Exam 26037 (Msc) / 62638 (PhD) Behavioral Economics

25th October 2023

Section 1 (Only one choice is correct.)

1. Is the following statement true or false? Based on von Neumann and Morgernstern Theorem (Expected Utility Theory), there exists only one Bernoulli utility function that characterizes one's preferences if the preferences satisfy completeness, transitivity, continuity, and independence.
   A: True.
   B: False.
   C: Cannot say.

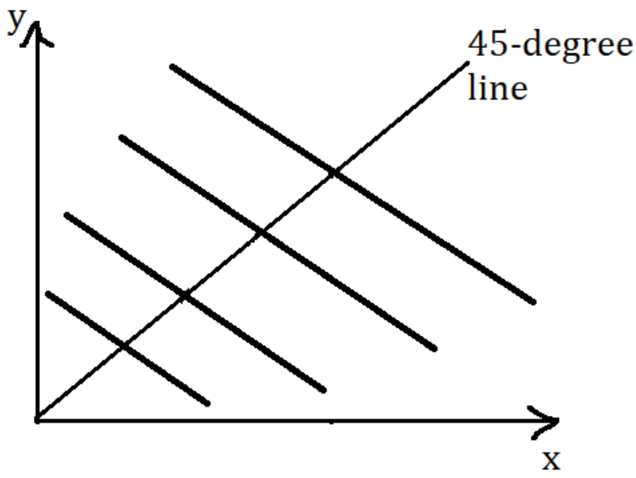
2. In which of the games below, the player who moves first has no concern for the other player's behavior?
   A: Dictator game
   B: Ultimatum game
   C: Public goods game
   D: Trust game

3. Which of the following cannot explain the Allais paradox?
   A: Disappointment aversion
   B: Expected Utility Theory
   C: Prospect Theory
   D: Rank Dependent Utility

4. Suppose that a decision maker is a quasi-hyperbolic discounter. That s/he is fully sophisticated entails that s/he would not exhibit present bias.
   A: True
   B: False
   C: Cannot say

5. Suppose that a decision maker's other-regarding preferences are context-dependent, and the decision maker's preferences can be represented by the utility function,
   $$U(x,y) = \begin{cases} x - b(x-y), & x \geq y \\ x - a(y-x), & x < y \end{cases}$$
   where x is the payoff of the decision maker, and y is the payoff of someone else. Suppose the indifference curves that describe the preferences of the decision maker

are shown in the graph below. What values of the parameters, a and b, are associated with the indifference curves in the graph?



A: $0 < a \leq 2, b > 1$
B: $-1 < a < 0, 0 < b < 1$
C: $a > 0, b = 0$
D: $a = 0, b \rightarrow \infty$

6. Which of the following axioms is the key axiom that entails parallel indifference curves?
A: Continuity
B: Transitivity
C: Completeness
D: Independence

7. Correlation neglect describes the setting where each agent believes that everyone else only uses their private signals to make decisions neglecting the correlation between actions, so that the agents double count the historical signals and eventually stop learning.
A: True
B: False
C: Cannot say

8. Given the utility function under Prospect Theory, $V(x_1, p_1; \dots; x_n, p_n) = \sum_{x_i} \pi(p_i) v(x_i)$ where $(x_{i,} p_i)$ denotes a prospect in the lottery $(x_1, p_1; \dots; x_n, p_n)$ and $v(x) = \begin{cases} x^\alpha, x \geq 0 \\ -\lambda(-x)^\alpha, x < 0 \end{cases}$. Which of the following is right?
A: $\lambda < 1$ means the loss aversion.
B: The value function, $v(x)$, is concave means that the decision maker is risk averse.
C: The value function, $v(x)$, has the objectively given outcomes as input.
D: The probability weight function, $\pi(p_i)$, follows the same shape in gain and loss domain.

