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Incentivizing Experiments: Monetary Rewards versus Extra Credits*

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Abstract

We use laboratory experiments with different salient rewards (monetary rewards versus extra credits) to study collective decision making behavior under different informational structures. The results show that even though subjects' behavior follows a similar pattern in both cases, subjects tend to act more efficiently when they are compensated with extra credits rather than money.

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(1) Introduction

An important consideration in the design of any experiment is how to incentivize the subjects (i.e., how to encourage subjects to take the task seriously and to behave in a way consistent with how they would behave in a “real world” setting). Economics has distinguished itself from the other social sciences by emphasizing the importance of real and salient incentives. The predominant means of doing so has been to offer monetary incentives.¹ Subjects are paid for their time and the payment is a function of the decisions made during the course of the experiment. Camerer and Hogarth (1999) note that the effects of monetary incentives are mixed and complicated but the presence and the amount of financial incentives seem to affect average performance or at least the variance of responses in many tasks. In many tasks (but not all), subjects work more carefully if they earn more money for better performance.

Obviously, if money is what is used to motivate subjects, then the ability to conduct research using experiments is limited by the availability of funds. The number of subjects, the time commitment expected of subjects, and the complexity of the task all contribute to the expense of research using experiments. Absence of or inadequate resources limit the work that can be done. Furthermore, if money is the only incentive that motivates subjects then the use of experiments as a pedagogical tool is suspect. Absent monetary incentives, classroom exercises might not generate the results expected.

This paper considers whether there are other rewards, ones not subject to the same strict budgetary limitations, that never the less still provide salient incentives to subjects. Given that most economic experimentalists draw their subjects from the convenient pool of university

¹ Although monetary incentives are not always the “magic bullet” (Read, 2005), salient monetary incentives are still an integral feature of experimental economics.

students, extra credit is, potentially, just such a reward. If extra credit is to substitute for money, two conditions must be satisfied. First, extra credit points must provide a salient incentive to experiment subjects. Second, the results of an experiment conducted with extra credit points as reward should track closely the results of an experiment conducted with money as reward.

Evidence suggests that extra credit points do provide a salient incentive for experiment subjects. For example, Kruse and Thompson (2001) find “class points” to be a salient incentive in an experiment designed to measure subjects’ willingness to pay to mitigate low-probability risk.² The saliency of the class points is indicated by the students volunteering for the experiment.

Evidence that extra credit points generate results that track results generated by money is less conclusive. Kruse and Thompson (2001) report differences by gender in willingness to pay in the class point sessions but not in the money sessions.³ In contrast, Isaac, Walker, and Williams (1994) find, in a study of group size effects in a voluntary contribution mechanism game, that classroom experiments using extra credits as the reward provide results consistent with their similarly conducted experiment using money as a reward.⁴

In this paper, we use laboratory experiments with different salient rewards (monetary versus extra credits) to study collective decision making behavior under different informational structures. We make an interesting observation: although subjects behave similarly under both reward mechanisms, they follow the theoretical predictions more closely when extra credits are used. This of course may be a coincidence but it is reasonable to think that extra credits may reduce irrational behavior in student subjects. Compared to small monetary rewards, students’

² Class points replaced exam points.

³ Women are more risk averse in class points than in money; men just the reverse.

⁴ Isaac, Walker, and Williamson (1994) do not do any statistical tests but rather rely on eyeballing of the data.

grades can be more visible and important to the students. Therefore, extra credit points may emulate monetary incentives.

Our paper is organized as follows. Section 2 presents the experimental design. Section 3 briefly explains the theoretical predictions and presents the empirical results. Section 4 concludes the paper. All tables, figures, forms, and instructions are in the appendix.

(2) Experimental design

For each session, 15 subjects were recruited to a common room. For the monetary reward sessions, subjects were recruited by e-mail, posters, or class announcements; for the extra credit reward sessions, subjects were recruited by classroom announcement. The extra credit sessions were held at a time separate from the usual class time. This was done for two reasons: 1) to be consistent with the procedures used in the monetary rewards sessions; and 2) so that only subjects who considered the extra credit a sufficiently salient reward (what is assumed to be true for participants in the monetary rewards sessions) participated.⁵ The extra credit session subjects were recruited from two Principles of Microeconomics classes taught by the same instructor.⁶ Of a total of 128 students, 120 participated.⁷ The same number of subjects participated in the monetary rewards sessions.⁸

⁵ Eckel and Grossman (2000) found that participants in a modified dictator experiment conducted in classes behaved differently than participants in sessions recruited to a separate location even though both played for monetary rewards. Classroom participants were more likely to keep all of the endowment or give all of the endowment away than their recruited counterparts.

⁶ The instructor used a fixed grading scale so not participating or doing poorly would not hurt a student's grade in the class.

⁷ Of the eight who did not participate, four did not complete the class, three failed, and the eighth had the highest cumulative grade in the two classes.

⁸ Subjects in the extra credit rewards sessions did not complete the survey form reporting socio-economic characteristics completed by monetary rewards session subjects. A review of the class roles indicates that the two samples did not differ significantly by gender (monetary rewards: 54.6 percent male; extra credit rewards: 53.3 percent male) or by major (monetary rewards: 32.4 percent economics/business; extra credit rewards: 42.5 percent economics/business).

A session comprised ten rounds of a simple three-person investment game (eight for the extra credit sessions). In each round a subject was randomly grouped with two other subjects. Groups were reformed after each round and no subject was grouped with the same two people for more than one round. The procedures preserved between-subject anonymity. Subjects were identified by a randomly assigned, five-digit code number and were instructed not to communicate with each other. Subjects began each round with an endowment of \$10 and had to decide whether or not to invest their whole endowment in a joint investment project. The project had three possible payoff scenarios (high, average, and low) each with equal probability of occurring. In each round different payoff scenarios were randomly assigned to different groups. Table 1 shows the possible scenarios.

The payoff structure satisfies certain characteristics such as: a) no rational player has the incentive to participate by herself; b) a rational player should be willing to participate only if she is in Scenario 1 and believes that others will also participate; c) if one player defects from full participation, then she earns a positive payoff. In other words, the defector can free ride, gaining something from others participation while sacrificing nothing herself. For bad projects (Scenario 3), participation may hurt nonparticipants; and d) efficiency requires either zero or full participation.⁹

The payoff structure was designed to exhibit the familiar problems of free riding and coordination failure (which exist in many organizations). Scenario 1 exhibits a potential of coordination failure: wellbeing is maximized if all group members invest in the project; each subject, however, finds it optimal to invest only if the other group members do the same.

