Problems for the second seminar: Behavioral Economics

Solutions to the problems will be presented at the seminars in week 38. Please direct any question to Kjell Arne Brekke (Room ES1243, Tel 228 41169, E-mail: k.a.brekke@econ.uio.no)

Problem 1 (Plott and Zeiler)
Plott and Zeiler (2005) find that there are no endowment effect when sufficient controls for "misconceptions" are introduced. The four controls they invoke are

1. Incentive compatibility
2. Training
3. Paid practice
4. Anonymity

Explain what is meant by each of these controls and why they may influence the outcome of the experiment. Was paid practice important for the conclusion in their study?

Problem 2 (The Equity Premium Puzzle)
In Benartzi and Thaler's explanation of the equity premium puzzle, they argue that investors reset their reference point every year. Would their theory predict a larger or smaller equity premium if the reference point was reset every month? Explain why a more frequent resetting will have this effect.

Problem 3: (Rabins Theorem and equity premium)
Suppose that stocks yield a return of either +33.3% with probability 59.1% or -33.3%, with remaining probability.

a) Show that the average return is 6% and the standard deviation is 33%. (6% is approximately the equity premium while risk associated with stocks is more in the range around 10%.)

Consider a person earning 300 000 net per year, with an expected income growth of 1% and with 4% rate of return (on similar risk), for simplicity we assume an infinite life length.

b) Show that the wealth is 10 million kroner.

Now, we assume that the person refrains from investing 30 000 kroner in stocks and rather invest the money in a bank account, for simplicity with a 0% return. The person will do so for any level of wealth. Assume that the person is an expected utility maximizer. Normalize the utility function such that $u(W_0) = 0$ and $u(W_0 - 10000) = -1$.

a) Why can we choose this normalization without loss of generality?
To get an upper bound on utility, we simplify and do the computations as if the person is always indifferent between investing and not investing.

b) Compute \(u(W_0 + 10000)\), \(u(W + 20000)\), \(u(W + 30000)\) and \(u(W - 20000)\).

c) Show that \(u(W_0 + X) < 2.3\) for any value of \(X\).

d) Will the person do the investment if the return are either -66.6% or +10 000 000% with equal probability?

Suppose that the person will turn down the investment opportunity only for a wealth range of ±5%, and beyond that range the person is risk neutral.

e) (Use a spread sheet) Assuming risk aversion, what is an upper bound on the utility gain from one billion extra, starting from \(W_0 \cdot 1.05\)?

f) Will the person accept a lottery with a prospect of losing either 20 000 kroner or gaining 1 billion kroner with equal probability?

**Problem 4** (Liberal paternalism)

Thaler and Sunstein argues for the use of choice aritechure to make subjects choose what is good for them (paternalism) without coercion (liberalism). One example is default options, where liberalism is ensured as it is easy to opt out.

In many airlines it is possible to buy CO\(_2\) compensation when you purchase a ticket. Usually the default option is not to choose the compensation, and consumers have to opt in. Suppose that such a compensation is in fact the socially most efficient alternative. Would it be an example of liberal paternalism to change the default option to be the choice of compensation, and have customers to opt out if they do not want to buy compensation?

**Problem 5** (Doing it now or later)

Please direct any questions concerning this problem to Geir B. Asheim (Room ES1152, Tel: 228 55498, e-mail: g.b.asheim@econ.uio.no)

You must perform an activity exactly once, and there are 4 periods in which to perform it. If you reach a period and has not yet performed the activity, then you must choose between “do it” or “wait”. You cannot commit your future self in a given future period to perform the activity then. If you wait until period 4, then you must do it then.

If the activity is done in period \(t\), then you incur cost \(c_t \geq 0\) and receive reward \(v_t \geq 0\).

Reward schedule: \(v = (v_1, v_2, v_3, v_4)\)

Cost schedule: \(c = (c_1, c_2, c_3, c_4)\)

Differentiate between two cases:

- **Immediate costs**: incur cost when you do it, receive reward after some delay.

- **Immediate rewards**: receive reward when you do it, incur cost after some delay.
Assume that you, in any period, put half weight on reward received or cost incurred in any future period, compared to if the reward is received or the cost is incurred in the current period, but the same (half) weight on reward received or cost incurred in different future periods. Hence, in period $t$ your utility for “do it” in period $\tau \geq t$ is given as follows.

For immediate costs:

$$U_t = \begin{cases} \frac{1}{2} v_\tau - c_\tau & \text{if } \tau = t, \\ \frac{1}{2} v_\tau - \frac{1}{2} c_\tau & \text{if } \tau > t, \end{cases}$$

For immediate rewards:

$$U_t = \begin{cases} v_\tau - \frac{1}{2} c_\tau & \text{if } \tau = t, \\ \frac{1}{2} v_\tau - \frac{1}{2} c_\tau & \text{if } \tau > t, \end{cases}$$

**Example with immediate costs.** Suppose that you have to do an assignment one of the following four Saturdays. The assignment has to be done by the forth Saturday. The cost of doing the assignment is that you will not be able to see a movie being shown that Saturday. A mediocre movie is shown the first Saturday, a good movie is shown the second Saturday, a great movie is shown the third Saturday, and (best of all) a movie with your favorite actor/actress is shown the fourth Saturday. Hence, the reward and cost schedules are as follows:

- Reward schedule: $\mathbf{v} = (0, 0, 0, 0)$
- Cost schedule: $\mathbf{c} = (3, 5, 8, 13)$

**Example with immediate rewards.** Assume now instead that you have a coupon to see one movie for free one of the next four Saturdays, and that you cannot afford to pay for a second movie. The movies being shown are as in the previous example. Hence, the reward and cost schedules are as follows:

- Reward schedule: $\mathbf{v} = (3, 5, 8, 13)$
- Cost schedule: $\mathbf{c} = (0, 0, 0, 0)$

**Problems.** For each of these two examples, answer the following questions:

1. At the first Saturday, when do you want to do the activity?
2. *Naive*. If you can change your mind every Saturday, but you are fully un-aware of the future self-control problems that this leads to (and therefore expect to behave in the future exactly as you currently would like your future selves to behave), when will you actually do the activity?
3. *Sophistication*. If you can change your mind every Saturday, and you are fully aware of the future self-control problems that this leads to, when will you actually do the activity?