice.

However, settings with such a relatively broad choice set are unlikely to produce results that we can confidently extrapolate to some of the most momentous real-world votes that we typically encounter. These significant real-world votes usually involve binary, diametrically-opposed options with extremely consequential ramifications. A recent case in point of such a vote would be UK's 2016 Brexit referendum, when a narrow majority (51.9% of the 72.2% of the eligible electorate that turned out) voted in favor of leaving the European Union. Such referendums, which are becoming increasingly popular (see Donovan et al. (2009)), have the potential to reshape entire economies and cultures for many generations.

The first and more obvious implication of the type of knife-edged choice set that I employ in this experiment is that it is likely to be more representative of some of the most consequential votes that we face in the real world. Secondly, in the current experiment, each of the two distributions that subjects are asked to vote between has very strong, but conflicting, other-regarding attributes. As such, a given other-regarding motive is not necessarily pitted directly against nar-

row self-interest by itself but perhaps more likely against self-interest and other other-regarding motives jointly. This may allow subjects to more easily justify a self-interested vote.

In this setting, I find that narrow pecuniary self-interest, by itself, can rationalize the overwhelming majority of the votes, even when we restrict attention to votes where the gain or loss to *self* is paltry when compared to the gain or loss to the *others*. It may prove useful to interpret these results as follows: it appears that for a significant majority of individuals, only a very negligible pecuniary self-interested gain (or loss) is needed to tip their decision in favor of (or against) a given policy, even for votes where the society-wide ramifications are likely to be dramatic and far-reaching.

2 The Experiment

The design of the experiment is relatively straightforward. Without completing any kind of tasks, subjects are asked to vote six times between two distributions of income:

1. Distribution 1: All subjects receive an equal amount. This equal amount changes across votes: \$8, \$9, \$10, \$14, \$15, and \$16 in votes 1 through 6, respectively.

2. Distribution 2: Each subject receives an amount ranging from \$9 to \$135. The amount that each subject receives under Distribution 2 is randomly determined but is fixed across votes. Seven subjects receive \$9 each, fourteen receive \$15 each, six receive \$35 each, and one subject receives \$135 (see Figure 1).[1]

Distribution 2 was chosen in such a way that its degree of inequality is similar to that of the USA—the Gini coefficient of 37.7 for Distribution 2 is in the same neighborhood of the 41.5 coefficient for the USA in 2016 (data accessed from the World Bank's online database (January 8, 2020)).[2]

[1] All subjects vote in the same pre-determined order. The unequal distribution remains unchanged, but the equal distribution increased monotonically (\$8, \$9, \$10, \$14, \$15, and \$16) from the first vote through to the sixth vote. Generally, experiments are more likely to suffer from order effects when all subjects make decisions in the same order. However, as I argue in Appendix 4.D, given the specific hypotheses that I test, and given the subjects' observed behavior, it is highly unlikely that any order effect would invalidate, especially, the qualitative findings of this experiment.

[2] Unfortunately, due to limited sign-ups and no-shows, some sessions had less than 28 participants. Across the six sessions, the number of participants ranged from 23 to 28. In sessions that had fewer than 28 participants, the unequal Distribution 2 was necessarily adjusted to fit the actual number of participants. For instance, in the session that had 23 participants; under Distribution 2, seven subjects would receive \$9 each, eleven would receive \$15 each, four would receive \$35 each, and one subject would receive \$135. In all sessions where it was necessary to adjust Distribution 2, the adjustments were such that there was a similar level of inequality across all the sessions—the Gini coefficient for Distribution 2 ranged from roughly 37 to 40 across the six sessions. Throughout the paper, for ease of exposition, I discuss the design and results of the experiment within the context of a session with twenty-eight subjects.

Figure 1: Incomes under Distribution 2 (Screenshot from experiment instructions)

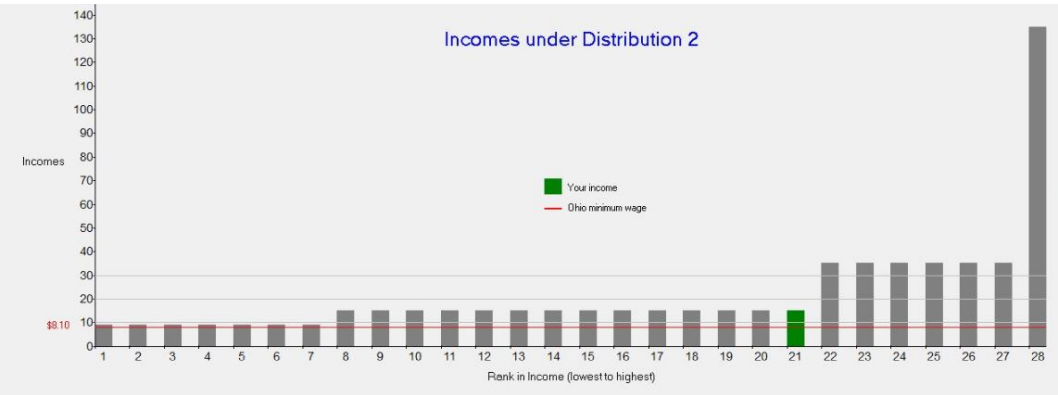

Figure 1 helps to make two features of the experiment more salient. Firstly, it shows that, before voting, each subject knows their income under both distributions—in vote 1, the subject (# 21) displayed in Figure 1 would receive $8 under Distribution 1 and $15 under Distribution 2. Secondly, Figure 1 makes the extent of the inequality under Distribution 2 obvious by graphically depicting the disparity that exists across the incomes of the low- , middle- , and high-income subjects.

Subjects were reminded on each vote that their payoffs will be determined by the majority vote in one of the six votes. This payout vote was randomly chosen at the start of the experiment but was not revealed to the subjects until the end of the experiment. Additionally, all six votes were made without any subject knowing any of the prior voting outcomes. Subjects did not receive a show-up fee, so their entire payout was determined by which distribution received the majority vote in the payout vote.

Before voting, each subject knows their own income under each distribution, as well as each distribution's mean, median, minimum, maximum, and total income. This information allows each subject, if they so desire, to weigh the importance of their narrow pecuniary self-interest against other distributional concerns.