Scenario 2 exhibits the familiar free-riding problem: well-being is maximized if all group

⁹ Examples of such projects could include adopting new procedures or software that improves a firm's efficiency, helping to prepare a bid, or cooperating with a restructuring plan. In the political context, "projects" could include supporting controversial legislation or working for a candidate.

members invest but the dominant strategy is not to invest no matter what the other group members do.

Sessions were conducted under one of two treatments: complete information treatment (CIT) — all group members know the payoff scenario and decide simultaneously, but separately, whether or not to invest; or incomplete information treatment (IIT) — only one group member, the leader, knows the payoff scenario and decides first whether or not to invest. The other two members, the followers, only know the possible scenarios and their likelihoods. After observing the leader's decision the followers must decide simultaneously, but separately, whether or not to invest.

Theory predicts the following: assume information is complete. In Scenario 1 coordination failure implies missed opportunities for mutually beneficial and individually rational cooperation. Even if players somewhat coordinate on the most efficient equilibrium (all invest) in Scenario 1, they inefficiently fail to participate in Scenario 2 as the typical consequence of the free-riding problem. Summarizing: the CIT exhibits failures of both coordination and cooperation. In the Incomplete Information Treatment the story is different. There always exists a trivial equilibrium in which no one ever participates. Alternatively, the leader can induce a productive equilibrium in which the leader invests when it is efficient to do so (in Scenarios 1 and 2) and followers mimic the leader (See Komai and Stegeman 2004 for a detailed characterization of the equilibria).

We conducted four CIT and IIT sessions with monetary rewards and four with extra credits. The extra credit sessions were conducted using experimental dollars with an exchange rate of \$4 for each extra credit point. At the beginning of each session subjects received a consent form and instructions, which were read aloud by the experimenter (see the Appendix for

copies of the instructions and other forms). Subjects were tested to make sure they understand the game. The experimenters monitored all the answers, corrected and explained any mistakes, and answered each subject's questions individually.

Subject's individual earning was calculated and announced at the end of each round using their five-digit code number. Subjects were informed that their final earnings would be those of only one round chosen at random (by the role of a die at the end of the game) and therefore they should make the best decision possible in each round. At the end of each session subjects were called up by code numbers to determine their earnings (and to be paid their earnings in private in the monetary rewards sessions).

(3) Empirical Results

Figures 1 – 3 show by round the percentage of subjects investing by treatment and by reward type for Scenarios 1 – 3, respectively. For Scenarios 1 and 3, there is little difference: subjects behaved in a reasonably consistent manner across treatment and rewards type. For Scenario 2, subjects behaved reasonably consistently within reward medium but differently across treatments.

Tables 2 – 4 report percentage investing by round, treatment, and reward medium as well as results for Binomial Proportions tests. For all three scenarios, the round-by-round proportions test results do not, with rare exceptions, indicate any significant ($p\text{-value} < 0.05$) differences in subjects' behavior by reward medium.¹⁰ However, in six of the comparable eight rounds in Scenario 1 - IIT, and all comparable rounds in Scenario 2 - IIT, the percentage of subjects investing is equal or higher in the extra credit sessions than in the monetary sessions. In all

¹⁰ The exception are: Scenario 1, IIT treatment, round 3; Scenario 2, CIT treatment, round 3; Scenario 2, IIT treatment, round 7; and Scenario 3, IIT treatment, round 4.

comparable rounds of Scenario 3 - IIT, the percentage of subjects investing is equal or lower in the extra credit sessions than in the monetary sessions.

While the round-by-round difference may not be significant, the cumulative effect is. When we compare the overall investment rates (Total column) subjects in the IIT extra credit reward sessions consistently perform more efficiently than their IIT monetary reward session counterparts. There is no significant difference in the overall investment rates for the CIT sessions. For Scenarios 1 and 2, the overall investment rates for the IIT sessions are 18.1 and 22.2 percent (respectively) higher for the extra credit sessions than the monetary rewards sessions. For Scenario 3, the overall investment rate for the IIT session is 82.0 percent lower for the extra credit session than the monetary rewards session. These results suggest that subjects in the extra credit reward sessions more effectively utilize the information contained in the revealed actions of the first movers. In the CIT sessions, all subjects have the same information and subjects' behavior, whether by round or overall, is consistent both within a scenario and across reward medium.

This conclusion is supported when we examine data on group cooperation. Komai and Stegeman (2004) and Komai, Grossman, and Deters (2006) argued that an informed leader with uninformed follower acting in sequence (our IIT) can result in higher levels of cooperation than could an informed leader with informed followers acting simultaneously (see Komai, Grossman, and Deters, 2006) for evidence supportive of this hypothesis). Thus, what is ultimately of greatest importance is whether group cooperation differs by treatments and reward medium.

Tables 5 – 7 report results on group cooperation by treatment and reward medium. Table 5 reports the level of group coordination in Scenario 1. As expected, cooperation is high in Scenario 1 with more than two-thirds of all groups having two or more group members investing

regardless of the treatment or the reward medium. However, while cooperation in the CIT sessions does not differ significantly for the two reward mediums (p -value = 0.081), there is a significant difference (p -value = 0.015) in cooperation between reward mediums in the IIT sessions. Ninety-eight percent of the groups had two or more members investing in the extra credit sessions versus 85 percent in the monetary rewards sessions.

Group coordination in Scenario 2 is reported in Table 6. Theoretically, we expect higher cooperation in the IIT sessions than in the CIT sessions and our results are consistent with our expectations (see Komai, Grossman, and Deters (2006)). No group in the CIT sessions fully cooperates (regardless of reward medium) versus 38.2 percent and 57.1 percent in the IIT monetary and extra credit sessions, respectively. (Comparing monetary versus extra credit session results, we find that the reward medium has no significant effect on cooperation.)

