Exercises for seminar week X, November 23 - 26, ECON3215/4215, fall 2010

A

Cowell problem 10.8 (page 324)

B

An individual has an initial wealth of 1,000, but runs a ten percent risk of losing 100 due to an accident. The loss can be fully or partially insured. Denote the amount of insurance K, so that $K = 0$ represents no insurance, $0 < K < 100$ represent partial insurance, and $K = 100$ represents full insurance. The premium rate is p, that is, the cost of K units of insurance is pK. Assume that the individual's decisions can be described as expected-utility maximization, and let u be the utility function.

(a)   Formulate the individual's decision problem.

(b)   Assume that the rate p is fair, in the sense that the insurance company makes zero profit in expected value. If the individual is risk averse, what is the optimal K? Justify your answer, mathematically and/or graphically.

(c)   Now assume that p is higher than the fair rate described in (b). If the individual is risk neutral, what is the optimal K?

(d)   Describe qualitatively (for example, by a graph) the behavior of a risk-averse individual facing a rate as described in (c).

(e)   If the utility function is U(x) = ln x, derive an expression for the ratio between the individual's final wealth with and without an accident.

(f)   Return to the assumptions of (b), that is, fair premium rate and risk-averse individual. At a cost of C, the individual can reduce the risk of accident to five percent. For which values of C is the risk-reducing activity socially optimal? Will it be undertaken, when full or partial insurance can be bought, as described above?