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THAMMASAT

Midterm Examination: 2/2019

Subject:EE416 Behavioral Economics

Date: March 5, 2020 Time: 09:00 - 11:00 hrs.

- Please do not turn this page over until you are instructed otherwise.
- This examination paper contains 4 main questions with a total of 14 pages. There are 100 points in total (25% of semester's total scores).
- Write neatly and readably in the space available for each question. If you want more space, please write at the back of that page and make sure to specify where your answer is located. Answers without verification will receive no credit.
- Please answer each question the best you can. You can also use a graph, a figure, and/or an equation if you think it helps you explain the question clearly.

Students:
Please make sure that you do not bring any unpermitted items into the examination room. If you are caught doing so, you will automatically receive an **"F"** for that course and be suspended for one academic year.

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1. [(20 points) Nonstandard decision making]

1.1 [(10 points) Heuristics and flood insurance] Some empirical evidences found that, after a recent major flood, there was an increase in flood insurance purchase. How can “heuristics” help explain this empirical evidence ? Give brief explanation to support your answer.

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1.2 [(10 points) Framing effect and Risk communication] Imagine that Thailand is preparing for the outbreak of an unusual airborne disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows:

If Program A is adopted, 200 people will be saved.
If Program B is adopted, there is a 50% probability that 600 people will be saved and a 50% probability that no people will be saved.

1.2.1 (2 points) Which program has higher expected value of number of people saved?

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1.2.2 (8 points) Based on the shape of value function of Prospect theory, how would you present the scientific estimates of the consequences of the programs to the public, so that the program with higher expected value is chosen? Provide brief explanation to support your answer.

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2. [(25 points)The application of Prospect theory in housing market]

Consider a simple model of loss aversion and the endowment effect for a house. Assume that preferences for house buyers and house sellers are described by:

$$U(c, m|r) = U(c|r) + m$$
$$U(c|r) = u(c) + v(c|r)$$

Variables in the model can be described as follows.

- $r \in \{0,1\}, where\ r = 0$ means that a person is unendowed with a house; and $r = 1$ means a person is endowed with a house.
- $c \in \{0,1\}, where\ c = 0$ means that a person doesn't buy, or doesn't keep a house, and $c = 1$ means a person buys, or keeps a house.

For simplicity, assume that there is no diminishing marginal utility of money m. $u(c)$ is intrinsic utility from consumption of a house.

$$u(c) = \begin{cases} \mu & if\ c = 1 \\ 0 & if\ c = 0 \end{cases}$$

$v(c|r)$ is gain-loss utility from buying or selling a house.

$$v(c|r) = \begin{cases} \phi & if\ r = 0, c = 1 \\ -\lambda\phi & if\ r = 1, c = 0 \end{cases}$$

$\mu > 0, \phi > 0$

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2.1) (5 points) Given wealth w and housing price p, derive the condition under which sellers who were endowed with a house will be willing to sell the house.

2.2) (5 points) Given wealth w and housing price p, derive the condition under which buyers who were not endowed with a house will be willing to buy a house.

2.3) (5 points) Since house sellers might be attached to their houses to some extent, what must the restriction on the value of λ be, to ensure that there is loss aversion? What is the reason for such restriction?

2.4) (5 points) How does loss aversion help explain the illiquidity of property transaction?

2.5) (5 points) In a situation in which there is bubble in housing market, properties become more liquid, compared to the normal situation with no bubble. How can the restriction on the value of λ be changed, so that we can still use this model to help explain the liquidity in housing transactions? Give a brief explanation to support your answer.

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3. [(20 points) The purchase of lottery ticket and insurance policy]

3.1) Can expected utility theory help explain why an individual buys both a lottery ticket and an insurance policy? Provide explanation to support your answer.

3.2) Can Prospect theory help explain why an individual buys both a lottery ticket and an insurance policy? Provide explanation to support your answer.

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4. [(35 points) Present bias and workout procrastination]

To achieve a health benefit h in the future, Eddie is trying to decide which day out of three-day window, he will work out this week.