Scenario 3 results are reported in table 7. Optimal individual and group behavior, regardless of the treatment, in this scenario is to not invest and more than 70 percent of all groups had zero members investing. For the CIT sessions, there is no significant difference in group cooperation between the monetary and extra credit reward sessions (p -value = 0.965). For the IIT session, subjects behave more efficiently in the extra credit sessions than in the monetary rewards sessions (this difference is statistically significant; p -value = 0.002). Ninety-six percent of all groups in the extra credit sessions invested nothing in the project while only 71.4 percent in the monetary rewards sessions followed the same pattern. Again our results suggest that subjects in the extra credit sessions more effectively use the information provided by a first moving leader than do their counterparts in the monetary rewards sessions.

Before concluding it is necessary to note a possible confound affecting our results. As noted above, subjects in the extra credit sessions were students in Principles of Microeconomics

classes taught by one of the authors. As such, results may be biased by an experimenter effect. We however consider this to have, at best, only minimal effect for two reasons. First, Komai had not lectured about free-riding or efficient group behavior prior to the experiment. This should minimize any experimenter effect, for subjects were not aware of what the teacher expected from them. Second, if the experimenter effect biased subjects' decisions towards the more efficient outcomes then this should have been observed in the CIT results as well, not just the IIT results. In all three scenarios, the decisions of subjects' in the CIT did not differ significantly between the two reward mediums.

(4) Conclusion

The purpose of this project is to determine whether or not different reward mediums (both of which are real and salient) elicit different responses in a laboratory experiment designed to study collective decision making behavior under different informational structures. We compare the customary monetary earnings to classroom extra credit. Subjects participated in a three-person investment game that was designed to exhibit the familiar problems of free riding and coordination failure. Subjects played the game under one of two treatments: Complete Information – all subjects act simultaneously based on the same information set; and Incomplete Information – a fully-informed leader acts first followed by uninformed leaders knowing only the leader's decision to invest or not. Subjects participated in either a monetary rewards session or an extra credit rewards session.

The two reward mediums generate similar patterns of behavior with, however, some interesting differences. For the Complete Information sessions, all subjects have the same information on which to base their investment decisions. In this case the reward medium has no

significant differential effects. Both round by round and overall subjects behaved in a like fashion.

For the Incomplete Information sessions, uninformed followers can deduce their best course of action by reading the actions of their group leaders (investing or not as the leader invests or not). While round by round, there is little difference in subjects' behavior (though the direction of the difference is consistent), overall the minor differences sum to significant differences. Subjects in the Incomplete Information, extra credit sessions consistently outperform their Incomplete Information, monetary sessions. The evidence suggests that subjects in the Incomplete Information, extra credit sessions more efficiently exploit the information contained in their group leaders' actions. An explanation consistent with the results is that extra credit points are a more valuable reward than money (at least for college students), sufficiently so to induce subjects to pay closer attention to experiment instructions and to the actions of their fellow players, thereby reducing "mistakes" due to confusion or inattention.

The reported results support a conclusion that, for the convenience sample of college students, extra credit points are sufficiently real and salient. Our extra credit sessions subjects treated the task at least as seriously as, and behaved in a manner consistent with, that of our monetary sessions subjects. This finding suggests that researchers lacking the necessary funding to conduct desired experiments might be able to circumvent this constraint and incentivize their experiments by using extra credit points. The results also support the use of experiments as a pedagogical tool. We would however suggest caution. While there may be a number of experiment types where extra credit rewards will provide results consistent with results generated by monetary rewards, we do not believe our results will generalize to all experiment types. In particular, experiments designed to elicit subjects' charitable or altruistic nature and

trustworthiness are, we predict, likely to generate different outcomes depending on the reward medium employed. We would not be surprised to find that subjects played in a manner more consistent with theoretical predictions when extra credit is the reward medium than is observed when money is the reward medium.

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Table 1: Payoff Matrices for Investment Scenarios

| Scenario 1 | Investors (each) | Non- investors (each) | Scenario 2 | Investors (each) | Non- investors (each) | Scenario 3 | Investors (each) | Non- investors (each) |
|---------------------------|-----------------------------|--------------------------------------|---------------------------|-----------------------------|--------------------------------------|---------------------------|-----------------------------|--------------------------------------|
| All invest | 20 | - | All invest | 13 | - | All invest | 0 | - |
| Two invest | 13 | 17 | Two invest | 9 | 15 | Two invest | 0 | 8 |
| One invests | 7 | 14 | One invests | 5 | 12 | One invests | 0 | 9 |
| Nobody invests | - | 10 | Nobody invests | - | 10 | Nobody invests | - | 10 |

Table 2: Scenario 1 Individual Invest Rates – Money vs. Extra Credit

| | | Period | | | | | | | | | | Total |
|---------------------------|--------------------------|--------|-------|--------|-------|--------|-------|-------|--------|-------|-------|--------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| CIT | Money | 83.3% | 72.2% | 75.0% | 72.2% | 70.8% | 83.3% | 75.0% | 66.7% | 77.8% | 81.0% | 76.2% |
| | Extra Credit | 50.0% | 60.6% | 66.7% | 73.3% | 50.0% | 66.7% | 83.3% | 100.0% | ... | ... | 67.4% |
| | Proportions test p-value | 0.171 | 0.307 | 0.653 | 0.943 | 0.220 | 0.182 | 0.515 | 0.063 | ... | ... | 0.176* |
| | | | | | | | | | | | | |
| IIT | Money | 83.3% | 77.8% | 66.7% | 94.4% | 75.0% | 70.8% | 81.0% | 83.3% | 55.6% | 73.8% | 75.4% |
| | Extra Credit | 73.3% | 93.9% | 100.0% | 93.3% | 100.0% | 75.0% | 88.9% | 100.0% | ... | ... | 89.1% |
| | Proportions test p-value | 0.627 | 0.137 | 0.029 | 0.894 | 0.058 | 0.745 | 0.632 | 0.205 | ... | ... | 0.005* |
| | | | | | | | | | | | | |
| Money: CIT vs. IIT | Proportions test p-value | 1.000 | 0.586 | 0.653 | 0.074 | 0.745 | 0.303 | 0.632 | 0.505 | 0.157 | 0.434 | 0.844 |
| Extra Credit: CIT vs. IIT | Proportions test p-value | 0.212 | 0.004 | 0.029 | 0.142 | 0.005 | 0.525 | 0.630 | 1.000 | ... | ... | 0.000 |

* Money vs. Extra Credit tests calculated for periods 1-8 only.

