

10th set GAUSS assignments Financial Econometrics

The GAUSS code `evntst.g` for this assignment sheet is based on chapter 5 and 6 of the book "Using SAS in Financial Research", written by Boehmer, Broussard, Kallunki (2002) and partly on chapter 4 of "The Econometrics of Financial Markets" from Campbell, Lo, MacKinlay (1997). The data set `returns.dat` contains the event date (`evntdate`), return data (`ret`), market return data (`mrktret`), a date variable (`dat`), a dummy variable for positive or negative earnings announcements (`evntdum`) and a firm indicator (`firm`).

1. Event study analysis

- i) First, take a look how the data are structured. Therefore, read in the data from the file `return.dat`. You can use the read in steps from the program `evntst.g`. Create an indicator variable which takes the value 1 if the date in the date column is less than the event date and 0 otherwise.
- ii) Then, write a procedure which conducts OLS estimation and returns the estimated parameters as well as the estimated error variance (or standard deviation).
- iii) The following steps are done for each stock and each event separately:
 1. Determine the estimation period and select the sub-matrix belonging to this period.
 2. Then, estimate the market model with your OLS procedure:

$$R_{it} = \alpha + \beta R_t^m + \varepsilon_t$$

3. Determine the event period (take a look in the example program) and select the sub-matrix belonging to the event period.
4. Use your estimated parameters to calculate abnormal returns in the event period:

$$\widehat{AR}_{i\tau} = R_{i\tau} - \hat{\alpha} + \hat{\beta} R_{\tau}^m$$

5. Compute cumulative abnormal returns: $\widehat{CAR}_i = \sum_{\tau} \widehat{AR}_{i\tau}$ and the variance of the CAR :

$$\widehat{Var}(CAR_i) = \gamma' \hat{\mathbf{V}}_i \gamma$$

where

$$\hat{\mathbf{V}}_i = \hat{\sigma}_{\varepsilon_i} (\mathbf{I} + \mathbf{X}_i^* (\mathbf{X}_i' \mathbf{X}_i)^{-1} \mathbf{X}_i^{*'})$$

\mathbf{X}_i^* is the data matrix from the event period and \mathbf{X}_i is the data matrix from the estimation period. \mathbf{I} denotes the identity matrix and $\hat{\sigma}_{\varepsilon_i}$ is the error variance.

6. Compute the standardized cumulative return:

$$\widehat{SCAR}_i = \frac{\widehat{CAR}_i}{\sqrt{\widehat{Var}(CAR_i)}}$$

....TO BE CONTINUED