11th set GAUSS assignments Financial Econometrics

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 `readin_es.prg`.

After you got some idea about the data structure, 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 (Hint: Use and `if` statement or use the Gauss command `code`).

ii) Then, write a procedure which conducts OLS estimation and returns the estimated parameters as well as the estimated error variance (or standard deviation). We will call the procedure in the next step.

iii) The following steps are done for each firm and each event separately, which means using loops over firms and events.
However, to keep things less complex, you might want to start with selecting one firm (and one type of event) and add the loop in the end:

1. For each event determine the estimation period and select the sub-matrix belonging to this period (the Gauss command `unique` can be used to determine the number/index of events). Create an index that counts the days relative to the event day, i.e., the event day would be indexed with zero. The estimation period contains all data until 10 days prior to the event and the event window is t=[-3,1], including three days prior to the event, the event day and the day after.
2. Then, estimate the market model with your OLS procedure:

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

3. Determine the event period 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: $\widehat{CAR}_i = \sum_\tau \widehat{AR}_{i\tau}$.
6. Compute the standardized cumulative return $\widehat{SCAR}_i$, i.e. the cumulative abnormal returns are standardized by the standard deviation of the estimation period abnormal returns: the variance of the estimation period abnormal returns is multiplied by the number of days in the event period and cumulative abnormal returns are then divided by the square root of this product. Save the result in a matrix together with the firm indicator and the event dummy. (If you add the loops over firms later on, conduct vertical concatenation, so you end up with a matrix containing standardized cumulative abnormal returns associated with a special firm and event type.)

iv) Calculate the Patell's test statistic for all events as well as positive and negative events only.

$$t_{Patell} = \frac{\sum_i \widehat{SCAR}_i}{\sqrt{n}}$$

This assignment can be handed in for grading until 17th February 2009.
If you want to hand in this assignment for grading, include your program code and a pdf file that shortly describes the procedures. Outline the main idea of an event study and interpret the estimated parameters and test statistic.
Send your program code and the pdf file to franziska-julia.peter@uni-tuebingen.de