

## *Exam in ECON4260, Fall 2022*

### **Problem 1, The endowment effect.** Weight 30% (each subproblem is 10%)

The endowment effect has been demonstrated in the lab in different ways. One design is as follows: Half the participant gets an item, such as a mug or a chocolate, then the market open and participants can trade items. In the first wave of experiments conducted the results typically supported the claim that there is an endowment effect.

- a) Explain why standard theory – with no endowment effect – predicts that about half the items are traded. Explain also what kind of results, i.e. shares of sales, would support the claim that there is an endowment effect.

The endowment effect is related to the idea of loss aversion. Here it is essential how the reference point determined. One theory is that the reference point is what you expect to get.

In a paper by Engelman and Hollard (2010), discussed in the curriculum paper Ericson and Fuster (2014), half the subjects are first forced to trade their item (otherwise the item is taken). Next, they conducted the traditional endowment effect experiment. They find the traditional results with no such initial forced trading round, but they get markedly different results for the participants who are forced trade in the first round.

- b) What are the results after a round of forced trading? How can expectation-based reference points explain the impact of such an initial round of forced trading? (Engelman and Hollard's (2010) interpretation is different. You are not required to state this interpretation but a bonus if you can.)

The experimental design above, with trading, is one of two main designs used to show the endowment effect. The curriculum papers also discuss an alternative design with no trading, where the early results show a disparity between willingness to accept and willingness to pay. This alternative design, with no trading, was used in Plott and Zeiler's (2005) curriculum paper where they found no WTA-WTP gap.

- c) Explain briefly this alternative design. (Explain only the main idea of the design, which is common for both earlier studies and Plott and Zeiler's study. Note also that you do not have to explain how to make choices incentive compatible.)

*Problem 2 (Time inconsistency and self-control problems)*  
**Weight: 30% (with equal weight = 5% on each subproblem)**

In this problem you will analyze the behavior of infinitely lived individuals by means of the multi-self model; that is, a model for one-person decision-making where every decision node in the decision tree corresponds to a separate self having preferences over the remaining choices in the decision tree. The individuals will be assumed to have  $(\beta, \delta)$ -preferences; that is, they have a per-period discount factor  $\delta$  and, in addition, discount all future periods by an additional factor  $\beta$ .

- (a) Let an individual in period 1 be indifferent between 9 units of utility in the present period (period 1), 15 units of utility in the first future period (period 2), and  $x$  units of utility in the second future period (period 3). For which values of  $x$  does the individual have present-biased preferences?

For parts (b)–(f), assume that individuals have  $(\beta, \delta)$ -preferences, with values for  $\beta$  and  $\delta$  that imply that the consumer in period 1 is indifferent between 9 units of utility in the present period (period 1), 15 units of utility in the first future period (period 2), and 20 units of utility in the second future period (period 3).

- (b) Show that  $\beta = \frac{4}{5} = 0.8$  and  $\delta = \frac{3}{4} = 0.75$ .

For parts (c)–(f), assume that we consider a society where half of the people are naïve and half of the people are sophisticated, but all with  $(\beta, \delta)$ -preferences with  $\beta = \frac{4}{5} = 0.8$  and  $\delta = \frac{3}{4} = 0.75$ . Furthermore, assume that the government offers a medical screening program that is free but leads to a disutility equal to 20 for each individual in the period when the screening takes place, but leads to utility gain that is equivalent to 40 in the subsequent period. (For simplicity we assume a one-time utility gain, but this can easily be generalized to long term benefits.) In subproblems (c)–(e) the screening is assumed to be offered in all periods 1, 2, 3, ...,  $t$ , ...

- (c) Show that all individuals, in any period  $t$ , have the following preferences over when be screened, given that they have not already been screened:

$$\text{screen in } t + 1 \succ \text{screen in } t + 2 \succ \text{screen in } t \succ \text{screen in } t + 3 \succ \text{screen in } t + 4 \dots$$

- (d) When will a naïve individual plan to do the screening? When will a naïve individual be screened?

It can be shown that the sophisticated individuals are indeed sophisticated if they, in any period  $t$ , choose to be screened with probability equal to  $\frac{1}{3}$  if not screened before. This is because with such behavior they will receive the same net benefit as evaluated in period  $t$  if deciding to be screened then, as if deciding to postpone the screening and believing that they will choose to be screened with probability  $\frac{1}{3}$  in each subsequent period if not screened before. This means that

the expected utility of sophisticated individuals in the first period 1 is the same as if they had decided to be screened for sure in period 1.

In parts (e) and (f) you are asked to evaluate government policies that might increase participation in the screening program and improve welfare.

(e) The government considers two alternative policies.

