
Handout #4

Midterm is over now - I hope to have the results out this week. Now we are heading towards the end of the quarter. Be prepared for new topics and anticipate a final exam and/ or a project; announcements will follow.

Solutions to Problem Set 3: Uncertainty

Uncertainty I

1.) Functions i.) and iii.) have the expected utility property as they are affine transformations of their utility functions.

Uncertainty II

2.) Take an exponential utility function of the form

$$u(x) = a + b e^{-x/\rho}, \text{ where } \rho \text{ is the risk tolerance}$$

$$u'(x) = -b/\rho e^{-x/\rho}$$

$$u''(x) = b/\rho^2 e^{-x/\rho}$$

$$-u''(x) / u'(x) = 1/\rho, \text{ which is the risk aversion coefficient and is constant.}$$

Uncertainty III

3.) Given a quadratic utility function of the form

$$u(x) = x - bx^2, \text{ and } b > 0$$

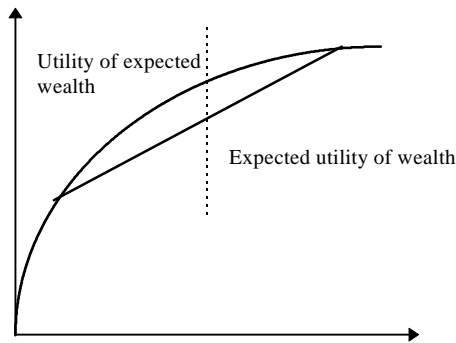
$$u'(x) = 1 - 2bx < 0 \Rightarrow 2bx > 1 \Rightarrow \text{when } x > 1/2b, \text{ marginal utility is decreasing.}$$

$$u''(x) = -2b \Rightarrow \Gamma(x) = -u''(x) / u'(x) = 2b / (1 - 2bx)$$

$$\Gamma'(x) = -2b(1 - 2bx)^{-2}(-2b) = (2b / (1 - 2bx))^2 > 0, \text{ therefore, } \Gamma(x) \text{ increases with wealth.}$$

Uncertainty IV

4a.) The utility curve of the average risk-averse farmer is concave. Therefore, the utility of expected wealth lies above the expected utility of wealth. Given there is an opportunity to insure against a risk such as fire damage, the farmer will always choose to do so.



b.) In order to self-insure, the risks must be independent. However, this does not hold in the case of flood damage. If one house in the neighborhood is damaged by a flood it is likely that all or many of the houses will be damaged.

c.) The risk-averse farmer will always choose to fully insure at a "fair" or competitive price for insurance.

Problem Set 4: Economic Efficiency

To brush up your Edgeworth box-skills and get practise in problems of efficiency in an exchange economy:

Economic Efficiency I

Luenberger: Chapter 6, Problem 3

Economic Efficiency II

Luenberger: Chapter 6, Problem 7