Also, before the experiment started, the subjects were made aware of the average number of total participants that was expected across the six sessions. And given the information contained in the Distribution 2 graph, it is very likely that all participants had a very good approximation of the number of participants in there respective session, with perhaps the vast majority knowing the exact number of participants. All six sessions of the experiment were conducted using (mainly undergraduate) students at the Ohio State University Experimental Economics Laboratory over a two-day period.[3]

[3]ORSEE (Greiner (2015)) was used to schedule the sessions and recruit subjects, and the codes for the experiment were written using zTree (Fischbacher (2007)). Additionally, there are two other elements of

3 Results and Discussion

Of the 154 subjects, 53.9% were males, 77.9% were born in the U.S.A., 66.2% were white, 70.8% self-identified more with the Democratic Party than the Republican Party, and ideologically, 81.2% considered themselves as moderate (33.8%), moderately progressive (34.4%), or very progressive (13.0%).[4]

The key question under investigation is "Do subjects consistently vote in their narrow pecuniary self-interest?" even in a setting where the virtues of the other-regarding options are obvious and the total costs to others are substantial relative to the personal gain from a self-interested vote. Each of the 154 subjects makes six votes for a total of 924 votes. In 117 of these votes, the subject was a disinterested voter, in that their own payoff would be the same regardless of the outcome of the vote. Subjects voted roughly equally between the equal distribution (53.0%) and the unequal distribution (47.0%) when they were disinterested voters.

Of the remaining 807 votes, subjects voted 88.4% of the time in line with their narrow self-interest. Subjects voted in line with their self-interest and against the equal (perhaps *fair* or *inequality-averse*) distribution in 90.9% of the 570 opportunities when faced with such a choice. Similarly, subjects voted in line with their self-interest and against the unequal (*efficient*) distribution in 82.3% of the 237 opportunities when faced with such a choice.[5]

This propensity for subjects to vote in line with their narrow self-interest, regardless of whether they are voting against the *fair* distribution or against the *efficient* distribution, strongly suggests that self-interest may dampen or even overwhelm the effects of many subjects' other-regarding motives. The propensity of subjects here to vote in a manner that is consistent with their narrow self-interest is a bit higher than what we observe in previous studies, such as Charness & Rabin (2002).

A plausible explanation for the stronger result in this experiment is the large-group setting. However, the effect on self-interested choices of having larger group sizes is, a priori, ambigu-

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the experiment that warrants mentioning: (1) Subjects also chose a weight (0.25, 0.5, 0.75, or 1) to attach to their votes, knowing that votes with a higher weight counted proportional more than votes with lower weights, and (2) In three of the six sessions, subjects are reminded that the minimum wage for the state of Ohio was $8.10 at the time of the experiment. These two design features did not impact the results in any meaningful way. And the inclusion of the weights would make the discussion of the results significantly more nuanced/obtuse, especially when trying to compare this paper's results with those of the existing literature. Given that the results are essentially the same, in the interest of conciseness, ease of expression, and readability, these two design features are not discussed beyond here.

[4]A total of 166 subjects actually participated in the experiment. However, there were twelve instances of repeat participation by some subjects. Observations for these repeat participants were removed in an attempt to reduce the potential noise caused by repeat participation. The observations for two additional participants were also removed because of the failure of these participants to satisfy the required minimum thresholds for understanding the instructions sufficiently well.

[5]On the other end of the spectrum, we find three of the six $135 subjects actually voting for the equal distribution in two or three of their respective votes. In each of those votes the individual would be voting to personally sacrifice at least $119.

ous. On one hand, a larger group could cause participants to make more pro-social choices because the outcome of the vote affects more people, and the total effect is greater. However, as we observe in some experiments on public goods contribution, people may perhaps make less pro-social choices in large-group settings where cooperation is hard to foster or punishment is hard to enforce (see, for example, Nosenzo et al. (2015)).

Additionally, there are other possible explanations for the slightly higher propensity to vote in a self-interested manner in this study relative to the existing literature. One such factor is that in this experiment, participants were voting between two distributions that each has pro-social attributes. The equal distribution would likely be viewed as the fairer distribution of income given that all participants are doing essentially the same work for the same amount of time. On the flip side, the unequal distribution created a greater amount of total income for the group as a whole. Given that both distributions have other-regarding attributes, it may make it easier for subjects to rationalize a vote for either distribution even if they are primarily motivated by self-interest.

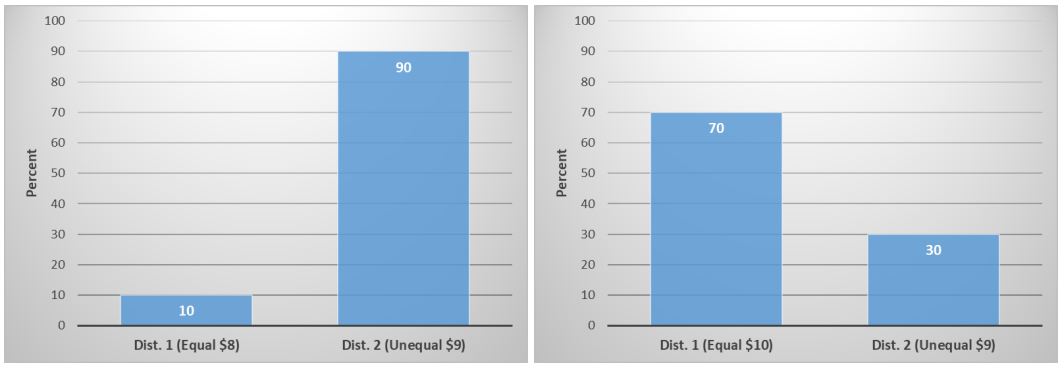
It is important to note however, that these explanations are just conjectures as the design of the experiment does not allow me to (nor was it intended to) decompose the specific reasons for participants voting predominantly in line with their narrow self-interest.

To better evaluate the role that self-interest played in these votes, I restrict the analysis to those votes where the cost of voting against one's self-interest is only \$1. Consider Figure 2, which provides, at the very least, highly suggestive evidence that the overriding factor in determining if most of the \$9 subjects voted for or against a given distribution is whether they would individually gain or lose a dollar by voting for that distribution. In vote 1, all subjects would receive \$8 under the equal distribution, and so the equal distribution is strongly Pareto-dominated by the unequal distribution, under which each subject receives at least \$9. Given the Pareto-dominance, it is unsurprising that 90% of the \$9 subjects voted for the unequal distribution here, in line with their self-interest.

