Econometrics III (module 5, 2023–2024)

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Assignment 5

Problem 1 "Publish or perish, and continue," 10 points

Continue with Problem 2 of Assignment 4.

3. Show that even if the shape of the actual conditional distribution of M given x is not in fact Poisson but the conditional mean $\lambda(x|\alpha, \beta)$ is correctly specified, the QML estimator based on the Poisson distribution is consistent.

Problem 2 "File your returns!", 25 points

`StockC.dat` and `StockT.dat` are data files for daily close prices p_t for stocks C and T, respectively. Convert daily close prices to daily returns: $r_t = \log p_t - \log p_{t-1}$. Allowing for only a constant in the mean equation, estimate a so called *log-GARCH(1,1)* model:

$$r_t = \mu + \eta_t,$$

where

$$\eta_t = \sigma_t \varepsilon_t,$$

with $\varepsilon_t \sim i.i.d. (0, 1)$, and

$$\log \sigma_t^2 = \omega + \beta \log \sigma_{t-1}^2 + \alpha \log \left(\sigma_{t-1}^2 \varepsilon_{t-1}^2 \right).$$

Use the gaussian QML approach to estimate the model. Construct and informally compare two sets of ML standard errors and one set of robust QML standard errors.

Problem 3 "The other Hansen's GMM", 15 points

Consider the just-identified model

$$y = x_1' \beta_1 + x_2' \beta_2 + e,$$

where $E(xe) = 0$ and $x = (x_1', x_2')'$. We want to test $H_0 : \beta_1 = 0$. Three econometricians are called to advise on how to test H_0:

- Econometrician 1 proposes testing H_0 by a Wald statistic.

- Econometrician 2 suggests testing H_0 by the GMM Distance Difference Statistic.

- Econometrician 3 suggests testing H_0 using the test of overidentifying restrictions.

You are asked to settle this dispute. Explain the advantages and/or disadvantages of the different procedures, in this specific context.