ECON 402 Summer 2006

Assignment 2

1. Suppose $B = 100$, $p_y = 1$ and p_x falls from 1 to 0.25. If

$$u = 2x - \frac{1}{2}x^2 + y$$

Compute CV and EV. What do you notice? Why does this happen?

2. Skippy is a risk averse individual with \$500 income assigns a utility of 100 to \$450 and a utility of 120 to \$500. She is willing to pay at most \$50 for a lottery ticket that pays \$250 with probability of 1/2 and \$0 with probability 1/2. Then, True or False, her utility of \$700 is 140.

3. A ship is overdue in port and a shortage of water develops. The limited supplies available are divided amongst all those on board. Myrtle (one of the crew) receives 225 pints of water, which is her supply from today (day 1) until the ship docks. Her utility function is

$$u = 600P - 2.5P^2$$

where U is utility an P is her daily consumption of water (in pints). For simplicity, today's utility from water is assumed to be independent of yesterday's consumption. The probability of making landfall at the end of day 1 is 0.6, at the end of day 2 is 0.3 and the end of day 3 is 0.1. How many pints of water does Myrtle allocate to consumption on each of the three days?

4. (See Below[1])An individual has no current endowment and can gain rights to consume only by working in one of two industries, producing the same good.
In the risky industry wages = 100 units of x ($= w_R$). The probability of state a is $13/20 = \pi_a^R$ and the probability of state b is $7/20 = \pi_b^R$.
In the safe industry wages = 81 units of x ($= w_S$). The probability of state a is $1/2 = \pi_a^S$ and the probability of state b is $1/2 = \pi_b^S$.
In state a the worker contracts asbetosis and his utility would be $U(x, 0) = x^{1/2}$. In state b the worker is healthy and his utility would be $U(x, 1) = 2x^{1/2}$.
The worker is indifferent between the industries except for the increased risk of state a.

   (a) Show that the worker is indifferent between the two industries, given the risk and relative wages and absent opportunities to gamble before job choice.

   (b) Without calculating a numerical result, determine whether the worker would be willing to make a fair gamble in X prior to choice of industry, the gain or loss to be paid concurrently with his receipt of wages.

   (c) Show how, if a gamble were chosen, the outcome of the gamble would affect his choice of occupation.

   (d) Show that the optimal gamble, denoted $(1/2, 1/2.B, -B)$ that maximizes expected utility is $B = 19$. (Hint: equate marginal utilities across industries)

[1] This problem is tricky, but not overly technical. It comes from Marshall, J. "Gambles and the Shadow Price of Death", *American Economic Review LXXIV (1984)*