When offered the choice between the equal-\$10 distribution and the same unequal distribution in vote 3, we see somewhat of a vote reversal, with 70% of the same \$9 subjects now voting for the equal distribution. To better appreciate the gravity of this vote reversal, we need to examine more closely the tradeoffs involved in making this vote. Recall that under the unequal distribution, seven subjects receive \$9 in each session. Therefore, under the \$10-equal distribution, the \$9 subjects would gain a total of \$7 (each gaining \$1) relative to their position under the unequal distribution. Compare this to the fact that the equal-\$10 distribution would make the remaining twenty-one subjects worse-off by a total of \$345 (each losing at least \$5 and one subject losing \$125). Twenty-eight of the forty \$9 subjects were willing to accept this extremely costly tradeoff.

We find additional evidence to buttress the case for the self-interested hypothesis when we look at the voting behavior of the \$15 subjects in votes where the gain from a self-interested

Figure 2: Voting of $9 Subjects in Votes 1 and 3

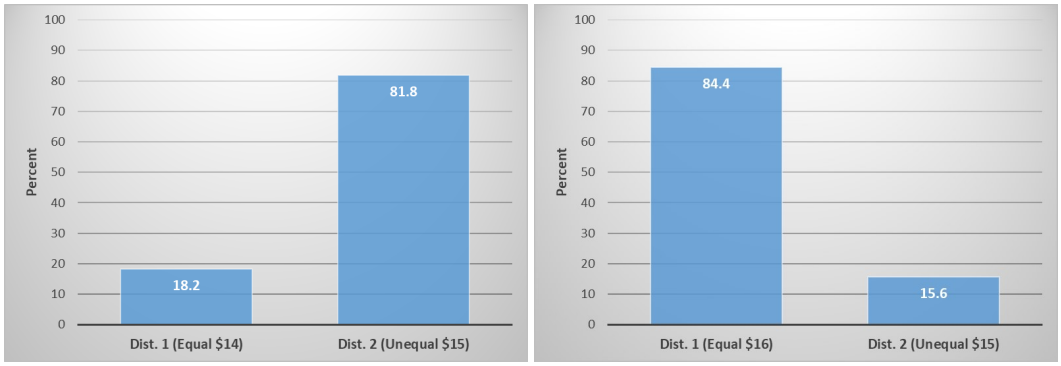


(a) Vote 1 (b) Vote 3

"Unequal $9" means that these subjects receive $9 under the unequal distribution (Dist. 2). The $9 subjects were disinterested voters in vote 2, and so the results for that vote are not displayed here.

vote is only $1. In Figure 3, we see that the voting pattern of the $15 subjects looks very similar to that of the $9 subjects. We observe 81.8% of the $15 subjects voting *against* the equal distribution when they would lose a dollar under the equal distribution, but then we see almost a mirror reflection of 84.4% of the same subjects voting *in favor* of the equal distribution when they gain a dollar by doing so.

Figure 3: Voting of $15 Subjects in Votes 4 and 6



(a) Vote 4 (b) Vote 6

"Unequal $15" means that these subjects receive $15 under the unequal distribution (Dist. 2). The $15 subjects were disinterested voters in vote 5, and so the results for that vote are not displayed here.

Using results from a probit regression (Table 1), the predicted probability of voting for

Table 1: Abbreviated Results of Probit Regression

Dependent variable: Voting for the Equal Distribution			
		Number of obs. = 924	
		Wald $\chi^2(19)$ = 238.12	
		Prob > χ^2 = 0.0000	
Log pseudolikelihood = −344.646		Pseudo R^2 = 0.4147	
Selected Regressors[†]	**Coefficient**	**Robust Standard Error** [††]	**P-value**
Voting for the equal distribution is			
··· against self-interest	−1.522	0.152	0.000
··· consistent with self-interest	0.905	0.148	0.000
(disinterested category omitted)			
Equal-dist payout − Unequal-dist payout	−0.002	0.002	0.401
Selected control variables			
Democratic party (identifies with)	0.359	0.212	0.089
Gender (Male)	−0.173	0.165	0.292
Age	−0.038	0.040	0.349
Constant	−0.776	2.518	0.758

[†] In the interest of conciseness, I include only the most relevant variables in this table. For a more comprehensive look at the probit results, see Table 4.B.1 in Appendix 4.B.
[††] Adjusted for 154 subject-level clusters.

the equal distribution is 0.830 when it is in the narrow self-interest of the subject to do so, whereas the probability is only 0.091 when it is against the subject's self-interest. This provides strong support to my central hypothesis that the deciding factor for how subjects voted in the vast majority of the votes was whether a particular distribution would increase or decrease that subject's individual payoff, not on any other-regarding motive, such as fairness, efficiency, or inequality-aversion.[6]

[6]A brief supplemental section of additional results and discussion is available in Appendix 4.B.

4 Conclusion

For most people, it likely comes as no surprise that self-interest plays a significant role in determining how people vote on a financial issue. However, what is striking in the results of this experiment is that it appears that even a $1 change in a subject's narrow self-interest may be sufficient to significantly drown out their other-regarding concerns (such as their desire for fairness or efficiency), even in situations where the costs to *the others* is extremely high relative to the $1 self-interest gain or loss.

This conclusion may prove even more stark when viewed in light of the following: In this research, self-interest was defined in one of the narrowest way possible—what gives an individual the highest monetary payout at the end of a one-hour experiment. Even with such a narrow definition, it still appears that the voting calculus of a significant fraction of the subjects hinged almost exclusively on the answer to the question, "Which option serves my self-interest best?" Given this result, when economists extend "self" to include family, friends, and whoever (or whatever) else an individual cares about and also extend "interest" beyond merely monetary gains or losses, it probably should not surprise many that a significant fraction of economists continue to rely heavily, and for some, maybe even dogmatically, on the assumption of "rational self-interest."

However, an equally important point warrants mentioning here—there was still a non-negligible fraction of subjects in this experiment who, perhaps commendably, did not always vote in line with their narrow self-interest. Some of these subjects did so at great monetary costs to themselves. This finding is consistent with the vast majority of previous experimental studies in this area.

