i Candidate instructions

ECON4260 – Behavioral Economics

This is some important information about the written exam in ECON4260. Please read this carefully before you start answering the exam.

Date of exam: Friday, December 14, 2018
Time for exam: 14.30 – 17.30

The problem set: The problem set consists of four questions, with several sub-questions. They count as indicated. Start by reading through the whole exam, and make sure that you allocate time to answering problems you find easy. You can get a good grade even if there are parts of problems that you do not have time to solve. Multiple choice questions are graded such that you will always be better off providing an answer, than to leave it blank.

Sketches: In this exam, you may use sketches on questions 1b, 1d, 1e, and questions 3 and 4 with sub-questions. You are to use the sketching sheets handed to you. You can use more than one sketching sheet per question. See instructions for filling out sketching sheets on your desk. It is very important that you make sure to allocate time to fill in the headings (the code for each problem, candidate number, course code, date etc.) on the sheets that you will use to add to your answer. You will find the code for each problem under the problem text. You will NOT be given extra time to fill out the "general information" on the sketching sheets (task codes, candidate number etc.) Do NOT hand in sketches on other questions than questions 1b, 1d, 1e and questions 3 and 4. **Sketches handed in for other questions, will not be included in the assessment.**

Resources allowed: No written or printed resources - or calculator - is allowed (except if you have been granted use of a dictionary from the Faculty of Social Sciences).

Grading: The grades given: A-F, with A as the best and E as the weakest passing grade. F is fail.
Grades are given: Tuesday 8 January 2019.

1(a) Rabin's Theorem

(3 points)

In this question you are not supposed to hand in sketches.

Assume that a person who maximizes expected utility is indifferent between getting 0 kroner with certainty and a lottery that gives +100 kroner with 60% probability and -100 kroner with the remaining probability. We normalize the utility such that $u(W) = 3$ and $u(W-100) = 0$, where W is his current wealth.

- Compute $u(W+100)$ ☐

Maximum marks: 3

Attaching sketches to this question?
Use the following code: **XXXXXXX**

1(b) Rabin's Theorem (continued)

(7 points)

In this question you can hand in sketches. Use the sketching paper handed to you in the examination venue. See instructions on your desk.

Rabin and Thaler (2001), in the course reading list, extend this kind of calculation. In the example discussed in Problem 1a, is possible to show that $u(W + X) < 9$, for any value of X. (You are not asked to show this.)

- What extra assumptions are needed to reach this kind of conclusion?

Fill in your answer here and/or on sketches

Maximum marks: 7

Attaching sketches to this question?
Use the following code:

XXXXXXX

1(c) Rabin's Theorem (continued)

(2 points per correct answer)

In this question you are not supposed to hand in sketches.

Consider a lottery where the person in Problem 1a-b can win an amount X with probability *p,* where X is equal to the value the Norwegan Oil fund. With the remaining probability the person loses 100 kroner.

- If it was the case that $u(W + X) = 9$, what would be the expected utility of this lottery in the following two cases?

p=20% [ ]

p=40% [ ]

- Would the person in Problem 1a-b, accept the lottery with *p=40%*? [ ] (Yes, No)

Maximum marks: 6

Attaching sketches to this question?
Use the following code:

XXXXXXX

1(d) Rabin's Theorem (continued)

(9 points)

In this question you can hand in sketches. Use the sketching paper handed to you in the examination venue. See instructions on your desk.

In their paper (in the course reading list), Rabin and Thaler state that: “we aspire to have written one of the last articles debating the descriptive validity of the expected utility hypothesis.” Their paper is based on calculations like those in the problems above.

- Explain why the results in the problems above and similar calculations are considered a problem for expected utility theory, but not for prospect theory.

Fill in your answer here and/or on sketches

Maximum marks: 9

Attaching sketches to this question?
Use the following code: **XXXXXXX**

1(e) Rabin's Theorem (continued)

(5 points)

In this question you can hand in sketches. Use the sketching paper handed to you in the examination venue. See instructions on your desk.

Expected utility theory is still much used in economic theory, also in applied analyses.

- Why do you think expected utility theory is still so much used? (There are no correct answers here. Your answers will be graded based on coherence and relevance of your arguments.)

Fill in your answer here and/or on sketches

Maximum marks: 5

Attaching sketches to this question?
Use the following code: **XXXXXXX**

2 Decision makers with self-control problems

(3 points per correct answer)
In this question you are not supposed to hand in sketches.

In each part of this problem you will consider a decision maker (DM) with self-control problems.

In parts (a) and (b), the DM will have present-biased preferences. In particular, the DM will have (β, δ)-preferences, with δ being the discount factor between two subsequent future periods and the product $\beta\delta$ being the discount factor between the current period and the first period that follows.