Section 2

1. Briefly explain the difference between ordinal and cardinal preferences.

2. In Disappointment Aversion model, a lottery can be decomposed into two parts, elation and disappointment. The elation/disappointment decomposition of a lottery is set up given the attitude toward disappointment and the utility function. Consider the lottery where a decision maker gets 16 with a chance of 0.6 and 81 with a chance of 0.4.
   (a) What is elation outcome, x_e, equal to? What is the disappointment outcome, x_d, equal to? What is probability that one gets elated, α, when the uncertainty of the lottery is resolved?

   (b) Assume that the utility function is $u(x) = \sqrt{x}$ and the decision is disappointment averse, $\beta = 1$. Assume also that the decision maker's preferences satisfy completeness, transitivity, continuity, weak independence axiom, and symmetry axiom. Compute the preference for the lottery, $V(p)$, based on value function introduced by the Representation Theorem of Disappointment Aversion, $V(p) = \frac{\alpha}{1+(1-\alpha)\beta}u(x_e) + (1 - \frac{\alpha}{1+(1-\alpha)\beta})u(x_d)$.

3. Briefly explain loss aversion.

4. Consider the utility function $u(x) = \log(x)$ and explain how Jensen's inequality applies to the utility function.

5. Briefly explain Endowment Effect.

6. Briefly explain Reflection Effect.

7. Briefly explain Present bias.

Section 3

Consider the following game:

- Ann and Bob together invest 1600 EUR at the stock market for a maximum of 4 years.
- They take turns managing their investment - in the first year, Ann will make the decision; in the second year, Bob will make decision; in the third year, Ann is in charge; and finally, Bob again in the fourth year.
- In every year, the investment manager can choose from two actions: managing or cash-out.
- If the investment is managed, then they get 50% returns on their investment (i.e., every 100 EUR they invest will be worth 150 EUR in the next year).
- If the investment is cashed out, then the current manager can steal half of the money, and then split the other half, i.e., the manager will receive 75% of the money, the other person receives the remaining 25% and the game ends.
- If the money has not been cashed out before, the investment will automatically be cashed out during year 4 when Bob is the manager.

(a) How much money would Ann and Bob receive respectively if Ann chooses to cash out already during the first year?

(b) How much money would Ann and Bob receive respectively if the money is cashed out in year 2, 3, 4?

(c) Find a strictly dominated strategy in this game.

(d) Solve the game using Iterative Elimination of Strictly Dominated Strategies.

(e) Assume that Ann is "level 0" and will flip a coin whenever it's her turn to decide. Should Bob manage the investment or cash out in year 2? Why?

(f) Assume that Bob is "level 0" and will flip a coin whenever it's her turn to decide. What should Ann do to best-respond?

(g) What is the outcome of the game if both Ann and Bob are "level ∞"?

Section 4

The following questions are ONLY for PhD students.

Malin is participating in the game show, Deal or No Deal, where she can win one of 26 monetary prizes ranging from 0.01 USD to 1 million USD. During the game, prizes are eliminated at random, and she gets in each stage a decision between continuing the gamble and accepting the bank's offer. The expected value of the game (if she continues to the end) is 131 000 USD. Contestants in the past have on average won 90 000 USD. Malin is facing the last stage of the game, choosing between (i) a gamble with possible outcomes 100 000 and 125 000 with equal probabilities and (ii) a safe option (bank offer) of 113 000 USD. Suppose Malin is an expected utility maximizer with utility function $u(m) = \sqrt{m}$ where m is monetary outcome.

(a) What is Malin's expected utility of the gamble (i)? What does she choose?
(b) What bank offer would make her indifferent between the options? What do we call his amount?
(c) Suppose instead that Malin is a prospect theory agent with value function $v(m)$ where $v(m) = \sqrt{(m-r)}$ for gains and $v(m) = -2\sqrt{(m-r)}$ for losses and where r is Malin's reference point. Suppose Malin's reference point is 131 000 USD. Calculate her value of the gamble and bank offer respectively. Compare and conclude what Malin chooses.
(d) Reanalyze the same choice as in (c) but with 90 000 USD as Malin's reference point instead. Is her choice the same? Discuss.