The central findings of this paper reaffirm that the motive of self-interest still plays a pivotal role in swaying our choices in important decisions. For a society to be "*good*," does many of its citizens need to make a significant fraction of their decisions based primarily on other-regarding motives, rather than on narrow self-interest? Many people, ignoring or challenging the import of Adam Smith's "invisible hand," may respond with an assured "yes." If that is indeed true, then this paper's reminder would suggest that we may each need to carefully and critically reexamine the underlying reasons for the choices we make, especially when such choices can have significant societal effects.

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Appendix

4.A Screenshots of Selected Experiment Instructions

Figure 4.A.1: Welcome and general instructions (Screenshot)

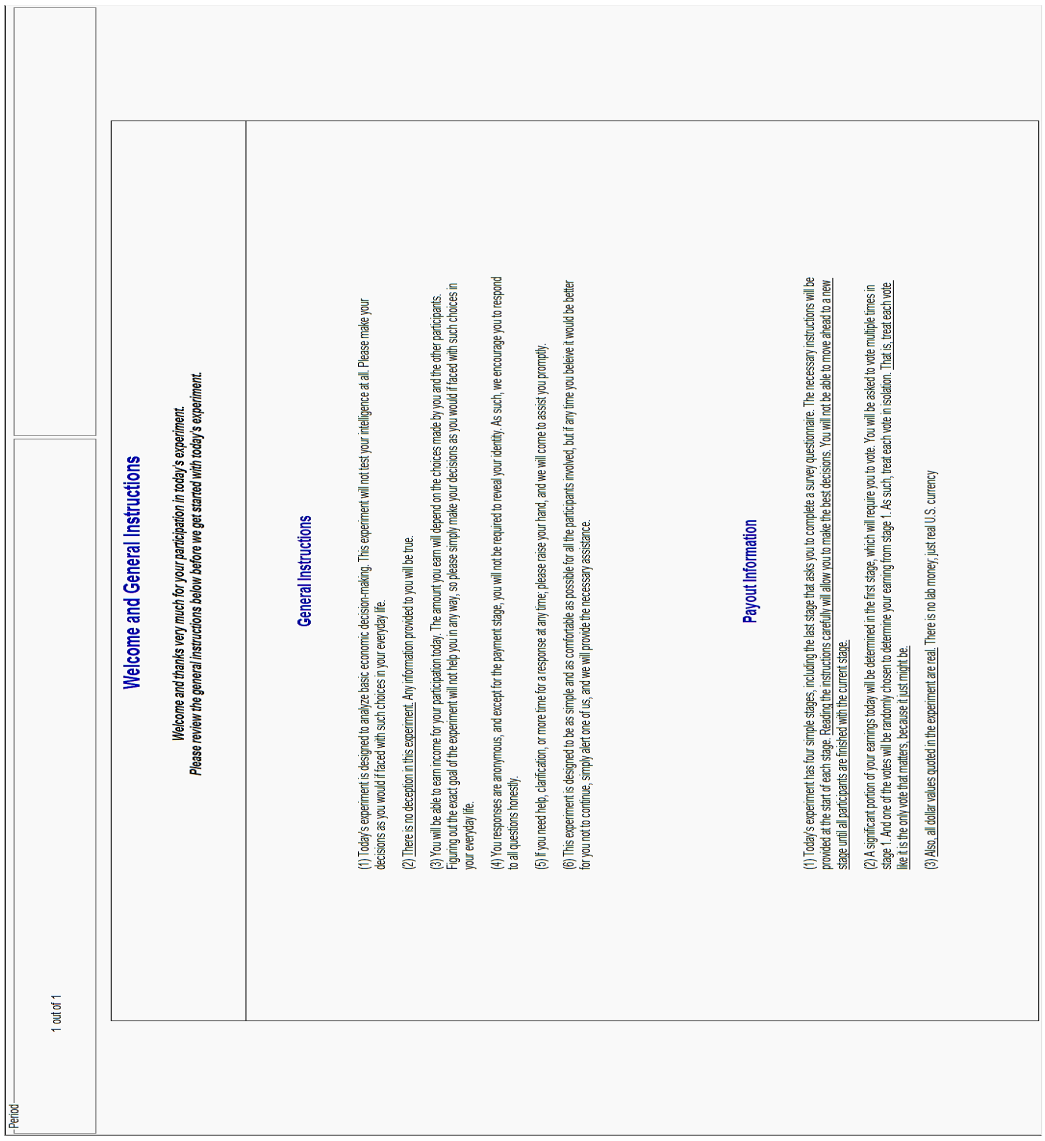


Figure 4.A.2: Vote 1 information (Screenshot)

