

ECON4260 Behavioural Economics - Fall 2023

Problem 1 (Counts 30%)

Ann is maximizing expected utility with asset integration. She is indifferent between two lotteries, A and B:

Lottery A gives a gain of 100 kroner with 60% probability, and a loss of 100 kroner with 40% probability.

Lottery B gives 0 with certainty.

Her initial wealth is W_0 , and we normalize her utility function such that $u(W_0 - 100) = -1$ and $u(W_0) = 0$.

a) Compute $u(W_0 + 100)$.

Ann claims to be indifferent between lotteries A and B at any level of wealth.

b) Explain briefly how we can compute $u(W_0 + 200)$, $u(W_0 + 300)$, and $u(W_0 + 400)$. You do not have to compute the values, just give the general outline of how you can do it.

In this case it can be shown that $\lim_{W \rightarrow \infty} u(W) = 2$.

Ann considers a series of lotteries, all involving a possibility of winning an amount similar to the size of the Norwegian oil fund (15 000 billion NOK). In each case she must decide if she would accept the given lottery.

c) For each lottery, please state whether she would accept it (prefer it over 0) or not:

C: She loses 100 kroner with 50% probability and wins an amount similar the oil fund with 50% probability.

D: She loses 100 kroner with 60% probability and wins an amount similar the oil fund with 40% probability.

E: She loses 100 kroner with 70% probability and wins an amount similar the oil fund with 30% probability.

d) Discuss whether an argument for her choice of lotteries in c) could have been made if Ann acted according to Prospect theory.

Lotteries where you can win high prices are common, although not as high prices as the lotteries in c). E.g., a ticket in Lotto costs 50 kroner, while in a random recent week, 5 persons were each winning more than 2.8 million NOK. The lottery is organized such that the expected value of the prices for a 50 kroner ticket is 25 kroner.

e) Discuss if and how you could explain the fact that people participate in such lotteries, both using Expected Utility theory and using Prospect theory.

Problem 2 (Time inconsistency and self-control problems)
Weight: 30% (with equal weight = 6% on each subproblem)

(a) Give short and concise answers to the following questions:

- What is the multi-self model?
- What are time consistent preferences?
- What are (β, δ) preferences? Why do they lead to time inconsistency when $\beta < 1$?
- What is naïve and sophisticated behavior when preferences are time inconsistent?

For the rest of the problem, consider a society consisting of individuals who live for 3 periods. In period 1 they are young earning an income of 25, in period 2 they are middle-aged earning an income of 10, and in period 3 they are old earning 0-income. Gross returns on savings equal 1, implying that the budget constraint is given by

$$c_1 + c_2 + c_3 \leq 25 + 10 = 35$$

Consumption in each period must be non-negative, and individuals cannot borrow, implying that $c_1 \leq 25$.

The individuals' preferences in period 1 are represented by $\ln c_1 + \frac{2}{3}(\ln c_2 + \ln c_3)$, and their preferences in period 2 are represented by $\ln c_2 + \frac{2}{3} \ln c_3$. This means that the individuals has (β, δ) -preferences with $\beta = \frac{2}{3}$ and $\delta = 1$. Assume that half of the people are naïve and half of the people are sophisticated.¹

- (b) What is the optimal consumption stream in period 1? What consumption stream will naïve individuals realize?
- (c) What consumption stream will sophisticated individuals realize?
- (d) The government decides to provide a possibility for individuals to sign up for a pension scheme in period 1, obliging the payment of 10 from the individual in period 1 and the payment of 10 to the individual in period 3. Signing up is voluntary, and it has an immediate cost of ε^{in} , which is a small positive number ($0 < \varepsilon^{\text{in}} < \frac{2}{3} \ln \frac{25}{24}$).² How will naïve and sophisticated individuals react to the possibility of signing up for the pension scheme in period 1? What are the welfare effects of the government's intervention?
- (e) The government decides instead to make the pension scheme under part (d) compulsory for everybody. However, any individual can in the period 1 obtain an exception at an immediate cost of ε^{out} , which is a small positive number ($\varepsilon^{\text{out}} > 0$). Will naïve and sophisticated individuals choose to opt out of the pension scheme? What are the welfare effects of this alternative intervention by the government?

¹When answering the following sub-problems, it is useful to note the following properties of the logarithmic function: $\ln a + \ln b = \ln ab$ and $\ln a - \ln b = \ln \frac{a}{b}$.

²Note that, by using the properties of the logarithmic function, it follows that $\ln 10 + \ln 10 - \ln 12 - \ln 8 = \ln \frac{25}{24}$.

Problem 3 (counts 40%)

You work in the administration of a large firm. Your boss, who is involved in many firm decisions affecting workers, finds that she has insufficient knowledge about behavioral economics theories that might be relevant for her work. She has some background in economics, but not on an advanced level, and has never attended a course in behavioral economics.

She knows, however, that your CV boasts a master's course in behavioral economics.¹ So she asks you to write a brief, mostly non-technical essay, explaining the concepts of *inequality aversion* and *reciprocity*. The purpose is not to tell her everything that is to know about these concepts, but to enable her to judge herself whether she should seek more detailed knowledge.

She asks you to include the following in your essay: i) What is inequality aversion? ii) In what kind of situations, if any, would inequality averse individuals behave differently than self-interested individuals? iii) In particular, can inequality-averse individuals sometimes be expected to act in ways damaging others? If so, in what kind of situations, and why? iv) What is meant by reciprocity? v) In what kind of situations, if any, would reciprocal individuals behave differently than self-interested individuals? vi) In particular, can reciprocal individuals sometimes be expected to act in ways damaging others? If so, in what kind of situations, and why? vii) What are the important similarities and differences between inequality aversion and reciprocity?

Write this essay.

When doing so, you can interpret "inequality aversion" as referring to the model proposed by Fehr and Schmidt in their 1999 paper on the course's reading list. You should interpret the term "reciprocity" to mean "reciprocal preferences", but you do not necessarily need to refer to a specific, detailed model of reciprocity (for example the one used in class); a more general definition of the concept should be sufficient.

Note: There is no single correct way to write this essay. You will not have time to discuss every relevant aspect, so focus on what you find important and interesting.

¹ Yes! Very soon, very likely, you have passed the exam!