Impure Altruism and Impure Selfishness: Online Appendix

Kota SAITO*

California Institute of Technology

May 6, 2015

Abstract

We provide an extention of GU model that incorporates a decision maker who is averse to inequality of allocations among other agents. We also provide a detaled discussion on the experiments on dictator games with an exit option.

1 Introduction

This Online Appendix contains two sections. In the first section, we provide an extention of GU model that incorporates a decision maker who is averse to inequality of allocations between other agents. In the second section, we provide a detaled discussion on the experiments on dictator games with an exit option.

2 Extension

In this section, to incorporate inequality aversion, we axiomatize an extended GU model, in which u_S is a maxmin utility function. We consider a decision maker who is averse to

*Email: saito@caltech.edu

inequality of allocations among other agents. However, the decision maker is not inequality averse between himself and another agent. This is an important limitation of this extention.

It is well known that the independence axiom may fail in social context because mixtures among allocations can offset inequality in the mixed allocation. However, mixing with constant allocations does not offset inequality. Hence, we keep the following weaker version of the independence axiom:

Definition: A set $C \in \mathscr{A}$ is called *constant over* S if $p_i = p_j$ for any $i, j \in S$ and $p \in C$.

Axiom (Weak Independence): Let $\alpha \in [0,1]$ and $A, B, C \in \mathscr{A}$. Suppose that C is constant over S. Then $A \succsim B$ if and only if $\alpha A + (1-\alpha)C \succsim \alpha B + (1-\alpha)C$.

We need an additional axiom to make sure that $\succsim_1$ and $\succsim_S$ well-defined.[1]

Axiom (Separability): For all $p_1, q_1, l_1, r_1 \in \Delta(Z)$ and $p_S, q_S, l_S, r_S \in (\Delta(Z))^S$, (i) $(p_1, l_S) \succsim (q_1, l_S)$ if and only if $(p_1, r_S) \succsim (q_1, r_S)$; (ii) $(l_1, p_S) \succsim (l_1, q_S)$ if and only if $(r_1, p_S) \succsim (r_1, q_S)$.

The next axiom captures inequality aversion among other agents' allocations.

Axiom (Quasi-Concavity) For any $p_S, q_S \in (\Delta(Z))^S$, if $p_S \sim_S q_S$, then $\frac{1}{2}p_S + \frac{1}{2}q_S \succsim_S p_S$.

Corollary: *The following statements are equivalent:*
(a) $\succsim$ *satisfies Quasi-Concavity, Weak Independence, and Separability as well as the axioms in the theorem except Independence.*
(b) There exists an extended GU model in which $\sum_{i \in S} \alpha_i u(p_i) = \min_{\alpha_S \in C} \sum_{i \in S} \alpha_i u(p_i)$ *for some* $C \subset \Delta(S)$.

Proof: It is easy to see the necessity of the axioms. To show the sufficiency it suffices to show the following two lemmas. First, instead of Lemma 1, we prove the next lemma by using the standard argument with the von Neumann-Morgenstern's theorem and Gilboa and Schmeidler's (1989) theorem.

Lemma 1 *There exist a mixture linear function* u_1 *on* $\Delta(Z)$ *and a closed subset* C *of* $\Delta(S)$ *such that (i)* u_1 *represents* $\succsim_1$ *on* $\Delta(Z)$*, (ii) there exist* $\overline{z}, \underline{z} \in Z$ *such that* $u_1(\overline{z}) = 1 \geq$

[1] I appreciate a referee who points out the necessity of this axiom.

$u_1(p) \geq 0 = u_1(\underline{z})$ *for all* $p \in \Delta(Z)$*, and (iii)* $\sum_{i\in S} \alpha_i u(p_i) \equiv \min_{\alpha\in C} \sum_{i\in S} \alpha_i u_1(p_i)$ *represents* $\succsim_S$*.*

Given the above u_1 and u_S, we define $\succsim^*$ in the same way as in the proof of theorem. Weak Independence of $\succsim$ on $\mathscr{A}$ implies Independence of $\succsim^*$ on $\mathscr{A}^*$.

Lemma 2 $\succsim^*$ *satisfies Independence*.*

Proof of Lemma 2: Fix $C^* \in \mathscr{A}^*$. For all $x \in [0,1]$, define $p(x) = x\delta_{\overline{z}} + (1-x)\delta_{\underline{z}}$ and $p_S(x) = (p(x))_{i\in S}$. Then, for all $\boldsymbol{u} \equiv (u_1, u_S) \in [0,1]^2$, $u_1(p(u_1)) = u_1$ and $\sum_{i\in S} \alpha_i u(p_i(u_S)) = u_S$. Define $C = \{(p(u_1), p_S(u_S)) | \boldsymbol{u} \equiv (u_1, u_S) \in C^*\}$. Then, C is constant over S and $\boldsymbol{u}(C) = C^*$. Therefore, by Weak Independence, $A^* \succsim^* B^* \Leftrightarrow A \succsim B \Leftrightarrow \alpha A + (1-\alpha)C \succsim \alpha B + (1-\alpha)C \Leftrightarrow \alpha A^* + (1-\alpha)C^* \succsim^* \alpha B^* + (1-\alpha)C^*$. □

