

Practice Set 3

1. An investor has a utility of wealth function given by: $U(w) = w + kw^2$ where k is a constant and $w > 0$ is the investor's wealth.

(i) Show under what circumstances this utility function would be appropriate for a risk-averse investor who prefers more wealth to less

(ii) Show whether the function exhibits:

- a. increasing, decreasing or constant absolute risk aversion
- b. increasing, decreasing or constant relative risk aversion

2. The loss to an individual from the occurrence of an adverse event is £200 and the probability that the event will occur is 0.2. Insurance is available against the loss.

(i) The utility of any level of wealth for a particular individual is given by the function: $U = 200 + w + \frac{500}{w}$ where U = utility and w = wealth and the individual's initial level of wealth is £250.

Calculate, to the nearest penny, the maximum premium the individual is prepared to pay to cover this risk.

(ii) The utility of any level of capital (can be regarded as insurer's wealth) for a particular insurer is given by the function: $U = 5,000 + 0.7c$ where U = utility and c = capital and the insurer's initial level of capital is £1,500.

Calculate the minimum premium the insurer is prepared to charge for taking on this risk.

2. Consider the two risky assets A and B with cumulative probability distribution functions:

$$F_A(x) = x$$

$$F_B(x) = \sqrt{x}$$

In both cases $0 \leq x \leq 1$.

(i) Show that A is preferred to B on the basis of first-order stochastic dominance.

(ii) Verify explicitly that A also dominates B on the basis of second-order stochastic dominance

Excel exercise:

Go to finance.yahoo.com. Choose Apple and Microsoft stocks and download their price histories for one year.

- a. For each stock, go to the stock quote page. On this page, there is a top row consisting of several links, including “Historical data.” Choose this link, then check that the top row settings show a time period going back 1 year (starting today’s date) and frequency = daily. Now click on “download data.” You will have a csv file, which opens with Excel.
- b. Remember to check that the dates for the two stocks match – if there are misaligned observations, please remove them so that the two stocks have the same one year of data.

Questions:

1. Use the Adj Close column (these prices are adjusted by the dividend yield) to calculate the daily returns.
$$R_t = \ln P_t - \ln P_{t-1}$$
2. Calculate the average returns, variance and the standard deviation of the returns in your sample.
3. Calculate the covariance and the correlation coefficients of the stocks