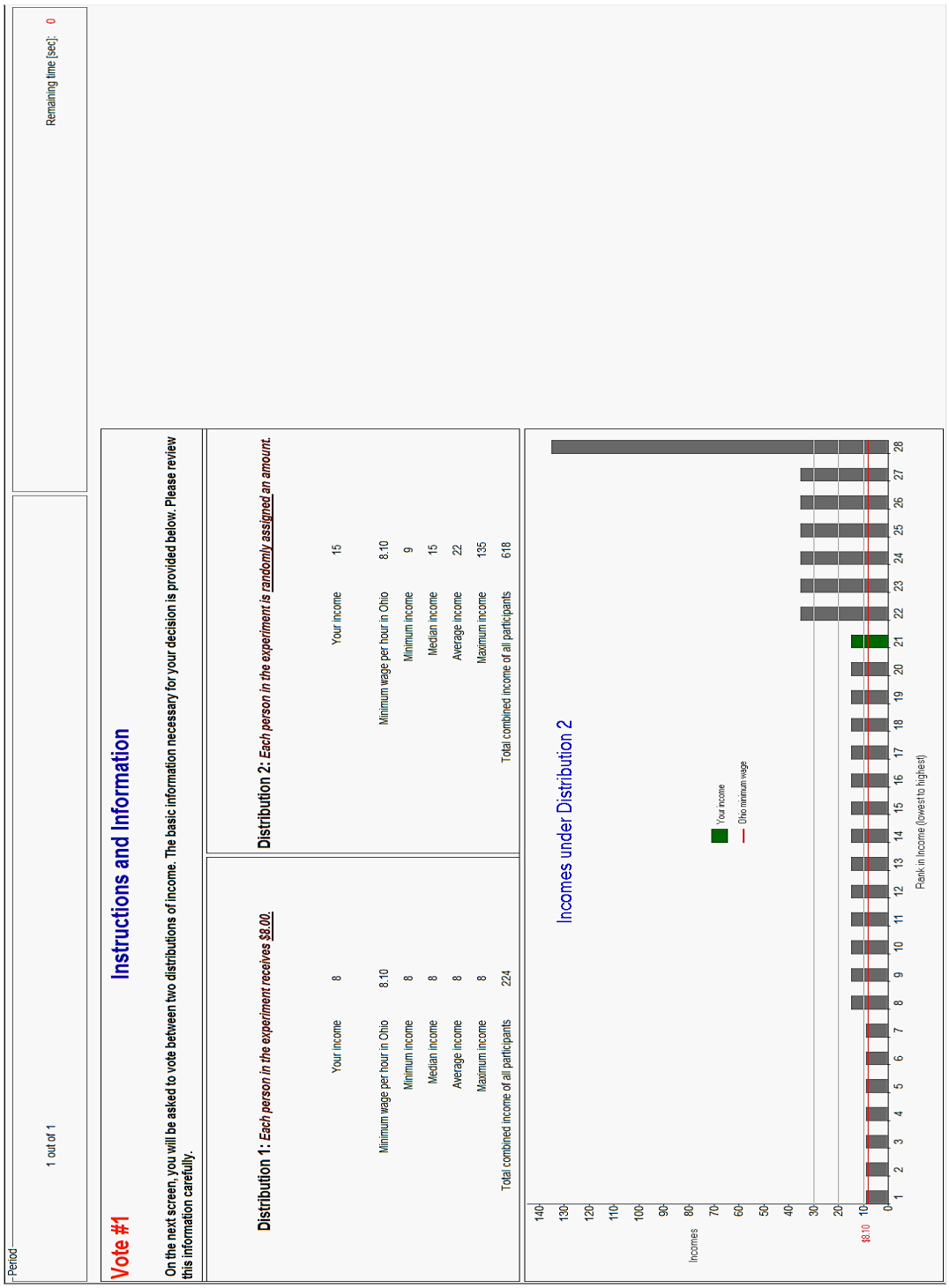


Figure 4.A.3: Test of understanding of instructions for Vote 1 (Screenshot)

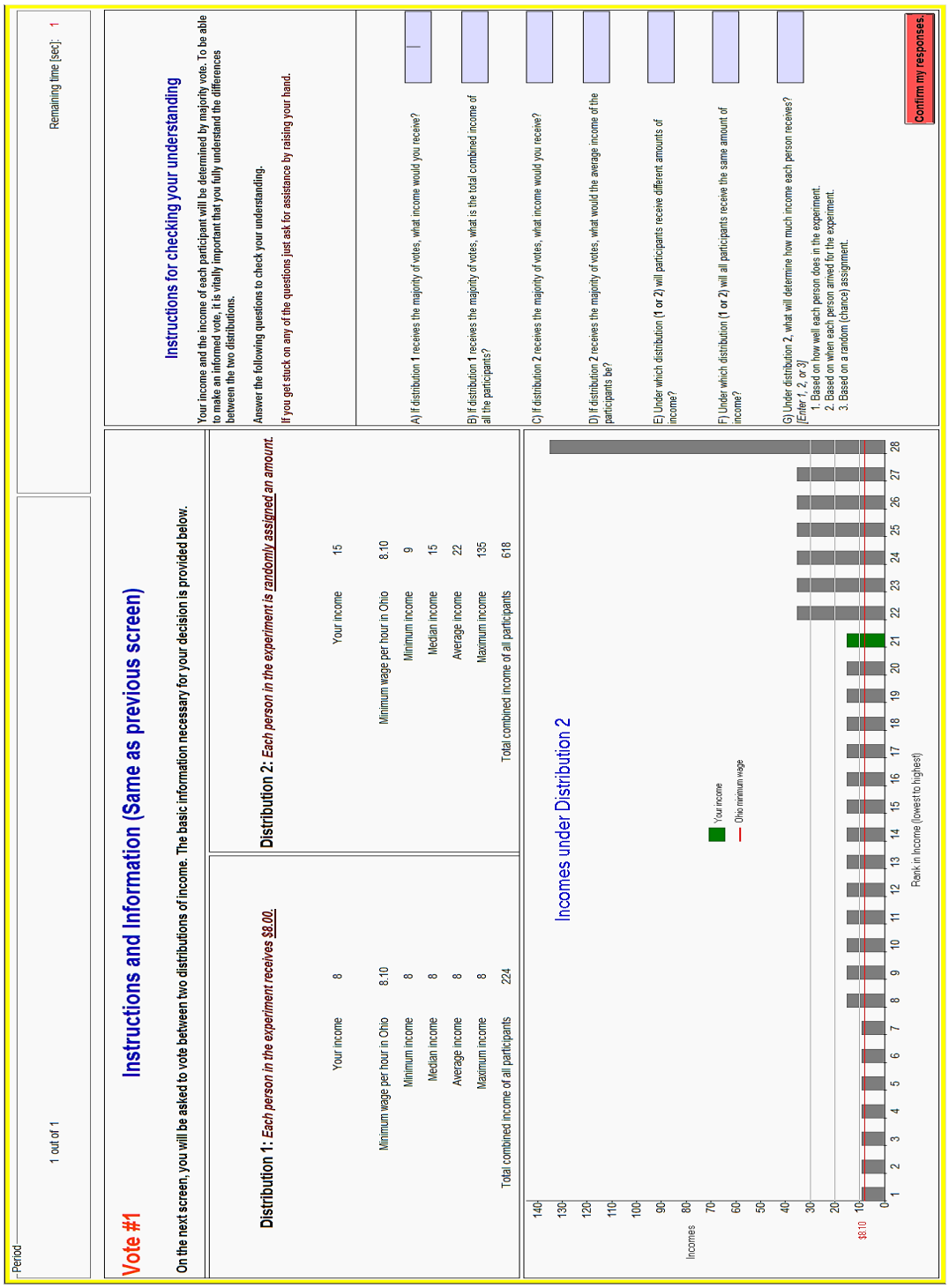


Figure 4.A.4: Vote 1 actual vote opportunity (Screenshot)