Since $\succsim^*$ satisfies the same properties as in the proof of the theorem, Lemma 4–8 hold in the same way. Hence, the sufficiency of the axioms holds with $u_1 = u_1(p_1)$ and $u_S = \min_{\alpha\in C} \sum_{i\in S} \alpha_i u_1(p_i)$. Therefore, Corollary holds. ■

3 Discussion on Experiments

In the experiments conducted by Lazear et al. (2012), we could observe that medium-level donors exit more often than low-level and high-level donors, when playing the dictator game is subsidized. In the experiments, 96 subjects (48 dictators) participated in five sequential sessions of dictator games with an exit option. Lazear et al. (2012) provided dictators with \$10 as baseline endowment and, on top of that, added subsidies of \$0, \$1, \$3, \$6, and \$10 to the baseline endowment in order. For each subsidy value, dictators decided whether to play the dictator game or exit. Then, the dictators decided the donation amount publicly if they did not exit. For each dictator, the left figure in Figure 3 in the main paper (Figure 1 of this Online Appendix) shows the minimal subsidy needed to play the dictator game and the dictator's average donated proportion.[2] Clearly, the figure shows tendency (i).[3]

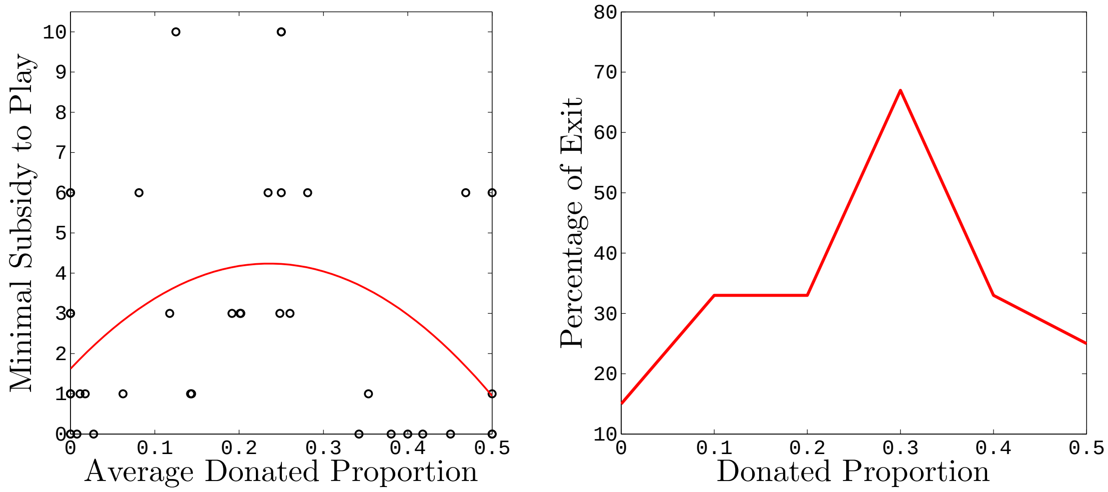

Figure 1: Figure 3 in the main paper: The relationship between donations and the choice of exit in Lazear et al. (2012) (left) and Dana et al. (2006) (right). (In the left figure, each point shows the choice of each subject. The curve is a smooth approximation of the choices. The right figure shows the percentage of subjects who existed, depending on the proportions of their donations.)

We found consistent evidence for the tendency in the earliest experiments on dictator games with an exit option conducted by Dana et al. (2006). Dana et al. (2006) provided dictators with \$10 as an endowment and asked dictators the donation amount before the dictators knew that they could exit privately. When the dictators exited, they obtained \$9 privately and receivers obtained \$0 without knowing that this is a consequence of the dictators' choice. The right figure in Figure 3 shows the percentage of dictators who exited and their (intended) donated proportion, which clearly exhibits the tendency.[4]

In the experiment conducted by Dana et al. (2006), dictators were anonymous, while in the treatment conducted by Lazear et al. (2012), receivers could identify dictators. Hence,

[2]We regressed donated proportion on subsidy size. The estimated coefficient on the subsidy size is $-1.6 \cdot 10^{-4}$ ($p = 0.887$), which is not significantly different from zero. Hence, the donated proportion is statistically constant across the treatments.

[3]We made the left figure of Figure 3 based on the no-anonymity treatment in Experiment 2 in Lazear et al. (2012).

[4]We made the right figure of Figure 3 based on Figure 1 (p.197) in Dana et al. (2006).

the consistency between these two experiments, as captured by Figure 3, would support our hypothesis: as long as playing dictator games is common knowledge among subjects, the dictator would consider the receiver's wish that the dictator should act altruistically. Hence, the dictator could feel pride in acting altruistically by living up to the receiver's wish and ashamed of acting selfishly by denying their wish, even though the receiver could not identify the dictator.

References

[1] Dana, J., Cain, D. M., and R. M. Dawes, What You Don't Know Won't Hurt Me, Organizational Behavior and Human Decision Processes 100 (2006) 193–201.

[2] Gilboa, I. and D. Schmeidler, Maxmin Expected Utility with a Non-unique Prior, Journal of Mathematical Economics 18 (1989) 141–153.

[3] Lazear, E. P., Malmendier, U., and R. A. Weber, Sorting in Experiments with Application to Social Preferences, American Economic Journal: Applied Economics 4 (2012) 136–163.