

# Numerical Methods for Ph. D Students in Economics

## Homework 4

Read <http://www.econ.umn.edu/~bajari/8602/hw1.pdf>.

- (1) Estimate a standard logit model.
- (2) Consider a variation of the above model, where the coefficient  $\alpha_i$  on a price is randomly drawn for each individual  $i$  (this coefficient is fixed for all experiments). Assume  $\alpha_i = \alpha + \sigma_\alpha \eta_i^\alpha$ , where  $\eta_i^\alpha \sim N(0, 1)$  iid. Estimate the model via maximum simulated likelihood method.
- (3) Fix parameters in the model we considered in question (2). Draw  $S$  random data sets, each with the sample size  $N \times T$ , where  $N$  is the number of people and  $T$  is the number of experiments. Set  $T = 10$ . Estimate the model for  $N = 200, 500, 1000$  for each data set. Compare the actual standard errors and asymptotic standard errors.
- (4) Estimate the exploded logit model.