14.127 Behavioral Economics. Lecture 11

Fairness

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1 Fairness

- Fehr and Schmidt, QJE 99

1.1 Stylized facts

- Ultimatum game
  - proposer gets $1 and propose a share s to the respondent
  - respondent accepts (payoffs $(1 - s, s)$) or rejects (payoffs $(0, 0)$)
  - typical strategy $s = .3$

- Market game with multiple proposers
  - 1 responder and $n - 1$ proposers
  - R accepts the highest offer
  - empirically $s = 1$

- Market game with multiple responders
  - $n - 1$ responders and 1 proposer
  - if at least one responder accepts, the contract is executed (responder share is divided between all responders that accepted)
  - empirically $s = 0$

1.2 Model

- Utility of a player i from allocation $(x_1, ..., x_n)$ to all n players is

$$U_i(x_1, ..., x_n) = x_i - \frac{\alpha_i}{n-1} \sum \left(x_j - x_i\right)^+ - \frac{\beta_i}{n-1} \sum \left(x_i - x_j\right)^+$$

where α_i, β_i are parameters, $0 \leq \beta_i \leq \alpha_i$, $\beta_i < 1$, and $y^+ = \max(y, 0)$.

- The assumption $\beta_i < 1$ means that player i always prefers having more rather than less (keeping allocations of others unchanged).

- Marginal effects

$$\frac{\partial U_i}{\partial x_j} = -\frac{\alpha_i}{n-1} 1_{x_j - x_i > 0} + \frac{\beta_i}{n-1} 1_{x_i - x_j > 0}$$

for $x_j \neq x_i$.

- Thus, U_i is increasing in x_j if $x_j < x_i$ and decreases in x_j if $x_j > x_i$.

1.3 Application: Ultimatum Game

- 2 players, proposer (1) and responder (2), an offer s leads to $x_1 = 1 - s$ and $x_2 = s$.

- $U_2(s) = s - \alpha_2 (x_1 - x_2)^+ - \beta_2 (x_2 - x_1)^+ = s - \alpha_2 (1 - 2s)^+ - \beta_2 (2s - 1)^+$

- Assume $s < \frac{1}{2}$. Then the responder accepts iff U_2 is positive, i.e. $s \geq s^* = \frac{\alpha_2}{1+2\alpha_2}$

- If $s \geq \frac{1}{2}$ then the responder accepts as then

$$U_2 = s + \beta_2 - 2\beta_2 s > s^2 + \beta_2^2 - 2\beta_2 s = (s - \beta_2)^2 \geq 0$$

- Assume $s > \frac{1}{2}$. Then the responder accepts iff U_2 is positive, i.e. $s \geq s^* = \frac{\alpha_2}{1+2\alpha_2}$

- $U_1(s) = x_1 - \alpha_1 (x_2 - x_1)^+ - \beta_1 (x_1 - x_2)^+ = 1 - s - \alpha_1 (2s-1)^+ - \beta_1 (1-2s)^+$

- Hence
$$\frac{\partial U_1}{\partial s} = -1 - 2\alpha_1 1_{2s-1>0} - 2\beta_1 1_{1-2s>0} = \begin{cases} -1 + 2\beta_1 & \text{if } s < \frac{1}{2} \\ -1 - 2\alpha_1 & \text{if } s > \frac{1}{2} \end{cases}$$
for $s \neq \frac{1}{2}$.

- If $\beta_1 < \frac{1}{2}$ then $s = s^*$

- If $\beta_1 > \frac{1}{2}$ then $s = \frac{1}{2}$.

- If empirically $s^* \simeq \frac{1}{3}$, then $\alpha_2 \simeq 1$.

- Proposition 1. In the market game with $n - 1$proposers, the equilibrium is $s^* = 1$.

- Proposition 2. In the market game with $n - 1$ receivers, it exists an equilibrium with $s^* = 0$.

1.4 Cooperation and Retaliation

- (Public Good Games or Cooperation Games)

1.4.1 Game 1

- n players, player i contributes g_i to the public good out of the budget of \$1

- monetary payoffs

$$x_i = 1 - g_i + a \sum_j g_j$$

with $a \in (\frac{1}{n}, 1)$

- the rational Nash Equilibirum is $g_i = 0$

- collective optimum $S = \sum_j x_j$

$$\frac{\partial S}{\partial g_i} = \sum_j \frac{\partial x_j}{\partial g_i} = na - 1$$

  and collectively optimal $g_i = 1$ if $\alpha > \frac{1}{n}$.

- In experiments, people play $g_i = 0$.

1.4.2 Game 2

- Same as Game 1 with everything public knowledge, except that player i can punish player j by an amount p_{ij} with cost cp_{ij} with $c \in (0, 1)$

- Proposition. In Game 1, if $\alpha_i + \beta_i < 1$ then $g_i = 0$. Moreover, if there are enough players with $\alpha_i + \beta_i < 1$, then everyone plays $g_i = 0$.

- Proposition. In Game 2, if there are enough people with $\alpha_i + \beta_i > 1$ then there exists an equilibrium with $g_i = g > 0$.

1.5 Cross society comaprison

- Camerer, Fehr et all, AER Papers and Proceedings, 2001 – a study of 16 societies

- societies with lots of cooperation offer 50-50 to each other

- in societies when the state is broken down personal reputation is important (so e.g. you don't accept splits below 50% or hit back if attacks)

1.6 Applications to labor market

- Short run wage rigidity caused by people who think cutting their wage is unfair and would become disgruntled if their wage was cut.