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Trust and Trustworthiness among Economics Majors

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Abstract

We use a simple trust-game to elicit trusting and trustworthy behavior among students majoring in economics and other disciplines. We also administer a Social Values Orientation (SVO) survey to evaluate any possible correlation between an individual's levels of trust indicated in the survey and his/her action in the game. Our results suggest that although students pursuing a major in economics appear to be no different than other students in choosing trusting actions, when it comes to being trustworthy, the former group always chooses the self payoff maximizing action rather than the trustworthy action. Scores from the SVO survey do not help in predicting trusting or trustworthy behavior in our experiment.

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1. Introduction

Trust and Trustworthiness are integral ingredients of social capital. They can influence economic activities at the national level to make a country more prosperous (Arrow 1972, Fukuyama 1995, Knack and Keefer 1997, Putnam 2000, Woolcock and Narayan 2000). Trusting actions are often associated with a calculative move of expecting a trustworthy reaction from the receiver (Rotter 1980; Williamson 1993; Hardin 2002). A trustworthy action on the other hand can be argued to stem from a sense of reciprocity (Camerer 2003, Ostrom and Walker 2003).[1] The two norms together can possibly help in bridging the gap in incomplete contracts by substituting for formal institutions (Carpenter and Cardenas 2006).

We use a simplified trust game to evaluate whether students pursuing an economics major choose trust or trustworthy actions any differently than students pursuing all other majors. Our results suggest that they do indeed. Although the two groups are similar when it came to choosing the trusting action as first movers, the students pursuing economics as a major were significantly less trustworthy than non-economists. We also find that the non-economics students chose reciprocal actions more often at the aggregate – i.e., a trusting action was reciprocated by a trustworthy action, and a non-trusting action was reciprocated by a retributive action.

2. Previous Work

Our paper adds to two areas of experiments. First is the area that compares behavior of economics majors with non-economics majors. Marwell and Ames (1981) were the first to observe that students of economics behaved differently than others. In a public goods dilemma situation they found that the average contribution by economics graduate students were far lower than the average contribution by students of all other subjects. Frank et al. (1993) reported results from a college survey on professors, where professors in economics were found to free ride more on charitable-giving compared to professors from other disciplines. In the same study he also reported results from a prisoner's dilemma game where students of economics defected more often than non-economics students. Carter and Irons (1991) compared freshman and senior economics students to conclude that economics students are in fact 'born' rather than 'made'.

Second, is the recent experimental work that looks at the link between trust and trustworthiness and finds that trusting behavior does not necessarily imply trustworthy behavior. In an interesting experiment design, Chauduri et al. (2003, 2007), Burks et al. (2003) allow subjects to play in the roles of both senders and receivers in a modified trust game (Berg et al. 1995) to evaluate a connection between trust and trustworthiness. Burks et al. find that subjects playing in both roles do not improve trust and trustworthiness. Chaudhuri et al (2003) found that trusting players are not necessarily trustworthy, allowing them to conclude that subjects often appear to be trusting to take advantage of reciprocal behavior and increase payoffs. Chaudhuri and Gangadharan (2007) found that trusting subjects are not always

[1] It is of course possible that actions that appear as trusting and trustworthy are simply an act of kindness without any expectation of personal monetary gain (see Ashraf Bohnet and Piankov 2006, Cox 2004, Dufwenberg and Gneezy 2000).

trustworthy whereas trustworthy subjects are consistently trusting. Ashraf et al. (2006) tested the importance of unconditional kindness in Russia, South Africa and USA using a within subject game triad that separates out conditional trusting behavior from unconditional kindness. They found that expectations of return explain the trusting behavior of first movers while unconditional kindness seems to be a large driving force in trustworthy behavior across all countries.

We implement a design similar to Chaudhuri et al. (2003) to evaluate the connection between trust and trustworthiness. Our focus is on eliciting behavioral differences (if any), between groups of students who are pursuing economics as a major and students who are pursing any other subject as a major. Our results add to the evidence on behavioral difference between economics majors and non-economics majors as well as the literature that dwells on the connection between trust and trustworthiness.

3. Experiment Design

Each subject participated in a Trust Survey first, and made choices in a simplified investment game next.

3.1 Trust Survey: Each subject filled out the SVO trust survey (Yamagishi 1986; Yamagishi & Sato 1986;) at the start of the experiment. The survey consisted of 5 statements to which the subjects had to respond by circling one of the following: strongly disagree, mildly disagree, neutral, mildly agree, or strongly agree (See Appendix). The lowest possible total score possible was 5, indicating least trust, and the highest possible total score was 25, indicating most trust.