(a) Suppose in this part that a DM must do an unpleasant task either in period 1, in period 2 or in period 3. The utility cost is increasing with time, so that it is 3 if the task is done in period 1, 6 if the task is done in period 2 and 8 if the task is done in period 3. Hence, the DM is faced with the choice between:

- Doing the task in period 1: $(u_1, u_2, u_3) = (-3,\ 0,\ 0)$
- Doing the task in period 2: $(u_1, u_2, u_3) = (0, -6,\ 0)$
- Doing the task in period 3: $(u_1, u_2, u_3) = (0,\ 0, -8)$

Assume that, in period 1, the DM is indifferent between these three alternatives. On this basis you will be able to calculate that δ equals [ ] (0, 1/12, 2/12 = 1/6, 3/12 = 1/4, 4/12 = 1/3, 5/12, 6/12 = 1/2, 7/12, 8/12 = 2/3, 9/12 = 3/4, 10/12 = 5/6, 11/12, 1) and that β equals [ ] (0, 1/12, 2/12 = 1/6, 3/12 = 1/4, 4/12 = 1/3, 5/12, 6/12 = 1/2, 7/12, 8/12 = 2/3, 9/12 = 3/4, 10/12 = 5/6, 11/12, 1) .

If the DM does not do the task in period 1, then her preferences in period 2 is given by: [ ] (Doing the task in period 2 is better than doing the task in period 3, Doing the task in period 3 is better than doing the task in period 2)

In parts (b) and (c) below, consider two other DMs who can watch one (and only one) film out of three possible films: one film shown in period 1, a different film shown in period 2 and the third film shown in period 3. The film shown in period 1 is acceptable and yields utility 5. The film shown in period 2 is better and yields utility 7. The film shown in period 3 is excellent and yields utility 10. Hence, this DM is faced with the choice between:

- Watching a film in period 1: $(u_1, u_2, u_3) = (5,\ 0,\ 0)$
- Watching a film in period 2: $(u_1, u_2, u_3) = (0,\ 7,\ 0)$
- Watching a film in period 3: $(u_1, u_2, u_3) = (0,\ 0,\ 10)$

(b) Assume in this part that the DM has (β, δ)-preferences with $\beta = \frac{3}{5}$ and $\delta = 1$.

The preferences of the DM in period 1 is: [ ]

(Watching in period 1 is better than watching in period 2 which is better than watching in period 3, Watching in period 1 is better than watching in period 3 which is better than watching in period 2, Watching in period 2 is better than watching in period 3 which is better than watching in period 1, Watching in period 2 is better than watching in period 1 which is better than watching in period 3, Watching in period 3 is better than watching in period 1 which is better than watching in period 2, Watching in period 3 is better than watching in period 2 which is better than watching in period 1)

The preferences of the DM in period 2, given that he did not watch a film in period 1, is: [ ] (Watching in period 2 is better than watching in period 3, Watching in period 3 is better than watching in period 2)

If the DM is naïve, then he will watch the film in period [ ] (1, 2, 3)

If the DM is sophisticated, then he will watch the film in period [ ] (1, 2, 3)

If the DM is sophisticated, then, in period 1, he is willing to pay up to [ ] (0, 0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 1.8, 2.0, 2.2, 2.4, 2.6, 2.8, 3.0, 3.2, 3.4, 3.6, 3.8, 4.0) for a commitment device that makes one of the later films unavailable.

(c) Assume in this part that the DM takes decisions according to the dual-self model, where the DM is divided into a long-term planner and a sequence of three short-term doers, one for each period. In each period, the planner controls, at a cost, the doer corresponding to this period. Assume that the control cost in each period is $\frac{3}{5}$ times the difference between the highest possible utility among the alternatives that remain and the actual utility. Furthermore, assume that the DM seeks to maximize the undiscounted sum of the utilities, after the control costs have been subtracted, over the three periods. Then the preferences of the DM is: [ ]

(Watching in period 1 is better than watching in period 2 which is better than watching in period 3, Watching in period 1 is better than watching in period 3 which is better than watching in period 2, Watching in period 2 is better than watching in period 3 which is better than watching in period 1, Watching in period 2 is better than watching in period 1 which is better than watching in period 3, Watching in period 3 is better than watching in period 1 which is better than watching in period 2, Watching in period 3 is better than watching in period 2 which is better than watching in period 1)

In period 1, the DM is willing to pay up to [ ] (0.0, 0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 1.8, 2.0, 2.2, 2.4, 2.6, 2.8, 3.0, 3.2, 3.4, 3.6, 3.8, 4.0) for a commitment device that makes one of the later films unavailable.

