ECN 275/375 Environmental and natural resource economics
Exercise set 12

Exercise 12.1 – The "cake eating" problem

Henry is 70 years old and expects to live for ten more years. He is paranoid about the authorities and paying taxes, and has therefore stashed away 1 million NOK in a safe place. He is well aware that he forfeits interest income on this, but his paranoia is stronger.

Henry has a personal discount rate (impatience of consumption) of 10 percent per year. For simplicity assume Henry goes to the secret hiding place and fetches money once a year. His utility of consumption is the natural log function of the form $ln(y+1)$ where 1 equals 10 000 NOK, and y is income in 10 000 NOK.

(a) Formulate Henry's decision problem.

(b) Build a simple simulation model on your computer, and try to find Henry's optimal consumption path for the ten years he expects to live.

(c) Suppose that Henry does not know exactly when he will die. He is well educated in statistics, and figures that with his health record and eating habits, there is 95 % probability that that he could live 12 more years in stead of his initial estimate of 10 years. How would that change his consumption profile based on the above table.

Exercise 12.2 – Backstop technology

The initial per unit price of a resource is 1, and society's discount rate is 5%. In year zero, the price of the backstop technology is 3. Annually, the unit cost of using the new technology drops by 10%.

(a) At what time should the backstop technology introduced?

(b) What would be the impacts of expectations about a backstop technology be on resource extraction and resource prices?