3.2 The Game: We use a simplified trust game (McCabe et al. 1998, 2002; Chaudhuri et al. 2003). Figure 1 describes the extensive form of the game. Player 1, the first mover, can choose Top or Bottom; Player 2, the second mover, can choose Left or Right. Player 1's choice of Bottom is indicative of trusting behavior since Player 2 has the option to maximize her own payoff by choosing Left and leave Player 1 with only \$2.50. Player 2's choice of Right after seeing Bottom, is indicative of trustworthy behavior since Player 2 ignores her own payoff maximizing choice to go for the total-payoff maximizing outcome. It is important to point out though that we define trust and trustworthiness similar to Chaudhuri (2003). However, in our single game design we cannot credibly separate trusting and/or trustworthy behavior from other-regarding behavior (See Cox, 2004 for a discussion on how to separate these two motives using a game triad). So our evidence of trusting and/or trustworthy behavior provides only an upper bound of such behavior, and possibly contains some actions that are motivated by other-regarding concerns such as unconditional kindness in addition to any trust or trustworthiness.

The narrow payoff maximizing Subgame-Perfect Nash Equilibrium (SPNE) of the game is the outcome Top-Left, where Player 1 receives \$5 and Player 2 gets \$2.50. The Subgame Joint Profit-Maximizing (SJPM) outcome of this game is Bottom-Right, where player 1 and player 2 each receive a payoff of \$7.50. Contrast this with the outcome Top-Right, where Player 2 possibly acts under other-regarding preferences and chooses to forego \$2.5 for her own self in order to punish Player 1 for not going for the Joint Payoff Maximizing outcome. We will call this outcome as the retributive outcome (Chaudhuri et al. 2003).

The game was presented in an extensive form using action labels in a neutral language to make the dominant strategy Nash Equilibrium more recognizable (Schotter, Weigelt & Wilson 1994, Schotter et al. 1994). Each subject played in the role of Player 1 as well as Player 2 (Chaudhuri et al. 2003, 2007). However, we departed from the Chaudhuri et al. designs in one important respect. We followed the procedure outlined in Cox (2010) to rule out confounds between portfolio effects and decision-making in reversed roles. To be able to identify decision-making in each role individually, a coin was tossed at the end of each session to decide the role that will be chosen to pay all the subjects in the session.[2] This was explained in the instructions.

2.3 Procedure

To ensure that behavior is minimally affected by experimenter contact, we imposed a double blind protocol (Hoffman et al. 1994, 2001; Cox and Deck 2005) in all our sessions. A monitor was in charge of distributing and collecting all decision sheets. Subjects collected payments in sealed envelopes from a third-party who was not present during the experiment. At the beginning of the experiment, subjects picked up either a red or a blue chip with a unique identification number written on it. Students who picked red chips were seated on one side of the classroom and students who picked blue chips were asked to sit on the other side. After subjects completed the trust survey they all made the Player 1 decision of either Top or Bottom on the decision sheet. The monitor took the decision sheets to the other side of the classroom to the Player 2 counterparts using a pre-made matching protocol. Each subject was matched with a different player such that the scope of reputation building was minimal (Chaudhuri, Sopher and Strand 2002; Burks, Carpenter and Verhoogen 2003). This was also explained in the instructions. Subjects then played the role of Player 2 and chose either Left or Right. The decision sheets were then passed back to the appropriate subjects who earlier took decisions in the role of Player 1. After all sheets were returned, subjects recorded their payoffs on the Record Sheet.

A total of 66 (30 economics majors and 36 non-economics majors) Franklin and Marshall College students were recruited for this experiment. The experiment consisted of 5 sessions. All sessions were held in the Behavioral Economics Laboratory at Franklin and Marshall College. The experiment lasted about 30 minutes and the average payoff was $11.16.

3. Results

In Observations 1-5 below, we use tests of proportion.

Observation 1: 56.7% of economics majors and 44.4% of the non-economics majors choose the non-trusting action (Top). The difference is not statistically significant (p value = 0.16). Figure 2 describes the results.

Observation 2: Faced with the non-trusting action (Top), 88.9% of economics and 92.3% of non-economics majors choose left. The difference is not statistically

[2] Note though, we adopt and maintain the underlying assumption of the independence axiom of expected utility theory (Holt 1986) to claim separability of the possible confound between role reversal and portfolio effects. On the other hand, if one assumes the dual independence axiom (Yaari 1987) such a separation in our design is not credible anymore (See Cox, 2010 for a discussion on this point).

significant (p value=0.75). Figure 3 describes the results.

Observation 3: Faced with the trusting action (Bottom), 25% of economics majors and 60.9% of non-economics majors choose the trustworthy action. This difference is statistically significant (p value =0.02). Figure 4 describes the results.

