7th set GAUSS assignments Financial Econometrics

1. Scaling factors- Lettau/Ludvigson

Write additional procedures to estimate the CAPM with scaled factors. In the GAUSS file `cay.fmt` you find the instrument used by Lettau/Ludvigson(JPE 2001). To replicate the results of Lettau/Ludvigson, use the 25 Fama/French portfolios provided in `ff_25.fmt`, the market return provided in `mkret_ll.fmt` and the T-bill rate provided in `tbill_ll.fmt`. The stochastic discount factor is specified as:

$$m_{t+1} = a_1 + a_2 cay_t + b_1 R^m + b_2 (R^m_{t+1} \times cay_t)$$

Note: Adjust the data sets, so that the time-dimension matches!
The moment conditions are collected in a vector $g_T(b)$:

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

Hint: If excess returns are used you need an additional moment restriction to identify the parameters. This moment restriction follows directly from the fact that $E(mR^F) = 1$.

2. Plot the average excess return vs. predicted excess return

Modify your programm code which returns the series for the stochastic discount factor to account for the different specification of the SDF. Produce the plot fitted excess return vs. realized excess return.

3. Additional Task: Scaling factors - Cochrane

Estimate the CAPM with scaled factors for the Cochrane deciles: Scale the factors with the two instruments term spread and dividend/price ratio provided in `instruments.fmt`. Use return data on the ten portfolios from the last assignment sheet. For the market return use the data contained in `mkret.fmt`.
The stochastic discount factor is specified as

$$m_{t+1} = a_1 + b_1 R^m + b_2(R^m_{t+1} \times d/p) + b_3(R^m_{t+1} \times term)$$

Note, that the constant is not scaled by the instruments (hence, the constant is not time varying), since Cochrane does not include the instruments themselves as factors. In order to replicate the results in Cochrane (JPE 1996), you have to provide conditional estimates of the scaled model (use only return decile 1, 2, 5 and 10 together with the "managed portfolios" $R^{e,i}z^i$). Note: We use excess returns again! The moment conditions for conditional estimates of the scaled factor model are now (as in the managed portfolio case):

$$g_T(b) = \begin{bmatrix} E[m_{t+1}R^{e,1}_{t+1}] \\ \vdots \\ E[m_{t+1}R^{e,10}_{t+1}] \\ E[(m_{t+1}R^{e,1}_{t+1})z^1_t] \\ \vdots \\ E[(m_{t+1}R^{e,10}_{t+1})z^1_t] \\ E[(m_{t+1}R^{e,1}_{t+1})z^2_t] \\ \vdots \\ E[(m_{t+1}R^{e,10}_{t+1})z^2_t] \end{bmatrix}$$

where z^1_t is the term spread and z^2_t is the dividend/price ratio. Do not forget the identifying moment condition: $E(mR^F) = 1$.

Modify your programm code which returns the series for the stochastic discount factor to account for the different specification of the SDF. Produce the plot fitted excess return vs. realized excess return.