Suppose Eddie is busier later in the week than earlier in the week. Accordingly, his effort costs to work out are as follows.
If he works out on day 1, immediate effort cost is equal to 4 units of effort.
If he works out on day 2, immediate effort cost is equal to 8 units of effort.
If he works out on day 3, immediate effort cost is equal to 12 units of effort.

This is equivalent to having the immediate effort cost schedule:

$$c \equiv (4,\ 8,\ 12)$$

And, future reward schedule:

$$v \equiv (h,\ h,\ h)$$

Assume Eddie has (β, δ)- intertemporal preference.

$$\mathrm{U}(x_t, \dots, x_T) = u(x_t) + \beta \sum_{s=t+1}^{T} \delta^{s-t} u(x_s)$$

Throughout this question, we will assume $\delta = 1$ for simplicity.

Accordingly, period-t intertemporal utility if Eddie works out in period $\tau \geq t$ is:

$$U^t(\tau) = \begin{cases} \beta h - c_\tau & if\ \tau = t \\ \beta h - \beta c_\tau & if\ \tau > t \end{cases}$$

If Eddie waits until day 3, he must work out on day 3.

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4.1) (7 points) Assume $\beta = \frac{1}{4}$ and future health benefit $h = 10$, if Eddie decides when to work out by thinking like a Naif, when does Eddie work out? That is, what is τ_{naif}?

Hint: Fill in the following table.

	$\tau = 1$	$\tau = 2$	$\tau = 3$
At $t = 1$: $U^1(\tau)$			
At $t = 2$: $U^2(\tau)$			
At $t = 3$: $U^3(\tau)$			

On day 1, write out $U^1(\tau = 1)$, $U^1(\tau = 2)$, $U^1(\tau = 3)$ and compare.
On day 2, write out $U^2(\tau = 2)$, $U^2(\tau = 3)$ and compare.

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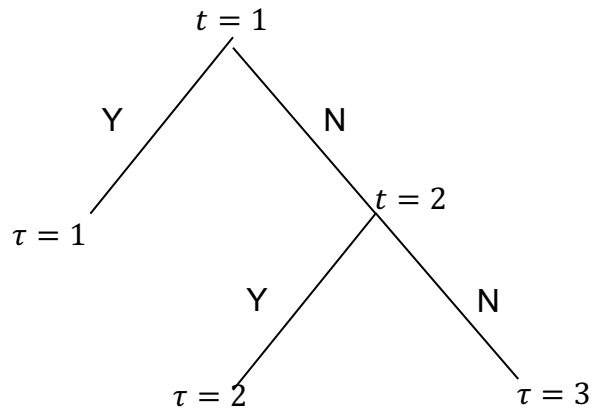
4.2) (7 points) Assume $\beta = \frac{1}{4}$ and future health benefit $h = 10$, if Eddie decides when to work out by thinking like a sophisticate, when does Eddie work out? That is, what is $\tau_{sophisticate}$?

Hint: Write out game tree, and figure out what Eddie would decide if Eddie was at day 2. Incorporate Eddie's day-2 behavior into his day-1 decision.



4.3) (5 points) Does sophistication help with procrastination in this case? Provide brief intuition why it helps or why it doesn't help.

4.4) (11 points) Now, let's consider the case when Eddie is a partial naivete with $(\beta, \hat{\beta}, \delta)$ preferences. Let $\delta = 1, \beta = \frac{1}{4}, \hat{\beta} = \frac{3}{4}$. That is, Eddie gives weight equal to 25% for his future payoff, for his current decision. But, he thinks that he will weigh his payoff at 50% of the actual payoff for his decisions in the future.

4.4.1) On day 1, what is his belief about day-2 behavior?

4.4.2) What is his day-1 preferences?

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4.4.3) On day 1, when does he plan to do the task?

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4.4.4) When does he actually work out?

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4.4.5) Briefly explain the time inconsistency problem found in this case.

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4.5) (5 points) If there happens to have a new health policy which tries to provide information on health benefit of exercising. This policy changes future health benefit h that Eddie uses when he is trying to decide when to work out. Will this policy change Eddie's behaviors ?

Hint: Write out all payoffs as function of h.