Observation 4: Compared to the economics majors (10%), non-economics majors (38.9%) are significantly more reciprocal (p value=0.00), i.e., faced with the trusting (non-trusting) action of Top (Bottom) they choose Right more often. Figure 5 describes the results.

Observation 5: Non-economics majors are significantly more *consistent* between their trusting and trustworthy actions than students who major in economics (p value =0.08). We define a subject to be consistent if she chooses the trusting action (Bottom) as Player 1, and faced with a trusting action by Player 1 chooses the trustworthy action (Right) as Player 2. We define a subject to be inconsistent if she chooses the trusting action (Bottom) as Player 1, and faced with a trusting action by Player 1 chooses the selfish action (Left) as Player 2. Figure 6 describes the results. In our sample consisting of economics major, everyone who faced the trusting action as player 2, and had chosen the trusting action while playing in the role of player 1, defected to choose the self payoff-maximizing outcome. In contrast, 40% of the non-economics majors who faced the trusting action as player 2, and had chosen the trusting action playing in the role of player 1, chose the trustworthy action.

Observation 6: The SVO trust scores, similar to Chaudhuri (2003), do not seem to be a good predictor of trusting or trustworthy actions as defined in our game. The lowest trust-score in our sample was 7 and the highest 19. The mean trust-score was 12. We do not find any significant difference in the trust scores of our two groups (p value =0.24). We estimated a probit model with robust standard errors (see Table 1). In specification 1(column 1, Table 1) we find that higher trust scores do not significantly predict the choice of Bottom. In specification 2, (column 2, Table 1) we only look at behavior of subjects who faced the first player decision of Bottom. Again we find that choice of "Right" is not determined significantly by trust scores. We also find that higher trust-scores are not a significant predictor of reciprocal behavior (column 3, Table 1). It is possible that the compounding of unconditional kindness with trusting and/or trustworthy behavior in our single game design exacerbates this lack of significance.

4. Conclusion

Trust games can be thought of as simple models of contracting with moral hazard that are devoid of any contractual enforcement. The amount passed on to the second mover measures trust, and the amount passed back measures trustworthiness. We used a simplified trust game to look at trusting and trustworthy behavior among students majoring in economics, and majoring in all other disciplines. At first blush we find that similar proportion of economics and non-economics students chose the trusting and not-trusting actions as first movers. The subjects also behaved similarly faced with a non-trusting action, and played the dominant strategy equilibrium. Faced with a "Top" at the Player 2 decision node, about 89% of economics majors and 92% of non-economics majors chose "Left".

The difference however, appears in trustworthy behavior. When it came to choosing between the Subgame Joint Profit-Maximizing (SPJM), and the self-payoff maximizing outcome (at the expense of exploiting the trust of others), there is a significant difference between choices of economics and non-economics majors. Faced with a trusting action, 75% of economics majors chose the payoff maximizing choice of "Left" instead of the trustworthy choice of "Right". In contrast, only 39% of the non-economics students chose the payoff-maximizing choice when faced with the trusting action. Further, all "trusting" economics majors faced with the trusting action "Bottom," chose "Left" to maximize their own payoffs. This suggests that the choice of Bottom by economics students probably stems mostly out of a strategic aim to exploit the trustworthiness of the second mover. When it came to non-economics majors, about 39% of students who chose trusting actions as player 1, faced with a trusting action from Player 1 reciprocated the trust and chose trustworthy action (Right). We also find that non-economics majors behave more reciprocally overall – they reciprocate trusting behavior with trustworthy behavior, and non-trusting behavior with retributive behavior. Finally, the SVO trust survey does not appear to be good predictor of trusting or trustworthy actions in our sample.

