EC3090, Michael Curran TA Clemens Struck
HT 2013 4pm: March 13, 2013

Problem Set 3: Senior Sophisters

Identification

Exercise 1 (20 Marks)**.** On the topic of identification, in problem set 1 you were asked to bound probabilities (using law of total probability):

$$P(y) = P(y|z=1)P(z=1) + P(y|z=0)P(z=0)$$
$$H[P(y)] = [P(y|z=1)P(z=1), P(y|z=1)P(z=1) + P(z=0)]$$

and bound expectations (using law of iterated expectations):

$$E(y) = E(y|z=1)P(z=1) + E(y|z=1)P(z=1)$$
$$H[P(y)] = [E(y|z=1)P(z=1) + g_0P(z=0), E(y|z=1)P(z=1) + g_1P(z=0)]$$

where $E(y|z=1) \in [g_0, g_1]$.
Come up with your own example (you can make up data – assume some of the data is missing or take an example from treatment response like in problem set 1), bound some probability using the law of total probability, bound some expectation using the law of iterated expectations and discuss.

Solution 1 (Identification)**.**
5 Marks for a well worked out example. 5 Marks for a well worked out bound on probability. 7 Marks for a well worked out bound on law of iterated expectations. 3 Marks for a reasonable discussion.

Limited Dependent Variable Models

Exercise 2 (50 Marks)**.** Along with dummy independent variables and the basic linear probability model, we studied logit, probit, tobit, poisson, censored and truncated models plus how to correct for sample selection, all under the heading of limited dependent variable models. Choose two models from logit, probit, tobit, poisson, censored and truncated models and come up with an example in each case. In each case motivate the use of the model for the particular example, estimate the model on some data you find for your example (you may make this up or get it from Wooldridge or elsewhere), interpret the estimates and discuss.

Solution 2 (Limited Dependent Variable Models)**.**
5 Marks for each well worked out example. 6 Marks for each motivation. 7 Marks for each estimation. 4 Marks for each correctly interpreted estimation. 3 Marks for each discussion.

IV/2SLS

Exercise 3 (20 Marks)**.** Come up with a model where you believe one of the regressors to be endogenous. Motivate an instrumental variable in place of your possibly endogenous regressor and test for endogeneity. Estimate this model, interpret your estimates and discuss.

Solution 3 (IV/2SLS)**.**
3 Marks for well motivated model. 3 Marks for well motivated instrumental variable. 6 Marks for testing for endogeneity. 4 Marks for estimating model, 2 Marks for interpreting estimates and 2 Marks for discussion.

Simultaneous Equations Models

Exercise 4 (10 Marks)**.** Discuss the problem of identification in Simultaneous Equations Models. Compare and contrast Iterated Least Squares and 2 Stage Least Squares as estimation procedures for Simultaneous Equations Models.

Solution 4 (Simultaneous Equations Models)**.**
5 Marks for discussing identification in SEM. 5 Marks for comparing and contrasting ILS and 2SLS. See SEMslides.pdf and SEMnotes.pdf for both.