

## AcF305: International Financial and Risk Management

### Week 9 tutorial questions

1. The country Prince Rupert's Land (PRL) has two companies, the Hudson Bay Company (HBC) and the Boston Tea Traders (BTT). In equilibrium, the returns of these two companies have the following distributions:

	Expected excess returns	Covariances	
		HBC	BTT
HBC	0.11	0.04	0.01
BTT	0.08	0.01	0.02

- a. Vary the weight of HBC from 0 to 1 by increments of 0.1 and compute how the portfolio covariance risks of HBC and BTT change as a function of the weights  $x_{hbc}$  and  $x_{btt} = 1 - x_{hbc}$ .
- b. Find the optimal weights of  $x_{hbc}$  and  $x_{btt} = 1 - x_{hbc}$  that equalise the ratio of expected excess stock return over stock covariance with the portfolio for the two stocks.
- c. If the total value of the PRL stock market portfolio is 1,000, what are the values of HBC and BTT?
2. Consider the following covariance matrix and expected return vector for assets 1, 2 and 3:

$$V = \begin{bmatrix} 0.01 & 0.002 & 0.001 \\ 0.002 & 0.0025 & 0.003 \\ 0.001 & 0.003 & 0.01 \end{bmatrix} \quad E(r) = \begin{bmatrix} 0.033 \\ 0.0195 \\ 0.025 \end{bmatrix}$$

- a. Compute the expected return on a portfolio with weights for assets  $j=0, \dots, 3$  equal to  $[0.2, 0.4, 0.2, 0.2]$ , when T-bill (asset 0) yields a return of 1%. Do so directly, and then via the excess returns.
- b. Compute the variance of the same portfolio.
- c. Compute the covariance of the return on each asset with the total portfolio return and verify that it is weighted covariance.