Table 3: Scenario 2 Individual Invest Rates – Money vs. Extra Credit

| | | Period | | | | | | | | | | |
|---------------------------|--------------------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Total |
| CIT | Money | 37.5% | ... | 31.0% | 33.3% | 29.2% | 12.5% | 16.7% | 8.3% | 5.6% | 16.7% | 22.5% |
| | Extra Credit | 37.0% | 27.8% | 11.1% | 23.8% | 23.3% | 19.0% | 0.00% | 9.5% | ... | ... | 19.3% |
| | Proportions test p-value | 0.973 | ... | 0.034 | 0.510 | 0.627 | 0.545 | 0.069 | 0.889 | ... | ... | 0.166* |
| | | | | | | | | | | | | |
| IIT | Money | 75.0% | ... | 52.4% | 44.4% | 45.8% | 37.5% | 50.0% | 75.0% | 66.7% | 50.0% | 55.4% |
| | Extra Credit | 75.0% | 66.7% | 63.9% | 44.4% | 70.0% | 54.2% | 88.9% | 80.9% | ... | ... | 67.7% |
| | Proportions test p-value | 1.000 | ... | 0.305 | 1.000 | 0.073 | 0.247 | 0.008 | 0.632 | ... | ... | 0.010* |
| | | | | | | | | | | | | |
| Money: CIT vs. IIT | Proportions test p-value | 0.009 | ... | 0.046 | 0.494 | 0.233 | 0.046 | 0.014 | 0.000 | 0.000 | 0.221 | 0.000 |
| Extra Credit: CIT vs. IIT | Proportions test p-value | 0.007 | 0.019 | 0.000 | 0.173 | 0.000 | 0.015 | 0.000 | 0.000 | ... | ... | 0.000 |

* Money vs. Extra Credit tests calculated for periods 1 and 3-8 only.

Table 4: Scenario 3 Individual Invest Rates – Money vs. Extra Credit

| | | Period | | | | | | | | | | |
|------------------------------|--------------------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Total |
| CIT | Money | 3.3% | 4.2% | 0.0% | 4.2% | 8.3% | 0.0% | 0.0% | 3.3% | 0.0% | 0.0% | 2.7% |
| | Extra Credit | 0.0% | 11.1% | 0.0% | 8.3% | 16.7% | 0.0% | 0.0% | 0.0% | ... | ... | 3.9% |
| | Proportions test p-value | 0.398 | 0.473 | 1.000 | 0.551 | 0.551 | 1.000 | 1.000 | 0.313 | ... | ... | 0.784* |
| | | | | | | | | | | | | |
| IIT | Money | 16.7% | 20.8% | 0.0% | 16.7% | 8.3% | 25.0% | 0.0% | 0.0% | 4.2% | 16.7% | 11.1% |
| | Extra Credit | 14.3% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | ... | ... | 2.0% |
| | Proportions test p-value | 0.818 | 0.137 | 1.000 | 0.027 | 0.213 | 0.064 | 1.000 | 1.000 | ... | ... | 0.001* |
| | | | | | | | | | | | | |
| Money: CIT vs. IIT | Proportions test p-value | 0.085 | 0.081 | 1.000 | 0.156 | 1.000 | 0.064 | 1.000 | 0.313 | 0.312 | 0.140 | 0.001 |
| Extra Credit: CIT vs. IIT | Proportions test p-value | 0.072 | 0.303 | 1.000 | 0.126 | 0.070 | 1.000 | 1.000 | 1.000 | ... | ... | 0.310 |

* Money vs. Extra Credit tests calculated for periods 1-8 only.

Table 5: Scenario 1 Group Coordination – Money vs. Extra Credit

| | | Number Choosing to Invest | | | | X ² test (p-value) <i>d.f.</i> |
|---------------------------|--------------|---------------------------|--------------|--------------|--------------|---|
| | | 0 (%) | 1 (%) | 2 (%) | 3 (%) | |
| CIT | Money | 3 (4.3) | 7 (10.0) | 27 (38.6) | 33 (47.1) | 5.03 (0.081) 3 |
| | Extra Credit | 0 (0.0) | 14 (31.1) | 16 (35.5) | 15 (33.3) | |
| | | | | | | |
| IIT | Money | 2 (2.9) | 8 (11.6) | 29 (42.0) | 30 (43.5) | 8.35 (0.015) 3 |
| | Extra Credit | 0 (0.0) | 1 (2.2) | 14 (30.4) | 31 (67.4) | |
| | | | | | | |
| Money: CIT vs. IIT | | | | | | 0.74 (0.925) 3 |
| Extra Credit: CIT vs. IIT | | | | | | 17.00 (0.000) 2 |

Table 6: Scenario 2 Group Coordination – Money vs. Extra Credit

| | | Number Choosing to Invest | | | | X ² test (p-value) <i>d.f.</i> |
|---------------------------|--------------|---------------------------|--------------|--------------|--------------|---|
| | | 0 (%) | 1 (%) | 2 (%) | 3 (%) | |
| CIT | Money | 33 (48.5) | 24 (35.3) | 11 (16.2) | 0 (0.0) | 1.37 (0.504) 2 |
| | Extra Credit | 33 (51.6) | 25 (39.1) | 6 (9.4) | 0 (0.0) | |
| IIT | Money | 21 (30.9) | 7 (10.3) | 14 (20.6) | 26 (38.2) | 5.24 (0.155) 3 |
| | Extra Credit | 14 (22.2) | 6 (9.5) | 7 (11.1) | 36 (57.1) | |
| Money: CIT vs. IIT | | | | | | 38.30 (0.000) 3 |
| Extra Credit: CIT vs. IIT | | | | | | 55.4 (0.000) 3 |