References

1. Arrow, K.J. (1972). "Gifts and Exchanges". *Philosophy and Public Affairs,* 1, 343-62.
2. Ashraf, N., Bohnet, I., & Piankov, N. (2006). "Decomposing trust and trustworthiness", *Experimental Economics*, 9(3),193-208.
3. Berg, J., Dickhaut, J., & McCabe, K. (1995). "Trust, Reciprocity and Social History". *Games and Economic Behavior*, 10,122-42.
4. Burks, S., Carpenter, J., & Verhoogen. E. (2003), "Playing both roles in the trust game: The golden rule and Machiavellian behavior", *Journal of Economic Behavior and Organization*, 51(2), 195-216.
5. Camerer, C.F. (2003). *Behavioral Game Theory*. Princeton University Press.
6. Carter, J., & Irons, M. (1991). "Are Economists Different, and If So, Why?" *The Journal of Economic Perspectives*, 5(2), 171-177.
7. Carpenter, J. & Cardenas, J.C. (2006). "Behavioural Development Economics: Lessons from field labs in the developing world". *Middlebury College Economics Discussion Paper No. 06-16*.
8. Chaudhuri, A., & Gangadharan, L. (2007). "An Experimental Analysis of Trust and Trustworthiness", *Southern Economic Journal*, 73(4), 959-985.
9. Chaudhuri, A., Ali Khan, S., Lakshmiratan, A., Py, A.L., & Shah, L. (2003). "Trust and trustworthiness in a sequential bargaining game", *Journal of Behavioral Decision Making,* 16(5), 331-40.
10. Chaudhuri, A., Sopher, B., & Strand, P. (2002). "Cooperation in social dilemmas, trust and reciprocity". *Journal of Economic Psychology*. 23(2), 231-49.
11. Cox, J. C. (2010). "Some Issues of Methods, Theories, and Experimental Designs". *Journal of Economic Behavior and Organization*. 73, 24-28.
12. Cox, J.C. & Deck, C.A. (2005). "When Are Women More Generous than Men?" *Economic Inquiry*, 44(6), 587-98.
13. Cox, J. C. (2004). "How to identify trust and reciprocity". *Games and Economic Behavior, 46*, 260-281.
14. Croson, R., & Buchan, N. (1999). "Gender and culture: International experimental evidence from trust games", *American Economic Review Papers and Proceedings*, 89(2), 386-91.
15. Frank, Robert H & Gilovich, Thomas & Regan, Dennis T. (1993), "Does Studying Economics Inhibit Cooperation?"*Journal of Economic Perspectives*, 7(2), 159-71.
16. Hardin, R. (2002). "*Trust and Trustworthiness*". New York. Russel Sage.
17. Hoffman, E., McCabe, K.A. & Smith, V.L. (1994). "Social Distance and Other-Regarding Behavior in Dictator Games". *American Economic Review*, 86(3), 653-660.
18. Holt, C.A. (1986). "Preference reversals and the independence axiom". *American Economic Review*, 76, 508-514.
19. Fukuyama, F. (1995). "*Trust: The social virtues and creation of prosperity"*. New York: Free Press.
20. Knack, S., & Keefer, P. (1997). "Does social capital have an economic payoff? A cross-country investigation." *Quarterly Journal of Economics*, 112(4), 1251-88.
21. Marwell, G. & Ruth, A. (1981). "Economists Free Ride, Does Anyone Else?" *Journal of Public Economics*, 15, 295-310.
22. McCabe, K, Rassenti, S., & Smith, V. (1998). "Reciprocity, trust, and payoff privacy in extensive form bargaining games". *Games and Economic Behavior*, 24, 10-24.

23. McCabe, K., Rigdon, M. & Smith, V. (2002). "Cooperation in Single Play, Two-Person Extensive Form Games Between Anonymously Matched Players". Chapter 3 in Rami Zwick and Amnon Rapoport (Eds.), Experimental Business Research, Kluwer Academic Publishers, Norwell, MA and Dordecht, The Netherlands.
24. Ostrom, E. & Walker, J. (2003). (eds.), *Trusty and Reciprocity*. New York: Russel Sage.
25. Parks, C.D. and L. G. Hulbert, (1995), "High and Low Trusters' Responses to Fear in a Payoff Matrix", *Journal of Conflict Resolution*, 39(4), 718-30.
26. Putnam, R. (2000). "B*owling alone: The collapse and revival of American community*". New York: Touchstone.
27. Rotter, J. (1980). "Interpersonal trust, trustworthiness and gullibility". *American Psychologist*, 35, 1-7.
28. Schotter, A., Weigelt, K. & Wilson, C. (1994). " A Laboratory Investigation of Multiperson Rationality and Presentation Effects". *Games and Economic Behavior*, 6, 445-68.
29. Williamson, O.E. (1993). "Calculativeness, trust and economic organization". *Journal of Law and Ethics*, 36, 453-486.
30. Woolcock, M. & Narayan, D. (2000). "Social Capital: Implications for Development Theory, Research, and Policy". *World Bank Research Observer*, 15(2), 225-249.
31. Yamagishi, T., (1986). "The Provision of Sanctioning as a Public Good", *Journal of Personality and Social Psychology,* 51 (1), 110-116.
32. Yaari, M.E. (1987). "The dual theory of choice under risk". *Econometrica,* 55, 95-115.
33. Yamagishi, T. and K. Sato, (1986), "Motivational Bases of the Public Goods Problem", *Journal of Personality and Social Psychology,* 50(1), 67-73.

Appendix: Subject Instructions

SUBJECT ID_____

INSTRUCTIONS

Welcome to today's experiment. You will receive $5 for participation, and in addition, another amount in cash that depends on your choices in the tasks described below.

As you enter you will pick up a colored chip. If you get a red chip, you should be seated on the left side of the classroom and if you got a blue chip you should be on the right.

