Exercises – Week 41

Introduction to Financial Engineering

Note: You may choose to work in R or Matlab. Sometimes solutions will be available in one language, sometimes in both.

1. (portfolios, diversification, efficient frontier) Use the data from Exercise 1, Week 40. Assume the risk free rate is 2% (or otherwise estimate it based on the USD 3m LIBOR rate found online – for instance on www.bankrate.com).

   (a) Calculate the efficient frontier for a combination of McDonalds and Coca Cola without a risk-free asset and the CML with the risk-free asset included.

   (b) Now add Microsoft to the portfolio and redo the previous question. Add the new efficient frontier and the CML to the same graph. Comment on your findings.

2. (portfolios, diversification, efficient frontier) Use the data and code from Exercise 1 and modify to include:

   (a) No bank account (risk-less lending) and no short selling allowed. Plot this in the same graph as with short selling allowed and comment on your findings

   (b) Risk-less lending is allowed and no short selling. Plot this in the same graph as above.

   (c) No more than $1/2$ of the wealth invested in each asset