Table 7: Scenario 3 Group Coordination – Money vs. Extra Credit

| | | Number Choosing to Invest | | | | X ² test (p-value) <i>d.f.</i> |
|---------------------------|--------------|---------------------------|--------------|------------|------------|---|
| | | 0 (%) | 1 (%) | 2 (%) | 3 (%) | |
| CIT | Money | 57 (91.9) | 5 (8.13) | 0 (0.0) | 0 (0.0) | 0.002 (0.965) 2 |
| | Extra Credit | 47 (92.2) | 3 (5.9) | 0 (0.0) | 1 (2.0) | |
| IIT | Money | 45 (71.4) | 15 (23.8) | 3 (4.8) | 0 (0.0) | 12.30 (0.002) 2 |
| | Extra Credit | 49 (96.1) | 1 (2.0) | 1 (2.0) | 0 (0.0) | |
| Money: CIT vs. IIT | | | | | | 9.40 (0.009) 2 |
| Extra Credit: CIT vs. IIT | | | | | | 1.04 (0.594) 2 |

Figure 1: Scenario 1 Investing Rates

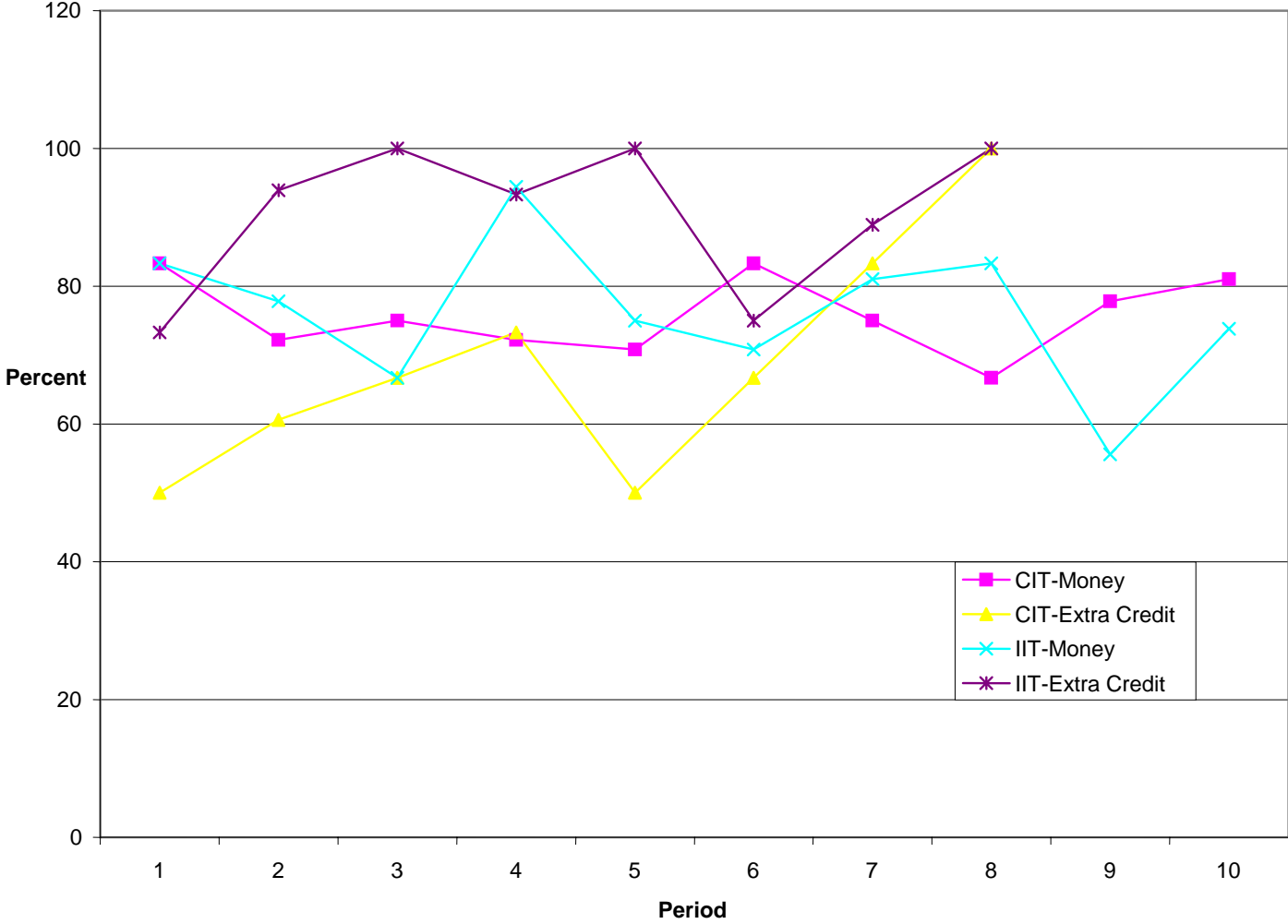


Figure 2: Scenario 2 Investing Rates

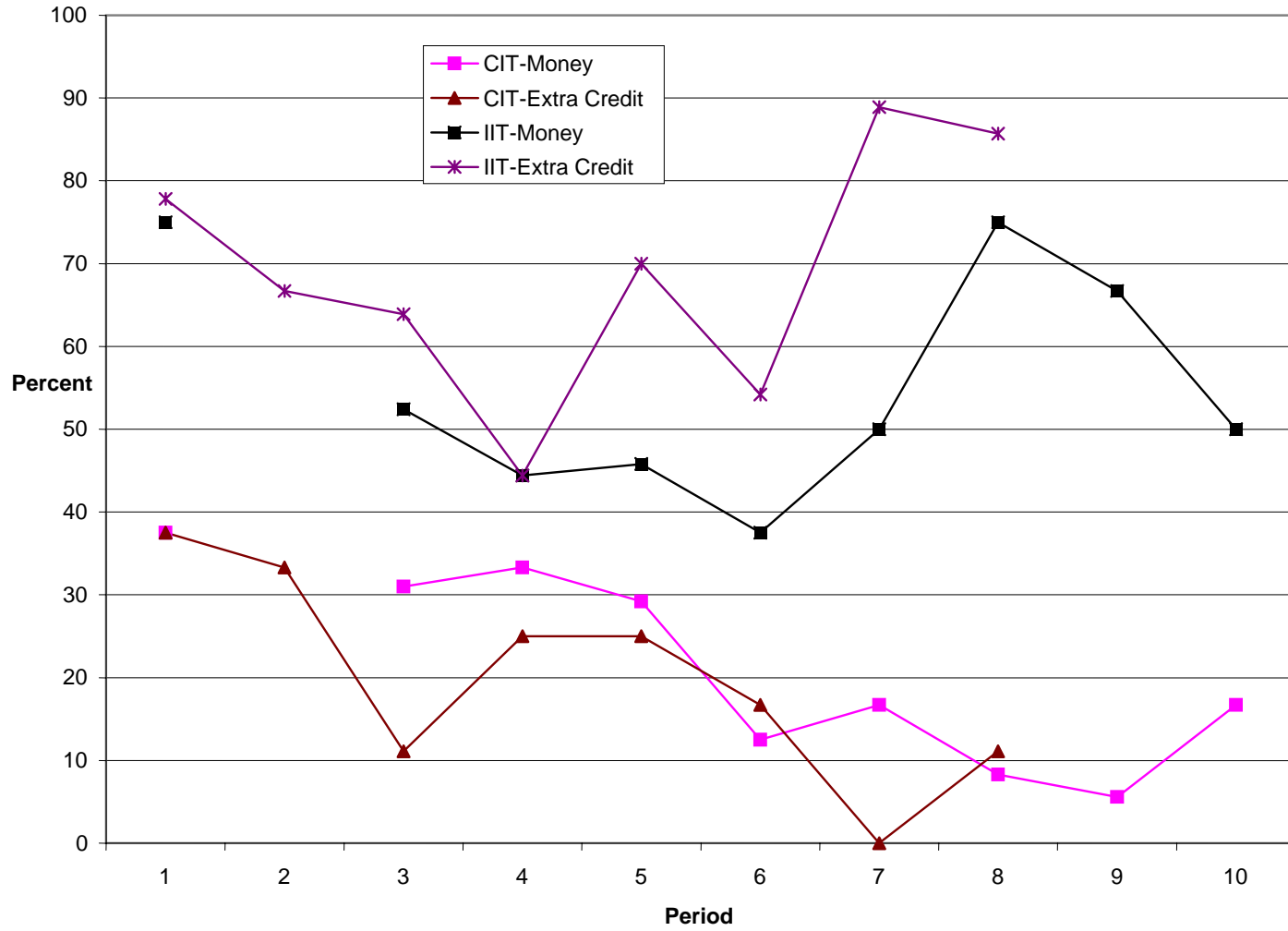
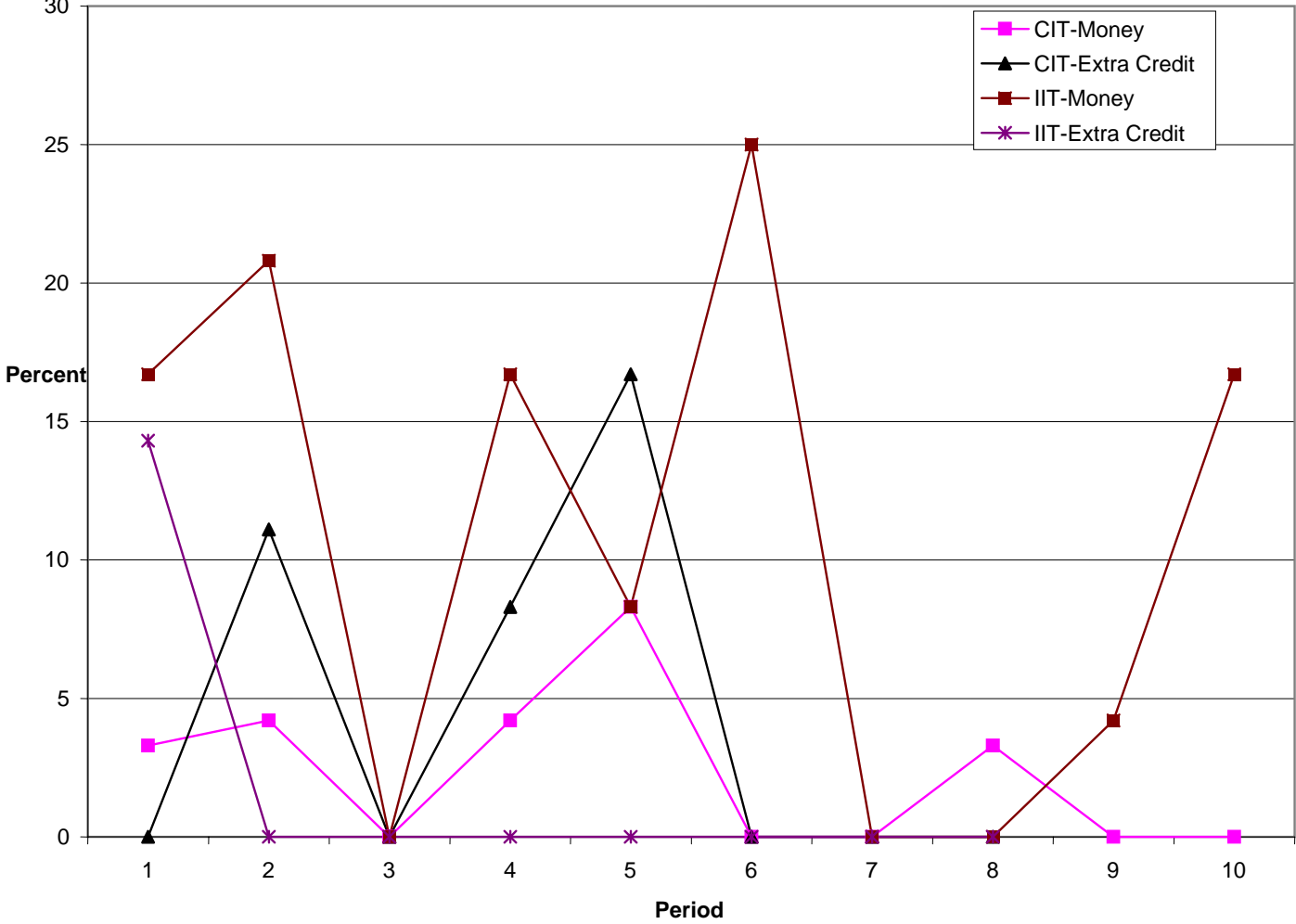


Figure 3: Scenario 3 Investing Rates



APPENDIX

CIT Instructions- Monetary Reward

This is an experiment about decision-making involving 15 participants. You must not talk to the other participants or communicate with them in any way during the experiment. If at any time you have questions, raise your hand and we come to you to answer them.