The colored chip also has an ID code written on it. This is your ID code for the duration of the experiment. Please write this code anywhere you see 'Subject ID.' The first is on the top right hand corner of this page. At the end of this experiment, you should have filled 6 total spaces.

To protect privacy and experiment results, this ID code must not be revealed to anyone else. Any participant found doing so will be disqualified from the experiment.

A monitor will read the instructions aloud. Please follow along and ask any questions you may have before the experiment begins.

This is an experiment in decision-making, and all payoffs are denoted in dollars and cents. These earnings will be paid to you in cash at the end of the experiment.

Your payments will be ready an hour after the conclusion of the experiment. You will be paid in sealed envelopes containing the amount you marked to keep for yourself in this task. You will pick up the envelope from Tami Lantz (Economics Department Coordinator) at Stager 319 in exchange for the ID-code colored chip that you retain from today.

[YOU MUST HAVE YOUR ID-CODE CHIP TO RECEIVE PAYMENTS.]

The experiment consists of two parts.

Part 1:

Part one consists of a short 5-question survey. You must answer each question.

Subject ID: _____

Major: _____

For each of the five questions below, please circle one of the five options given.

Question 1. Most people tell a lie when they can benefit by doing so.

Strongly Disagree	Mildly Disagree	Neutral	Mildly Agree	Strongly Agree

Question 2. Those devoted to unselfish causes are often exploited by others.

Strongly Disagree	Mildly Disagree	Neutral	Mildly Agree	Strongly Agree

Questions 3. Some people do not cooperate because they pursue only their own short-term self-interest. Thus, things that can be done well if people cooperate often fail because of these people.

Strongly Disagree	Mildly Disagree	Neutral	Mildly Agree	Strongly Agree

Question 4. Most people are basically honest.

Strongly Disagree	Mildly Disagree	Neutral	Mildly Agree	Strongly Agree

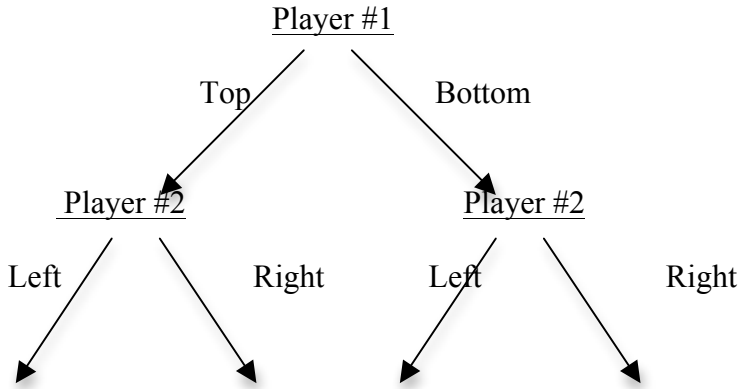
Question 5. One should not trust others until one knows them well.

Strongly Disagree	Mildly Disagree	Neutral	Mildly Agree	Strongly Agree

Part 2:

Part two consists of a decision making game and will be conducted in pairs. Each of you has been paired with a person from the other side of this classroom (red chips paired with blue chips). The identity of these pairs will not be revealed.

This is a sequential game, with one player designated as Player 1 and the other as Player 2. To start the game, Player 1 will choose between two strategies: Top or Bottom. Player 2 will get to see what Player 1 chose and will respond by picking between the strategies; Left and Right. The payoff to each player depends on the choices made by both. To understand how the game works please look at the diagram below.



Payoffs:

PLAYER 1:	\$5	\$ 1.50	\$ 2.50	\$ 7.50
PLAYER 2:	\$2.50	\$ 1.50	\$ 10	\$ 7.50

If Player 1 chooses Top and Player 2 chooses Left, then Player 1 gets \$5 and Player 2 gets \$2.50.
If Player 1 chooses Top and Player 2 chooses Right, then Player 1 gets \$1.50 and Player 2 gets \$1.50
If Player 1 chooses Bottom and Player 2 chooses Left, then Player 1 gets \$2.50 and Player 2 gets \$10
If Player 1 chooses Bottom and Player 2 chooses Right, then Player 1 gets \$7.50 and Player 2 gets \$7.50.

Each participant will play both roles in this experiment. You will not be paired with the same person twice. In one pair you will be Player 1 while in the other pair you will be the Player 2.
Note: You will receive your payoff from either your role as Player 1 or as Player 2. This will be randomly determined at the end of the experiment by a coin toss.

SUBJECT ID_____

The decisions made by each player will be conveyed using the Decision Sheet. Please take a look at the decision sheet now. You as Player 1 will first record your decision on the decision sheet. The monitor will then collect these and take it to the other side of the classroom and given to the Player 2 you are paired with.

Please show your ID code to me when the monitor comes around to give you the Decision Sheet from the Player 1 you are paired with.

