9th set GAUSS assignments Financial Econometrics

Add the new procedures related to the estimation of trade indicator models to the procedure file related to trade indicator models (e.g. `timprocs.src`).

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. 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.

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
$$
\begin{aligned}
D_t^s &= Q_t \quad \text{if share volume at } t \leq 1000 \text{ shares} \\
&= 0 \quad \text{otherwise} \\
D_t^m &= Q_t \quad \text{if share volume at } t < 10000 \text{ shares} \\
&= 0 \quad \text{otherwise} \\
D_t^l &= Q_t \quad \text{if share volume at } t \geq 10000 \text{ shares} \\
&= 0 \quad \text{otherwise}
\end{aligned}
$$
and implies the following moment conditions:

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