Advanced Econometrics II
Homework 6

Deadline: 2012-02-21 09:30

You are to hand in your homework via email to ta@zamojski.net by 9:30 on Tuesday. I would appreciate if your answers were TeXed in full, if you insist you can scan your handwritten answers at TI and send them to me as well.

You can work in groups of two.

Exercise 1 (small weight)

1. Provide at least 3 examples (each) for when the following models can be used:
   - Ordered Probit
   - Nested Logit
   - Poisson regression
2. Explain:
   - Why does a log-likelihood function in binary response models (almost) never achieve its upper bound, and why is this an issue when it happens?
   - Why in many of the models described in Chapter 11, it is not possible to include a constant among the explanatory variables?
   - What is overdispersion?
   - What is the difference between censored and truncated data, give a few examples.

Exercise 2

The contribution to the log-likelihood function (11.09) made by observation t is $y_t \log F(X_t\beta) + (1 - y_t) \log(1 - F(X_t\beta))$. First, find G_{ti}, the derivative of this contribution with respect to β_i. Next, show that the expectation of G_{ti} is zero when it is evaluated at the true β. Then obtain a typical element of the asymptotic information matrix by using the fact that it is equal to $\lim_{n\to+\infty} \left\{ \frac{1}{n} \sum_{t=1}^{n} \mathrm{E}\left[G_{ti}G_{tj}\right] \right\}$. Show that the asymptotic covariance matrix (11.15) is equal to the inverse of this asymptotic information matrix.

Exercise 3

Show the the ML estimator is the global likelihoood maximiser for the multinomial logit model.