After you receive the Decision sheet from your paired Player 1, you will now play the role of Player 2. You as Player 2 will record your decision on the decision sheet. The monitor will collect these and return them to the Player 1 you are paired with. The original Decision Sheet you had will be brought back to you after Player 2 has made a decision.

Each player will make a Player 1 decision first. This will be followed by each person making a Player 2 decision.

You will record your payoffs in the Record Sheet. Please take a look at the Record Sheet now. When you are Player 1, you will enter your Player 1 decision in the appropriate box. After you have seen the decision Player 2 has made, please record your payoff in the appropriate box. When you are Player 2, you will be informed of what the Player 1 you are paired with has decided and will then make your decision and enter the corresponding payoff in the appropriate box on the Record Sheet.

After all the boxes on the Record Sheet and Decision Sheet are filled, the monitor will collect all the sheets from you. Once again, please retain your colored chips so that you can collect your payoffs from Tami Lantz in Stager 319, an hour after the experiment. After all the sheets are collected, you will be instructed to leave the experiment.

Thank you for your time!

Record Sheet

SUBJECT ID _____		
As Player 1		
I CHOSE	PLAYER 2 CHOSE	PAYOFF
As Player 2		
PLAYER 1 CHOSE	I CHOSE	PAYOFF
	TOTAL PAYOFF=	

Decision Sheet

Player # 1 (Subject ID _____)

☐ TOP

☐ BOTTOM

(Check a box)

Player # 2 (Subject ID _____)

