10th set GAUSS assignments Financial Econometrics

1. Estimating the Huang/Stoll(1997) model

i) Write a procedure which returns the moment conditions implied by the HS model. In the GAUSS files `ads_tim.fmt`, `bmw_tim.fmt` and `dcx_tim.fmt` you find trade data for the three stocks over a period from 1st February 2004 to 10th February 2004. (Use the procedure from last week to read in the data.) The estimable equation which can be derived from the theoretical HS framework reads as:

$$\Delta P_t = \frac{S}{2} \cdot \Delta Q_t + v \cdot \frac{S}{2} \cdot Q_{t-1} + u_t$$

and implies the following moment conditions:

$$E \begin{bmatrix} u_t \\ u_t Q_t \\ u_t Q_{t-1} \end{bmatrix} = 0$$

where Q_t is a trade indicator taking the value 1 if the trade is a buy and -1 if the trade is a sell. ΔP_t is the price change from period $t-1$ to t. Note, that the spread S is estimated in this specification.
Estimate the model parameters for all three stocks.

ii) Write a procedure which returns the moment conditions implied by the HS model taking into account different volume categories. The estimable equation which can be derived from the theoretical HS framework reads as:

$$\Delta P_t = \frac{S^s}{2} D_t^s + (\lambda_s - 1)\frac{S^s}{2} D_{t-1}^s + \frac{S^m}{2} D_t^m + (\lambda_m - 1)\frac{S^m}{2} D_{t-1}^m + \frac{S^l}{2} D_t^l + (\lambda_l - 1)\frac{S^l}{2} D_{t-1}^l + u_t$$

where
$$\begin{aligned}
D_t^s &= Q_t &&\text{if share volume at } t \leq 1000 \text{ shares} \\
&= 0 &&\text{otherwise} \\
D_t^m &= Q_t &&\text{if share volume at } t < 10000 \text{ shares} \\
&= 0 &&\text{otherwise} \\
D_t^l &= Q_t &&\text{if share volume at } t \geq 10000 \text{ shares} \\
&= 0 &&\text{otherwise}
\end{aligned}$$

and implies the following moment conditions:

1

$$E \begin{bmatrix} u_t \\ u_t D_t^s \\ u_t D_{t-1}^s \\ u_t D_t^m \\ u_t D_{t-1}^m \\ u_t D_t^l \\ u_t D_{t-1}^l \end{bmatrix} = 0$$

Estimate the model parameters for all three stocks. Save the stock symbols, parameter estimates and standard errors for all stocks in one matrix and print it to the output window (Hint: Use FTOCV, look it up in the help reference).

This assignment can be handed in for grading until 3th 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. Shortly outline the main features of the Huang and Stoll (1997) model and interpret the estimated parameters.
Send your program code and the pdf file to franziska-julia.peter@uni-tuebingen.de