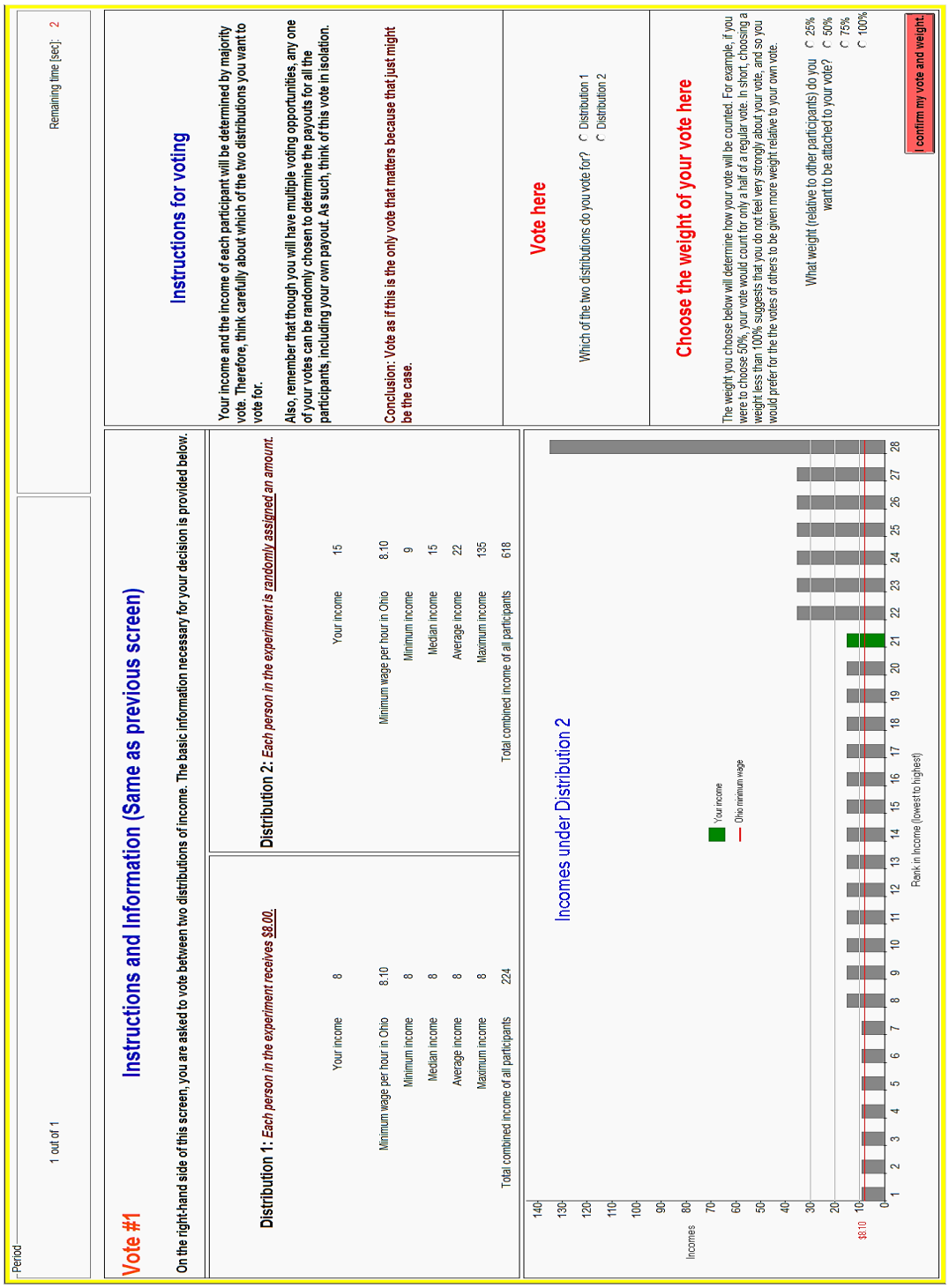


Figure 4.A.5: Vote 6 actual vote opportunity (Screenshot)