☐ LEFT

☐ RIGHT

Figures

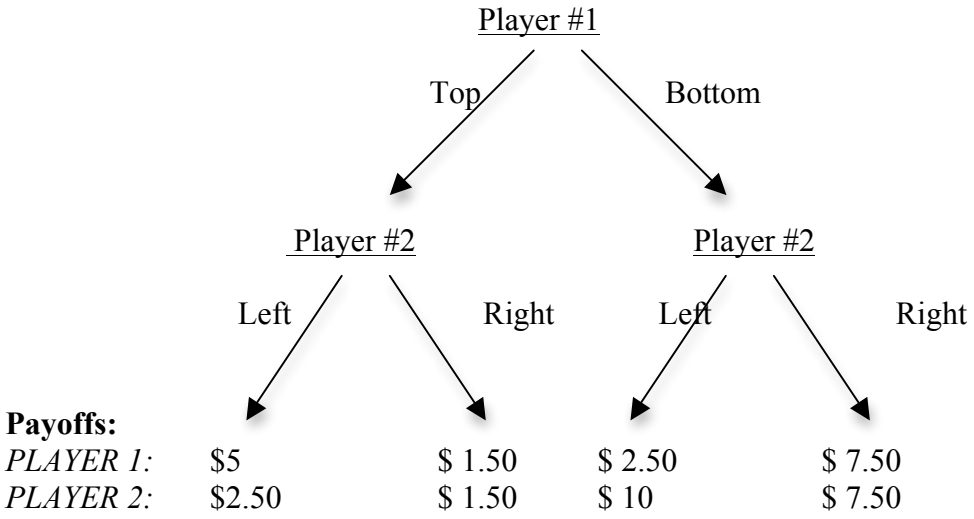


Figure 1: The Trust Game

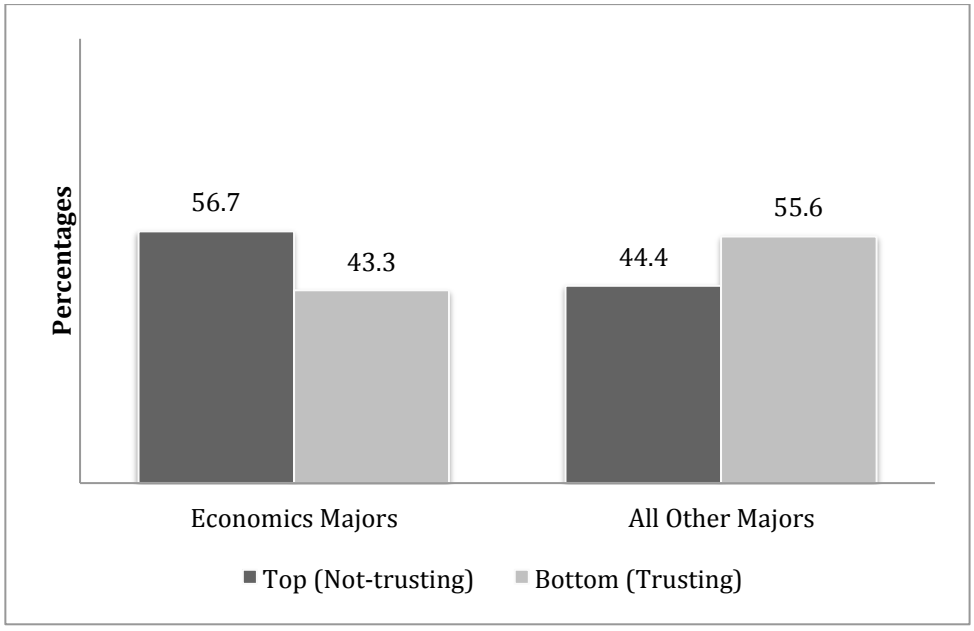


Figure 2: Student Choices: By Major of Study

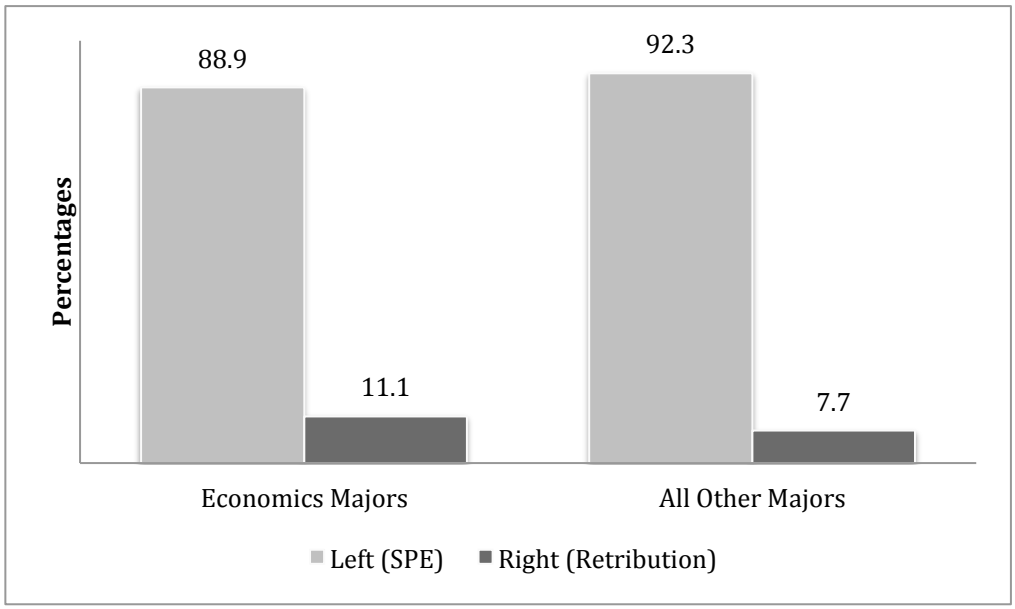


Figure 3: Decision as Player 2 (faced with Player 1's Decision of Top): By Major of Study

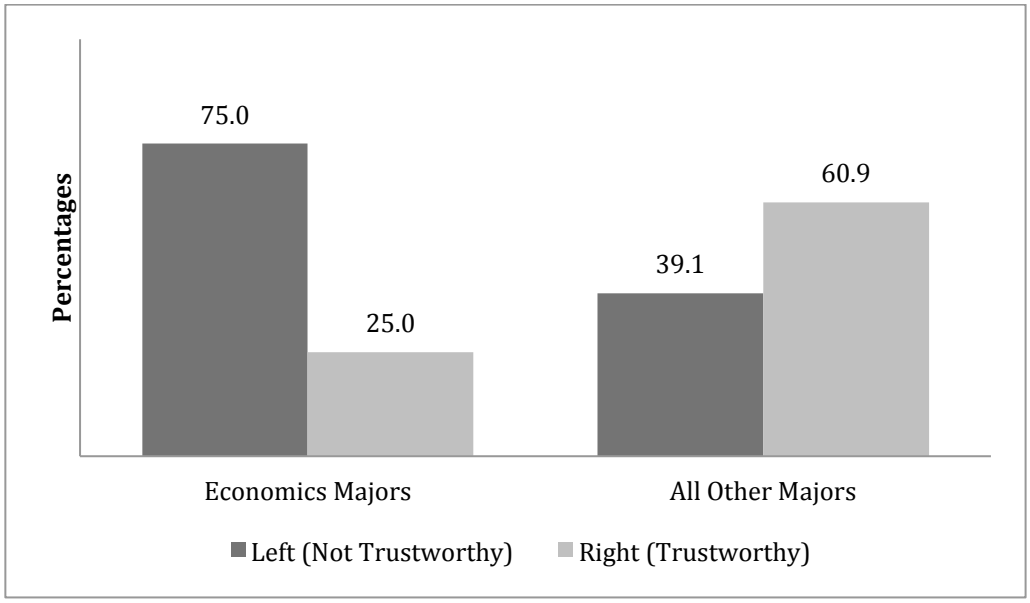


Figure 4: Decision as Player 2 (faced with Player 1's Decision of Bottom): By Major of Study