Maximum marks: 30

Attaching sketches to this question?
Use the following code:

XXXXXXX

3(a) Question 3.a

(5 points)

In this question you can hand in sketches. Use the sketching paper handed to you in the examination venue. See instructions on your *desk.*

Point out major differences between inequality aversion (as specified by Fehr and Schmidt 1999, course reading list) and reciprocal preferences.

Fill in your answer here and/or on sketches

Maximum marks: 5

Attaching sketches to this question?
Use the following code:

XXXXXXX

3(b) Question 3.b

(5 points)

In this question you can hand in sketches. Use the sketching paper handed to you in the examination venue. See instructions on your *desk.*

Provide at least one example of behavior that may be consistent with both Fehr-Schmidt inequality aversion and reciprocal preferences, but inconsistent with purely self-interested behavior.

Fill in your answer here and/or on sketches

Maximum marks: 5

Attaching sketches to this question?
Use the following code:

XXXXXXX

3(c) Question 3.c

(5 points)

In this question you can hand in sketches. Use the sketching paper handed to you in the examination venue. See instructions on your *desk.*

Provide at least one example of behavior that is consistent with reciprocal preferences, but not with Fehr-Schmidt inequality aversion.

Fill in your answer here and/or on sketches

Maximum marks: 5

Attaching sketches to this question?
Use the following code:

X X X X X X X

4 Consider the following game:

	Sandvika	Oslo City
Sandvika	2,2	0,0
Oslo City	0,0	2,2

The matrix describes the material payoffs of a couple, *A* and *B*, who have agreed to meet at a specific time to do their joint Christmas shopping. *A* has suggested that they meet at Sandvika, *B* has suggested that they meet at Oslo City. Each has Sandvika and Oslo City as their alternative strategies. Each meeting place is equally good for both players in terms of material payoffs, but if they go different places, none of them gets any material payoff at all. Since they have recently had an unpleasant fight, each is aware that the other might be angry.

Let U_i denote *i*'s utility, while x_i denotes *i*'s material payoff (which will depend on players' strategies). Assume that each *i* = A, B has preferences as specified below:

(i) $$U_i = x_i + \alpha_i k_{ij} \tilde{k}_{ji}$$

where $\alpha_i \geq 0, k_{ij} = i's$ kindness towards j, $\tilde{k}_{ji} = j's$ kindness toward *i* according to *i*'s belief (*i=1,2; j=1,2;* $i \neq j$). Further, let

(ii) $$k_{ij} = x_j(s_i, b_{ij}) - \frac{1}{2}[x_j^{max}(b_{ij}) + x_j^{min}(b_{ij})],$$

(iii) $$\tilde{k}_{ji} = x_i(b_{ij}, c_{iji}) - \frac{1}{2}[x_i^{max}(c_{iji}) + x_i^{min}(c_{iji})],$$

where s_i = *i*'s strategy, b_{ij} = *i*'s belief about *j*'s strategy, $x_j^{max}(b_{ij})$ is the *largest* material payoff *i* could secure to *j*, given *i*'s belief about *j*'s strategy b_{ij}, while $x_j^{min}(b_{ij})$ is the *smallest* material payoff *i* could secure to *j*, given b_{ij}. Finally c_{iji} = *i*'s belief about *j*'s belief about *i*'s strategy.

(a) ## Question 4.a

(10 points)

In this question you can hand in sketches. Use the sketching paper handed to you in the examination venue. See instructions on your *desk.*

If α_A = 0 and α_B = 2, what are the fairness equilibrium/equilibria in the above game, if any? Explain.

Fill in your answer here and/or on sketches

Maximum marks: 10

Attaching sketches to this question?
Use the following code:

X X X X X X X

(b) Question 4.b

(7.5 points)

In this question you can hand in sketches. Use the sketching paper handed to you in the examination venue. See instructions on your *desk.*

If $\alpha_A = \alpha_B = 2$, is (Sandvika, Sandvika) a fairness equilibrium in the above game? Explain.

Fill in your answer here and/or on sketches

Maximum marks: 7.5

Attaching sketches to this question?
Use the following code:

XXXXXXX

(c) Question 4.c

(7.5 points)

In this question you can hand in sketches. Use the sketching paper handed to you in the examination venue. See instructions on your *desk.*

If $\alpha_A = \alpha_B = 2$,is (Sandvika, Oslo City) (i.e. *A* goes to Sanvika, while *B* goes to Oslo City) a fairness equilibrium in the above game? Explain.

Fill in your answer here and/or on sketches

Maximum marks: 7.5

Attaching sketches to this question?
Use the following code:

XXXXXXX