Behavioral Economics

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Homework 2 - Fall 2016

Due Friday 18th December

Question 1 (Quasi-Hyperbolic Discounting) Consider an infinitely lived quasi-hyperbolic decision maker who is trying to lose weight. Their preferences in each period are given by

$$u(\gamma_t, w_t, w_{t-1}, x_t) = \gamma_t w_t - (w_t - w_{t-1})^2 - n w_t^2 - m x_t$$

Where w_t is weight in period t and γ_t is a preference parameter drawn randomly from some distribution f (for the sake of argument lets assume it is $N(0, \sigma^2)$) and x_t is any amount of money spent in period t. The interpretation is that the first term is the utility from consumption (which varies randomly), the second term is an adjustment cost, the third term is the cost of excess weight while the fourth term is the utility from any money spent (initally we will assume that this is zero)

1. Model the behavior of the agent as a game played between different 'agents' in each period. Guess and verify that the game has a solution of the form

$$w_t = a w_{t-1} + b\gamma_t + c$$

   Solve for a, b and c.

2. Imagine that you observed the weight path of this agent. Which of the parameters of the original model could you recover?

3. Now assume that in some time period t, the agent faces a 'commitment contract' such that they have to pay an amount x_t if their weight is above a threshold y_t. Characterize the behavior of the agent in this period.

4. Now assume that, after setting their weight in period $t-1$, the agent is (unexpectedly) given the option of setting a target weight for period t (assume that the amount they forfeit x is fixed, but they can choose y). What will their optimal target be? How will it vary with the parameters of the problem?

Question 2: (An Alternative Model of Menu Preferences) Consider the following variant of the Gul and Pesendorfer model. The utility of a menu is given by

$$U(x) = \max_{p \in x} \left[u(p) - \theta(\max_{q \in x} v(q) - v(p)) \right]$$

Where θ is a strictly increasing convex function

1. Does this model satisfy set betweenness?
2. Does it satisfy independence?
3. Show that the model will satisfy the following two properties
   (a) $\{p\} \succeq \{q\} \Rightarrow \alpha\{p\} + +(1-\alpha)\{r\} \succeq \alpha\{q\} + +(1-\alpha)\{r\}$
   (b) $\{p\} \succeq \{p,q\} \Rightarrow \alpha\{p\} + +(1-\alpha)\{r\} \succeq \alpha\{p,q\} + +(1-\alpha)\{r\}$
4. In slide 43 of the lecture on Preference for Commitment, we discussed a linearity property of the G and P model which we felt might be unrealistic. Would this model allow for more realistic behavior?

Question 3 (An Experimental Design Question) Write a 3-5 page experimental proposal for testing the set betweenness axiom. A good answer will include

1. An experimental design which has a chance of generating preference for commitment, and an explanation of why this hope is valid
2. An interesting alternative hypothersis
3. Some power calculations to estimate how many subjects you would need to make this test interesting