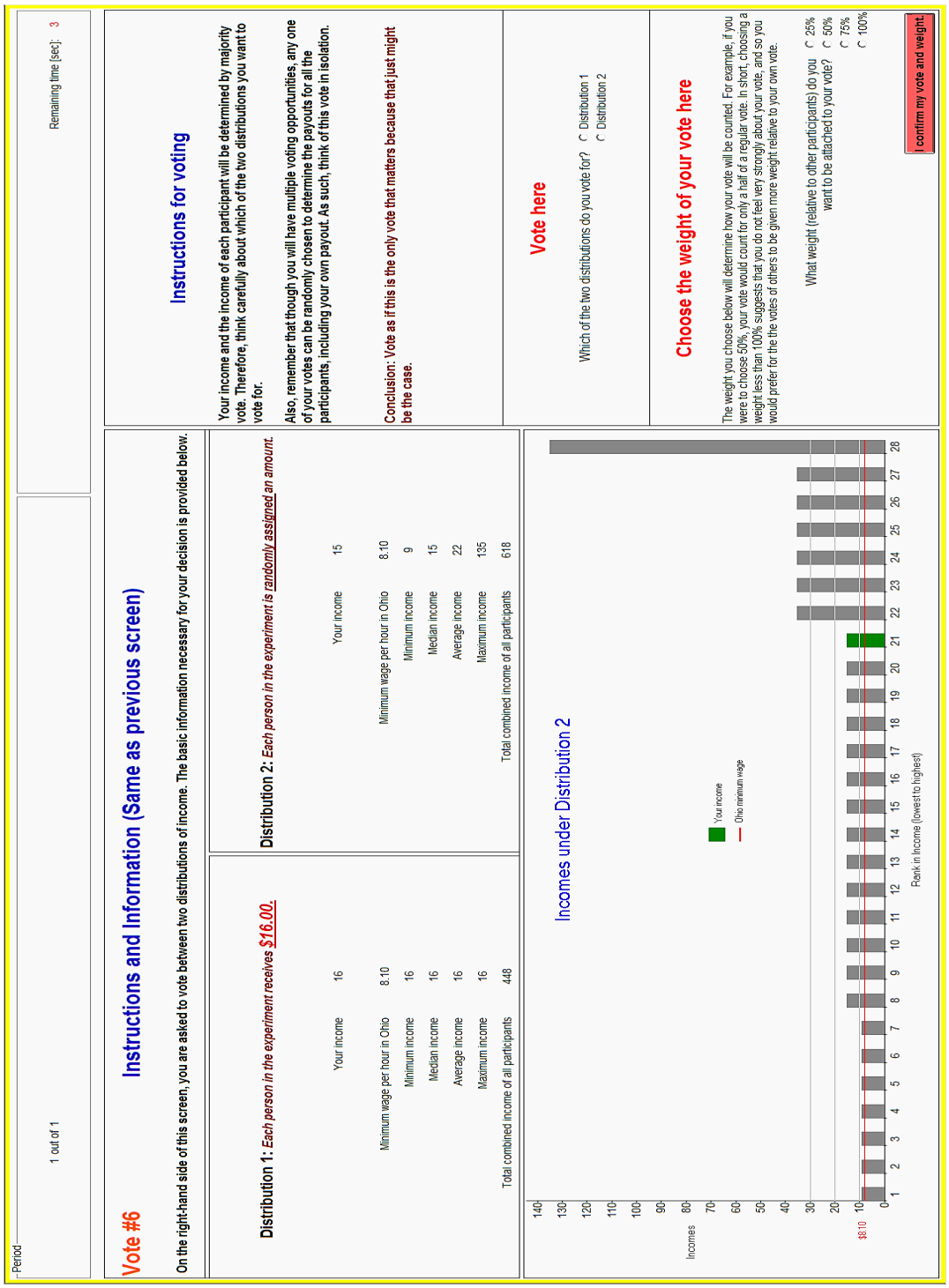
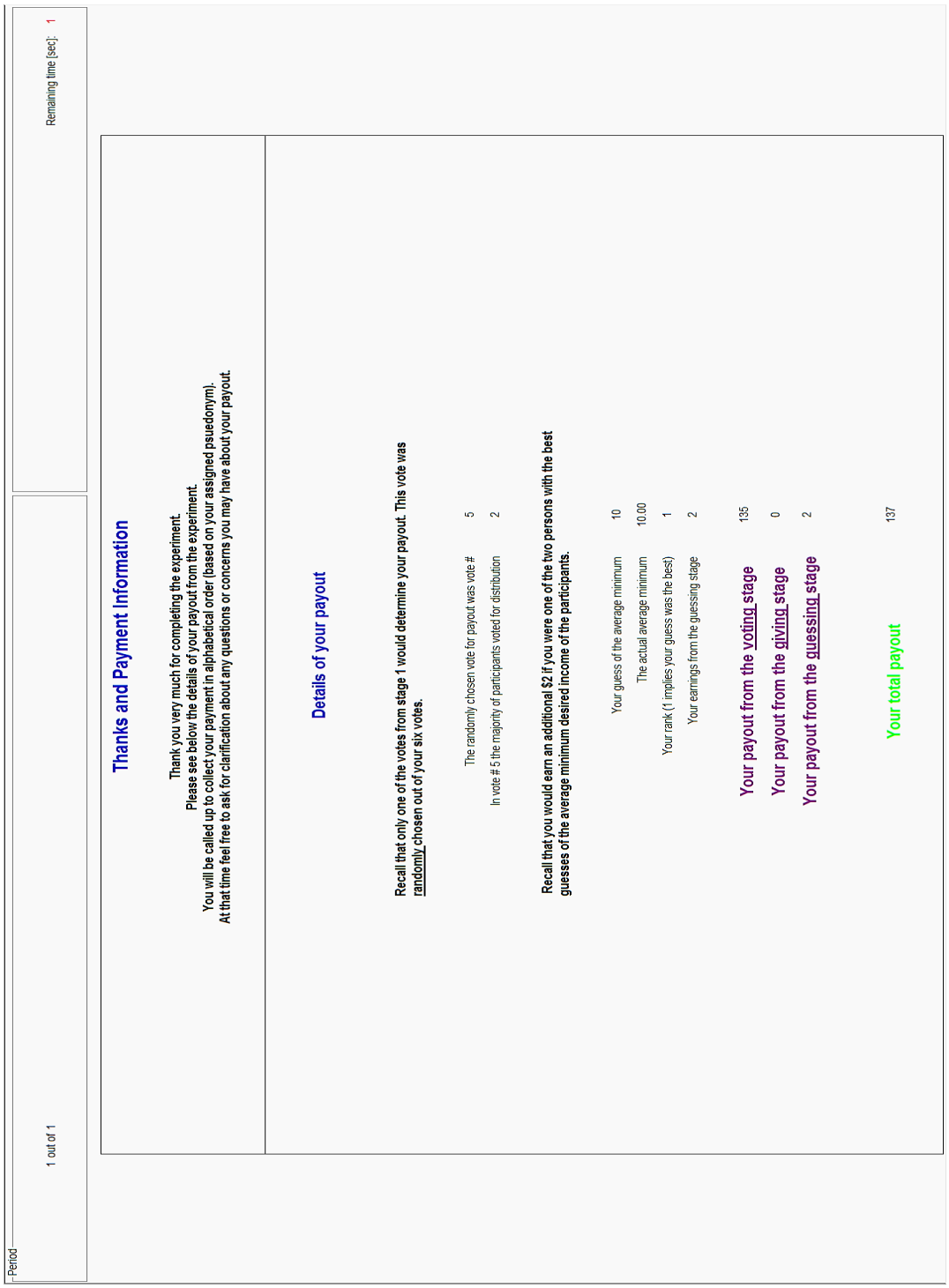


Figure 4.A.6: Sample of survey questions (Screenshot)

Figure 4.A.7: Payout screen (Screenshot)



4.B Supplemental Results Tables and Graph

Table 4.B.1: Results of Probit Regression

Dependent variable: Voting for the Equal Distribution

Number of obs. = 924
Wald $\chi^2(19) = 238.12$
Prob > $\chi^2 = 0.0000$
Log pseudolikelihood = −344.646
Pseudo $R^2 = 0.4147$

