Assignment Week 5 - Single and Multi index models [1]

1. Single Asset Model

   Pick weekly historical data for the following 8 stocks (American Express, McDonalds, Google, Exxon Mobil Corporation, IBM, Nike, Wal-Mart, Coca-Cola)

   For each of the assets calculate the needed parameters for the single index model on the period 1st Jan 2007-1st Jan 2013

   1.1. Calculate the market continuous returns, and the expectation of yearly return and variance (Use the S&P 500 as 'the market').

   1.2. Use linear regression to estimate β_i, α_i and σ_{ei}^2 for each of the stocks. *Hint: you can use Matlabs built-in functions* `LinearModel.fit` *or* `fitlm`. *Documentation of the functions can be viewed by typing* `doc LinearModel.fit` *or* `doc fitlm` *into the command window.*

   1.3. Calculate the real yearly co-variance matrix of the continuous stock returns .

   1.4. Calculate the expected return and variance of the equally weighted portfolio (same holding in each of the assets). One is based on the real estimation and the other one based on the single index model.

[1] Omri Ross September 24, 2015

2. Multi index models (Optional, not needed for final exam, solution will not be supplied)

   2.1. We will assess the data that was collected in previous question using a multi -asset model. Collect data for the following three indices as explanatory data : S & P 500 , NASDAQ-100 Technology Sector (NDXT) and NYSE ARCA OIL & GAS INDEX (XOI)

   2.2. Estimate the parameters of the multi index model for American Express, Google, IBM and Exxon Mobil Corporation. Did the additional indices help explaining the expected returns of the stocks? Discuss your results.

   2.3. Repeat exercise 1.3. for the multi index model without assuming that the indices are uncorrelated and compare your results with the ones of question 1.3.[2].

   2.4. Repeat exercise 2.3. without the assumptions that the indices are uncorrelated.

[2]In order to simplify manners, make the (incorrect) assumption that the indices are uncorrelated. How could you overcome this assumption?