Assignment Financial Econometrics

1. Unconditioned Estimation/Scaling Factors

In this task you will estimate CAPM and CCAPM with a scaled factor. The EViews file `data_cochrane_rawdata.WF1` provides the necessary data. For this exercise use the 25 Fama/French portfolios (`s1b1 - s5b5`), the market return `Mktexret` and the T-bill rate `rf`. As scaling factor cay_t use the standardized factor `cay1`. You have to generate this variable the following way: `cay1 = (cay-@mean(cay))/@stdev(cay)`
The stochastic discount factor is specified as:

$$\text{CAPM:} \quad m_{t+1} = a_1 + a_2 cay_t + b_1 R^m_{t+1} + b_2 (R^m_{t+1} \times cay_t)$$

$$\text{CCAPM:} \quad m_{t+1} = a_1 + a_2 cay_t + b_1 \Delta c_{t+1} + b_2 (\Delta c_{t+1} \times cay_t)$$

The moment conditions are collected in a vector:

$$\begin{bmatrix} E[m_{t+1} R^{e,1}_{t+1}] \\ \vdots \\ E[m_{t+1} R^{e,25}_{t+1}] \end{bmatrix} = 0$$

a) Estimate the unconditioned moment conditions.
Hint: If excess returns are used you need to set $a_1 = 1$.

b) Compute and interpret the J_T statistic.
Hint: When using EViews use *iterated* estimation and compute the J_T-statistic in the following way: $J_T = J \cdot T$, where T is the number of observations.

c) Conduct the following test for joint significance $H_0 : a_2 = b_2 = 0$ and interpret the result.

d) Plot the estimated $\{m_{t+1}\}$ sequence against time.

e) Plot the average excess returns vs. predicted excess returns.
Hint: The predicted returns R^i for each return decile can be calculated from

$$E(R^i) = \frac{1 - cov(m, R^i)}{E(m)}$$

Predicted excess returns can be computed as:

$$E(R^{e,i}) = -\frac{cov(m, R^{e,i})}{E(m)}$$

2. Conditional Estimation

Now estimate CAPM and CCAPM using managed portfolios without scaling factors. Then the stochastic discount factors are:

$$\text{CAPM:} \quad m_{t+1} = a_1 + b_1 R^m_{t+1}$$

$$\text{CCAPM:} \quad m_{t+1} = a_1 + b_1 \Delta c_{t+1}$$

The moment conditions can be summarized in vector:

$$\begin{bmatrix} E[m_{t+1} R^{e,1}_{t+1}] \\ \vdots \\ E[m_{t+1} R^{e,i}_{t+1}] \\ E[(m_{t+1} R^{e,1}_{t+1}) cay_t] \\ \vdots \\ E[(m_{t+1} R^{e,i}_{t+1}) cay_t] \end{bmatrix} = 0$$

Again, when using excess returns, set $a_1 = 1$ for identification. To avoid a huge number of orthogonality conditions use a sub-sample of test assets for this and the following task:

`s1b1_r`, `s1b3_r`, `s1b5_r`,
`s3b1_r`, `s3b3_r`, `s3b5_r`,
`s5b1_r`, `s5b3_r`, `s5b5_r`

Now:

a) Estimate CAPM and linearized CCAPM using the conditional moment conditions.

b) Compute and interpret the J_T statistic.

c) Plot the average excess returns vs. predicted excess returns.

3. Conditional Estimation with Scaling Factors

In the third task we combine scaling from task 1 and managed portfolios from task 2.

a) Estimate CAPM and linearized CCAPM using the conditional moment conditions and scaling factors.

b) Compute and interpret the J_T statistic.

c) Plot the average excess returns vs. predicted excess returns.

d) Conduct the following test for joint significance $H_0 : a_2 = b_2 = 0$ and interpret the result.