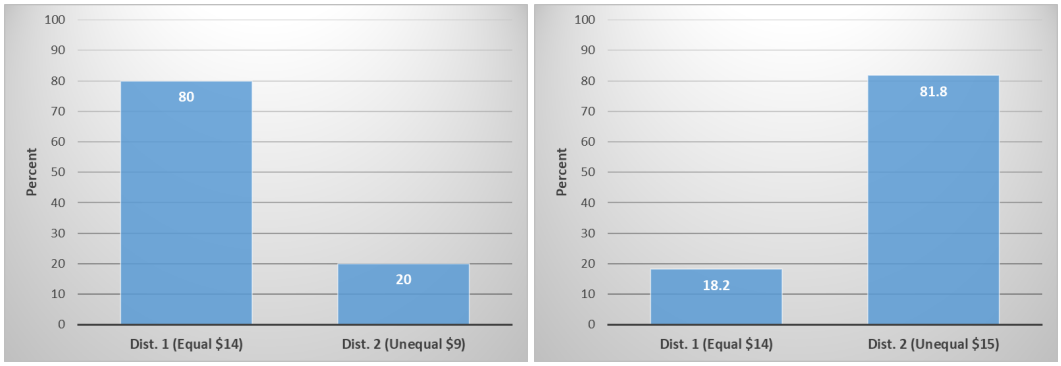
All Regressors	**Coefficient**	**Robust Standard Error** †	**P-value**
Voting for the equal distribution is			
··· against self-interest	−1.522	0.152	0.000
··· consistent with self-interest	0.905	0.148	0.000
(disinterested category omitted)			
Equal-dist payout − Unequal-dist payout	−0.002	0.002	0.401
Democratic party (identifies with)	0.359	0.212	0.089
Progressive ideology	−0.082	0.212	0.700
Gender (Male)	−0.173	0.165	0.292
U.S.A.-born	0.048	0.271	0.859
Age	−0.038	0.040	0.349
Min payout desired at start of experiment	−0.006	0.011	0.541
Expected future starting income (*ln*)	0.158	0.238	0.508
Minimum wage information presented	0.214	0.158	0.175
School of business students	−0.078	0.214	0.715
Computer, Math, & Engineering students	0.054	0.210	0.797
White	−0.335	0.343	0.328
Asian	−0.255	0.382	0.504
Importance of religion			
Very important	0.027	0.448	0.953
Moderately important	−0.044	0.450	0.917
Somewhat important	0.432	0.402	0.282
Not important at all	−0.013	0.427	0.975
("Extremely important" omitted)			
Constant	−0.776	2.518	0.758

† Adjusted for 154 subject-level clusters.

4.C Supplemental Results and Discussion

A comparison of how the $9 subjects and $15 subjects voted when they had the option between the equal-$14 distribution and the unequal distribution may further strengthen the case for the central thesis of the paper. Figure 4.C.1 shows that 80% of the $9 subjects voted *for* the equal distribution, whereas 81.8% of the $15 subjects voted *against* the equal distribution. The critical difference between these two groups appears to be the following: the equal-$14 distribution would make the $9 subjects better-off, while it would make the $15 subjects worse-off (even though only by a dollar, for the latter group). To fully appreciate the possible implications of this comparison, it may be necessary to recognize that the difference between the other-regarding calculus of a $9 subject and that of a $15 subject was only $6 in this instance.

Figure 4.C.1: Voting of $9 and $15 Subjects in Vote 4

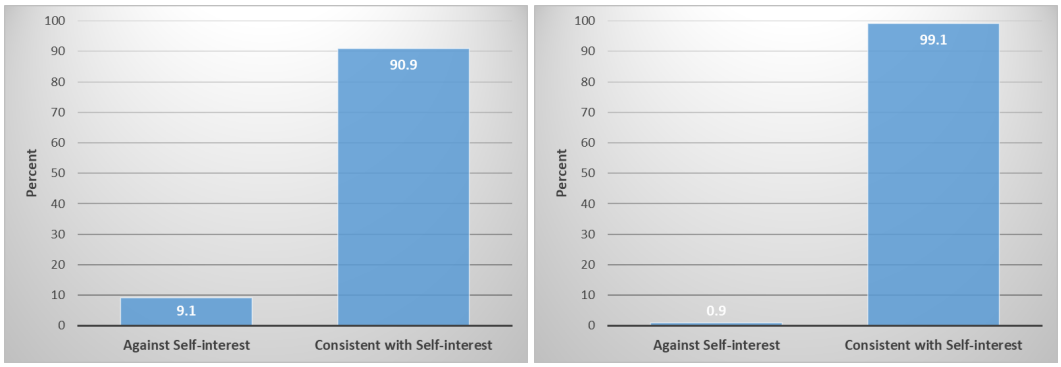


(a) $9 Subjects (b) $15 Subjects

"Equal $14" means that all subjects receive $14 under the equal distribution (Dist. 1). "Unequal $9" means that these subjects receive $9 under the unequal distribution (Dist. 2), and "Unequal $15" means that these subjects receive $15 under the unequal distribution.

In much of the analysis in the paper, I focused on votes where the personal pecuniary stake was only $1. If we were to consider only votes where the personal stakes were greater than $1, we would find that 90.9% of the subjects' votes were consistent with their narrow self-interest (see Figure 4.C.2). This number balloons to 99.1% (229 of 231 votes) when we consider only $15 subjects in votes with personal stakes of more than $1. To provide a bit of perspective for this high percentage of self-interested votes, I will mention, without exploring further here, that the $15 subjects can reasonably be viewed as belonging to the middle class in this experiment.

Figure 4.C.2: Voting when the personal stakes are greater than $1



(a) All Subjects

(b) $15 Subjects

4.D A note on possible order effect

Given that there is a within-subject component of the experiment and all subjects voted in the same order, we need to be mindful of the possibility of an order effect. However, given the main hypothesis that I test for in the experiment, it appears unlikely that an order effect would be sufficiently significant to invalidate the results obtained, especially the qualitative results. In the experiment, the equal amount for the equal distribution is increased in each successive vote. The two main questions that I attempt to answer with this research are (1) Does a tipping point exist, where the subject becomes significantly more likely to switch to voting for the equal distribution? and (2) If one exists, where is that tipping point? The results suggest that a tipping point does exist and that it exists at the point where voting for the equal distribution switches to being in the narrow self-interest of the voter. It is highly unlikely that the answer to either of these two questions would have been different had the equal amount for the equal distribution been presented in descending order.

Additionally, the extreme differences in the voting patterns *between* subjects also suggest that it is unlikely that an order effect is playing a major role in influencing the decisions of the subjects. See, for example, section 4.C for a discussion of the votes of the $9 subjects and $15 subjects when these two groups of subjects were faced with essentially the same other-regarding trade-offs.