You have received a folder with a unique five digit code number. You will use this number to collect your earnings at the end of this session.

The experiment consists of 10 rounds. In each round you play an investment game. At the end of each round your earnings will be calculated and announced. You are given a record sheet on which you should record your decision and earnings at the end of each round. Your final earnings will be those of only one round, chosen at random (by the role of a die) at the end of the experiment. Since you don't know which round will determine your earnings, it is important that you make the best decision possible in each round. Your earnings will be paid to you in private at the end of the experiment.

At the end of the experiment you will receive a survey form. Please complete the questions. When you have completed the survey deposit it in the box at the front of the room. You will then be called up to receive your earnings and then you are free to go.

The game

In each round you will be randomly grouped with two other participants. Groups will be reformed each round. You will not be with the same two people more than one round.

At the beginning of each round you will each be given an endowment of \$10. You must decide whether to invest or not invest your endowment in a joint investment project. The project's potential return is randomly determined at the beginning of each round and will vary from round to round. In each round three scenarios are equally likely to happen: Scenario 1 in which potential returns are high, Scenario 2 in which potential returns are average, and Scenario 3 in which potential returns are low. The potential return is the same for you and the other members of your group for that round. Potential returns, however, may vary among groups. The three scenarios are shown below:

| Scenario 1 | Investors (each) | Non-investors (each) | Scenario 2 | Investors (each) | Non-investors (each) | Scenario 3 | Investors (each) | Non-investors (each) |
|----------------|------------------|----------------------|----------------|------------------|----------------------|----------------|------------------|----------------------|
| All invest | 20 | - | All invest | 13 | - | All invest | 0 | - |
| Two invest | 13 | 17 | Two invest | 9 | 15 | Two invest | 0 | 8 |
| One invests | 7 | 14 | One invests | 5 | 12 | One invests | 0 | 9 |
| Nobody invests | - | 10 | Nobody invests | - | 10 | Nobody invests | - | 10 |

Your earnings depend on your decision, the decisions of the others in your group, and the return to the project.

Before we start the game we will practice to make sure you understand the game and your potential earnings.

IIT Instructions- Monetary Reward

This is an experiment about decision-making involving 15 participants. You must not talk to the other participants or communicate with them in any way during the experiment. If at any time you have questions, raise your hand and we come to you to answer them.

You have received a folder with a unique five digit code number. You will use this number to collect your earnings at the end of this session.

The experiment consists of 10 rounds. In each round you play an investment game. At the end of each round your earnings will be calculated and announced. You are given a record sheet on which you should record your decision and earnings at the end of each round. Your final earnings will be those of only one round, chosen at random (by the role of a die) at the end of the experiment. Since you don't know which round will determine your earnings, it is important that you make the best decision possible in each round. Your earnings will be paid to you in private at the end of the experiment.

At the end of the experiment you will receive a survey form. Please complete the questions. When you have completed the survey deposit it in the box at the front of the room. You will then be called up to receive your earnings and then you are free to go.

The game

In each round you will be randomly grouped with two other participants. Groups will be reformed each round. You will not be with the same two people more than one round.

At the beginning of each round you will each be given an endowment of \$10. You must decide whether to invest or not invest your endowment in a joint investment project. The project's potential return is randomly determined at the beginning of each round and will vary from round to round. In each round three scenarios are equally likely to happen: Scenario 1 in which potential returns are high, Scenario 2 in which potential returns are average, and Scenario 3 in which potential returns are low. The potential return is the same for you and the other members of your group for that round. Your earnings depend on your decision, the decisions of the others in your group, and the return to the project. The three scenarios are below:

| Scenario 1 | Investors (each) | Non-investors (each) | Scenario 2 | Investors (each) | Non-investors (each) | Scenario 3 | Investors (each) | Non-investors (each) |
|----------------|------------------|----------------------|----------------|------------------|----------------------|----------------|------------------|----------------------|
| All invest | 20 | - | All invest | 13 | - | All invest | 0 | - |
| Two invest | 13 | 17 | Two invest | 9 | 15 | Two invest | 0 | 8 |
| One invests | 7 | 14 | One invests | 5 | 12 | One invests | 0 | 9 |
| Nobody invests | - | 10 | Nobody invests | - | 10 | Nobody invests | - | 10 |

In each group one member is selected randomly and will be informed which scenario has been assigned to his/her group. The other two members will not know the scenario. At the beginning of the game you get a sheet of paper that tells you whether or not you are the informed member. The game is then played in two stages:

Stage 1: At this stage the informed member observes the scenario and decides whether or not to invest in the project. The uninformed members do not make a decision in this stage. They, however, should pretend that they are making a decision by drawing a circle. It is important not to show your identity to the others.

Stage 2: At this stage the uninformed members will be informed about the decision made by the first person and then will simultaneously decide whether or not to invest in the project. The first mover does nothing at this stage but should pretend that he/she is making a decision by drawing a circle on the paper.

Before we start the game we will practice to make sure you understand the game and your potential earning.

CIT Instructions – Extra Credit Reward

This is an experiment about decision-making involving 15 participants. You must not talk to the other participants or communicate with them in any way during the experiment. If at any time you have questions, raise your hand and we come to you to answer them.

You have received a folder with a unique five digit code number. You will use this number to collect your earnings at the end of this session.

The experiment consists of 10 rounds. In each round you play an investment game. At the end of each round your earnings will be calculated and announced. You are given a record sheet on which you should record your decision and earnings at the end of each round. Your final earnings will be those of only one round, chosen at random (by the role of a die) at the end of the experiment. Since you don't know which round will determine your earnings, it is important that you make the best decision possible in each round. Your earnings will be paid to you in private at the end of the experiment.

At the end of the experiment you will receive a survey form. Please complete the questions. When you have completed the survey deposit it in the box at the front of the room. You will then be called up to receive your earnings and then you are free to go.

The game

In each round you will be randomly grouped with two other participants. Groups will be reformed each round. You will not be with the same two people more than one round.