Policy A: Offering a voluntary option to sign up in period 1 for compulsory screening in period 2. Signing up has an immediate cost of 1. An individual that do not sign up can still choose to be screened in any period.

Policy B: Making it compulsory for everybody to be screened in period 2 while allowing any individual to opt out in period 1. Opting out has an immediate cost of 1. An individual that opt out can still choose to be screened in any period.

What are the effects on participation and welfare of the two alternative policies A and B?

(f) The government considers two other alternative policies.

Policy C: The frequency of screening is reduced to every two periods (periods 1, 3, 5, 7, ...).

Policy D: The frequency of screening is reduced to every three periods (periods 1, 4, 7, 10, ...).

What are the effects on participation and welfare of the two alternative policies C and D?

**Problem 3 (counts 20%)**

- a) (Counts 2%) What is an ultimatum game? Explain briefly.

Consider a two-person binary ultimatum game where the total amount at stake is 10. The only two options available to the Proposer are (5, 5) and (8, 2), where the first number in each parenthesis is the proposed payoff for the Proposer, while the last number is the proposed payoff for the Responder. The game is one-shot and completely anonymous. Assume that the Proposer is rational.

The Proposer chooses to propose (5, 5).

The Fehr-Schmidt model of inequality aversion assumes that person  $i$ 's utility is given by

$$U_i = x_i - \alpha_i \max\{0, x_j - x_i\} - \beta_i \max\{0, x_i - x_j\}.$$

- b) (Counts 8%) Assume now that the Proposer (P) is self-interested, and that the Proposer believes the Responder (R) to be inequality averse according to the Fehr-Schmidt model with  $\alpha_R = 0.5$  and  $\beta_R = 0.3$ . Are these assumptions consistent with the Proposer choosing (5,5) rather than (8,2) in the binary ultimatum game described above? Why/why not?
- c) (Counts 10%) Can the Proposer's choice be consistent with the suggested combinations of Proposer preferences and Proposer beliefs about the Responder's preferences as specified in Case 1 - 5 below? Why/why not? For each case, please provide a brief, intuitive explanation of your reasoning. (For simplicity, disregard any uncertainty in the Proposer's belief.)

Case	Proposer's preferences	Proposer's belief about Responder's preferences
1	Self-interested	Self-interested
2	Self-interested	Reciprocal
3	Classical altruist (cares about others' utility)	Self-interested
4	Inequality averse (Fehr-Schmidt model), $\beta_P < 0.5$	Self-interested
5	Self-interested	Classical altruist (cares about others' utility)

#### Problem 4 (counts 20%)

A soccer club is planning to ask their supporters to get together one weekend to do unpaid maintenance work on the club's stadium and clubhouse (keeping with the Norwegian tradition of joint voluntary community work called *dugnad*). The organizer of the event worries, however, that supporters may not turn up. He is unable to use economic incentives, such as fees or subsidies, to encourage people to participate.

While each supporter cares about the soccer club's athletic success, no supporter believes that his/her own effort during the event (the *dugnad*) will make any difference for the club's athletic success. However, supporters care about social approval. By participating, they can get social approval from others who are also participating. Assume that participants approve of each other, while non-participants neither receive nor give approval.

Let  $g_i$  be  $i$ 's time spent participating in the *dugnad*. The *dugnad* lasts for  $d$  periods of time, where  $d > 0$ . If one participates in the *dugnad*, one must stay for the entire duration. Hence, the decision for supporter  $i$  is to choose leisure time  $l_i$  and *dugnad* participation time  $g_i$  during the weekend such that

$$(1) T = l_i + g_i,$$

where  $T > 0$  is an exogenously given time constraint, equal for all  $i$ , and  $g_i$  is either 0 or  $d$ .

Assume that for every supporter  $i$ ,  $i$ 's utility  $U_i$  during the weekend can be written as follows:

$$(2) U_i = 2l_i + s_i,$$

where  $s_i$  is the social approval  $i$  receives from others participating in the *dugnad*.

Let  $a$  be the share of supporters choosing to participate. Each supporter treats  $a$  as exogenously fixed, disregarding the impact on  $a$  of her own participation choice. Let the social approval received by supporter  $i$  be given by

$$(3) s_i = 3ag_i.$$

- (a) (Counts 7%) Show: What are the conditions for an individual supporter  $i$  to participate?
- (b) (Counts 8%) Can both  $a = 0$  and  $a = 1$  be Nash equilibria in this case? Why/why not?

The event organizer is trying to plan the event, but is still worried and confused. He is no economist, and has a hard time understanding the intuitive implications of your analysis above. He asks you to help him.

"What do you mean," he asks, "will the supporters turn up at the *dugnad*, or will they *not*?"

- (c) (Counts 5%) Explain to the organizer, briefly and intuitively, the main implications of your analysis.