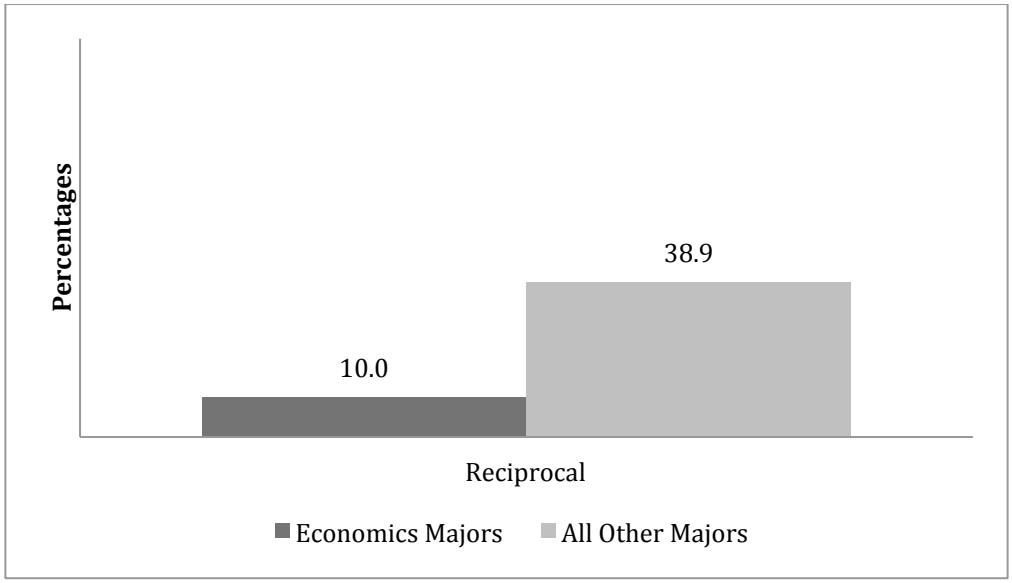


Figure 5: Reciprocal Behavior: By Major of Study

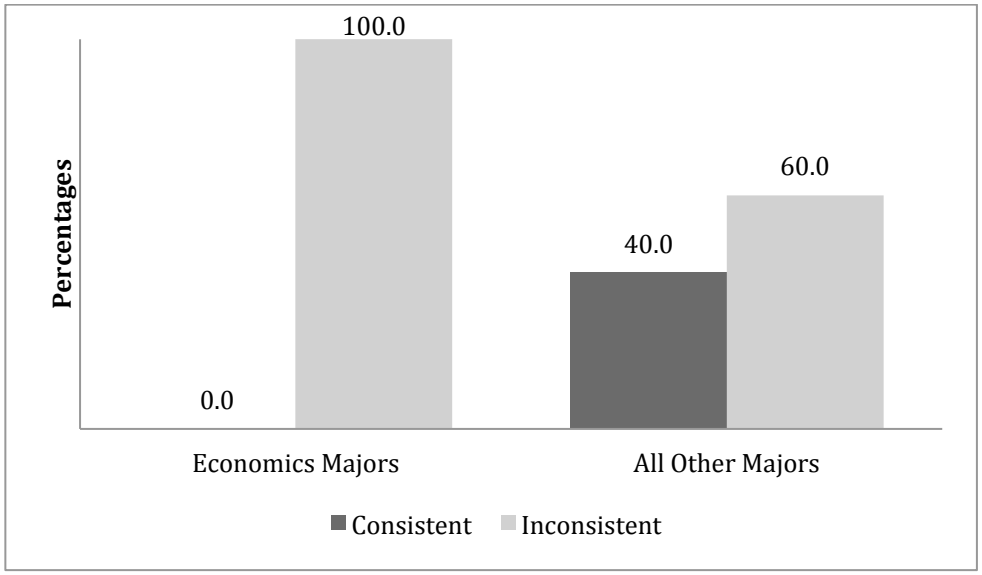


Figure 6: Consistency of Choices: By Major of Study

Tables

Table 1: Probit regressions

	Dependent Variable		
	Bottom (1)	Right (2)	Reciprocal (3)
Major of Study	-0.13	-0.36**	-0.28**
	(0.12)	(0.16)	(0.09)
Trust score	0.01	0.03	-0.01
	(0.02)	(0.04)	(0.01)
N	66	35	66

* Denotes significance at the 10% level ** denotes significance at the 5% level and *** denotes significance at the 1% level. Standard errors are in parenthesis.

In specification (1),(2) and (3), students pursuing majors other than economics is the reference group.