At the beginning of each round you will each be given an endowment of \$10. You must decide whether to invest or not invest your endowment in a joint investment project. The project's potential return is randomly determined at the beginning of each round and will vary from round to round. In each round three scenarios are equally likely to happen: Scenario 1 in which potential returns are high, Scenario 2 in which potential returns are average, and Scenario 3 in which potential returns are low. The potential return is the same for you and the other members of your group for that round. Potential returns, however, may vary among groups. The three scenarios are shown below:

| Scenario 1 | Investors (each) | Non-investors (each) | Scenario 2 | Investors (each) | Non-investors (each) | Scenario 3 | Investors (each) | Non-investors (each) |
|----------------|------------------|----------------------|----------------|------------------|----------------------|----------------|------------------|----------------------|
| All invest | 20 | - | All invest | 13 | - | All invest | 0 | - |
| Two invest | 13 | 17 | Two invest | 9 | 15 | Two invest | 0 | 8 |
| One invests | 7 | 14 | One invests | 5 | 12 | One invests | 0 | 9 |
| Nobody invests | - | 10 | Nobody invests | - | 10 | Nobody invests | - | 10 |

Your earnings depend on your decision, the decisions of the others in your group, and the return to the project.

Your earnings will be transformed to extra credit points. The extra credit point is $1/4$ of your earning. For example if you earn 20 dollars here your extra credit point will be $20/4=5$.

Before we start the game we will practice to make sure you understand the game and your potential earnings.

IIT Instructions- Extra Credit Reward

This is an experiment about decision-making involving 15 participants. You must not talk to the other participants or communicate with them in any way during the experiment. If at any time you have questions, raise your hand and we come to you to answer them.

You have received a folder with a unique five digit code number. You will use this number to collect your earnings at the end of this session.

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At the end of the experiment you will receive a survey form. Please complete the questions. When you have completed the survey deposit it in the box at the front of the room. You will then be called up to receive your earnings and then you are free to go.

The game

In each round you will be randomly grouped with two other participants. Groups will be reformed each round. You will not be with the same two people more than one round.

At the beginning of each round you will each be given an endowment of \$10. You must decide whether to invest or not invest your endowment in a joint investment project. The project's potential return is randomly determined at the beginning of each round and will vary from round to round. In each round three scenarios are equally likely to happen: Scenario 1 in which potential returns are high, Scenario 2 in which potential returns are average, and Scenario 3 in which potential returns are low. The potential return is the same for you and the other members of your group for that round. Your earnings depend on your decision, the decisions of the others in your group, and the return to the project. The three scenarios are below:

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Your earnings will be transformed to extra credit points. The extra credit point is $1/4$ of your earning. For example if you earn 20 dollars here your extra credit point will be $20/4=5$.

In each group one member is selected randomly and will be informed which scenario has been assigned to his/her group. The other two members will not know the scenario. At the beginning of the game you get a sheet of paper that tells you whether or not you are the informed member. The game is then played in two stages:

Stage 1: At this stage the informed member observes the scenario and decides whether or not to invest in the project. The uninformed members do not make a decision in this stage. They, however, should pretend that they are making a decision by drawing a circle. It is important not to show your identity to the others.

Stage 2: At this stage the uninformed members will be informed about the decision made by the first person and then will simultaneously decide whether or not to invest in the project. The first mover does nothing at this stage but should pretend that he/she is making a decision by drawing a circle on the paper.

Before we start the game we will practice to make sure you understand the game and your potential earning.

Practice Questions

Practice 1

Suppose you are in Scenario 1.

| Scenario 1 | Investors (each) | Non-investors (each) |
|----------------|------------------|----------------------|
| All invest | 20 | – |
| Two invest | 13 | 17 |
| One invests | 7 | 14 |
| Nobody invests | – | 10 |

Please answer the following questions:

- 1) What will you earn if all of you invest in the project?
- 2) What will you earn if nobody invests in the project?
- 3) What will you earn if you invest only by yourself?
- 4) What will you earn if you and one other member invest?

Practice 2

Suppose you are in Scenario 2.

| Scenario 2 | Investors (each) | Non-investors (each) |
|----------------|------------------|----------------------|
| All invest | 13 | – |
| Two invest | 9 | 15 |
| One invests | 5 | 12 |
| Nobody invests | – | 10 |

Please answer the following questions:

- 1) What will you earn if all of you invest in the project?
- 2) What will you earn if nobody invests in the project?
- 3) What will you earn if you invest only by yourself?
- 4) What will you earn if you and one other member invest?

SURVEY

CODE NUMBER _____

1. AGE _____

2. What is your sex? (Circle one number.) 00 Female 01 Male

3. Married? (Circle one number.) 00 NO 01 YES

4. Children? (Circle one number.) 00 NO 01 YES

5. How often do you attend religious services?

00 Never 01 Less than once a month 02 At least once a month

03 Once a week. 04 More than once a week.

6. Are you employed? 00 No 01 Yes, Part time 02 Yes, Full time

7. Which of the following categories best describes you? (Circle one number.)

01 Asian-American/Oriental 02 Black/African-American 03 White/Caucasian

04 Hispanic-Black/Spanish-speaking Black 05 Hispanic-White/Spanish-speaking White

06 Native American/American Indian 07 Other (Please specify: _____)

8. Class (Circle one number)

00 Freshman 01 Sophomore 02 Junior 03 Senior 04 Graduate Student

9. Major (Circle one number)

00 Economics 01 Other Business 02 Psychology 03 Sciences 04 Liberal Arts 05 Other

10. How many Economics classes have you taken at the university level? (Circle one)

None One Two Three Four Five Six More than Six

Please respond to items 11 through 14 by circling the number on the rating scale that best represents your opinion about that item.

Your responses will remain completely anonymous.

| | Strongly Disagree | | | | Strongly Agree |
|--|-------------------|---|---|---|----------------|
| 11. The procedures followed in this experiment preserved your anonymity. | 1 | 2 | 3 | 4 | 5 |
| 12. The money you passed to your designated charity will be sent to the charity. | 1 | 2 | 3 | 4 | 5 |
| 13. The instructions for the experiment were clear and easy to follow. | 1 | 2 | 3 | 4 | 5 |
| 14. The recipients of donations to your designated Charity are deserving of support. | 1 | 2 | 3 | 4 | 5 |