Practice Set MVPT

1) Consider an economy where there are just two companies, ABS and BNA whose shares are available for investment. The expected return on ABS shares is 8%, and the expected return on BNA shares is 12%. The rates of return of these two stocks have a correlation coefficient of 0.2. The standard deviation of the rates of return on ABS shares is 4% and the standard deviation of the return on BNA shares is 8%. An investor prefers more to less and can short sell both assets (i.e. hold negative amounts of either asset).

   a)   A portfolio P is formed using only ABS and BNA shares and which has the lowest variance. Derive P and hence calculate the expected return and the standard deviation for this portfolio.

   b)   Suppose the investor requires an expected return of 9% with the lowest possible variance from a portfolio Q formed using ABS and BNA. Derive Q and hence calculate the standard deviation for this portfolio.

   c)   Derive the general equation for the efficient frontier.

2) Assume that in an economy there are only two assets available for investment, A and B. The expected returns (as percentages), denoted by E, are $E_A = 9$ and $E_B = 6$ respectively. The risks, measured by standard deviations, denoted by σ, are $\sigma_A = 20$ and $\sigma_B = 10$ respectively. The returns on the assets are perfectly negatively correlated.

   a)

       i)   Derive the general expression for the mean and standard deviation of a portfolio formed from assets A and B.

       ii)   Hence construct a risk-free portfolio F formed from assets A and B.

   b)

     i)   Derive the equation of the efficient frontier for the economy. (Note: A will on efficient frontier as it is asset with highest expected return but B may not be on efficient frontier as it may lie below point of minimum variance).

     ii)   Hence construct a portfolio P formed from assets A and B which has the same risk as B but a higher expected return.

   c)

       i)   Draw and label the graph of the opportunity set on the $E - \sigma$ space, showing the positions of A, B, F, P and the efficient frontier.

       ii)   Discuss the relationship between an investor's indifference curves and risk/return preference.