Written Exam for the M.Sc. in Economics summer school 2012

Behavioral and Experimental Economics

Final Exam

August 21, 2012

(2-hour closed book exam)

Question 1: Causal effects

Consider an outcome of interest Y that depends on a list of determinants, i.e. $Y = f(X_1, \ldots, X_N)$. A causal effect of X_1 on Y is the effect of varying X_1 holding fixed all other determinants $Z = (X_2,\ldots,X_N)$. Answer questions a) to d) with reference to the notation introduced in Falk and Heckman (*Science* 2008).

a) Does an observed causal effect depend on the level of Z? (Hint: refer to "separability")

b) Does an observed causal effect depend on the level of X_1? (Hint: refer to "separability")

c) Suppose a laboratory experiment identifies a strong causal effect of X_1 on Y (given Z) and a field experiment identifies a weaker effect of X_1 on Y (given Z'). What can be concluded for the ability of results from experiments to "generalize" to other environments Z''?

d) Explain how "randomization" serves to neutralize the effect of uncontrolled determinants (X_u) on Y.

e) Provide an example (of research using non-experimental data) in which an observed difference between two groups is not causal but is likely to result at least in part from selection.

Question 2: Competitive Markets

Consider the Double Auction institution (Smith, JPE 1962). Suppose there are 5 buyers (B) and 5 sellers (S) with the following induced values.

ID number	Value of first unit	Value of second unit
B1	75	65
B2	85	60
B3	95	55
B4	105	50
B5	110	45

ID number	Value of first unit	Value of second unit
S1	55	90
S2	60	85
S3	65	80
S4	70	75
S5	55	95

a) Calculate the prediction (according to the "theory of supply and demand") for prices, quantities and surplus (hint: note that units are discrete)

b) Suppose that a tax of 25 is levied on all sellers in this market. Calculate equilibrium prices, quantities and surplus (hint: note that units are discrete)

c) What is the typical observation in such markets? (e.g. Smith, JPE 1962)

Question 3: Prospect theory and endowment effects

a) Name the three key assumptions of Kahneman and Tversky (ECMA 1979) about how people evaluate risky prospects (in particular if they involve the possibility of losses).

b) What is the "endowment effect"? Provide an example.

c) How does the endowment effect relate to the assumptions of Prospect theory?

d) What does the existence of an endowment effect imply for the Coase Theorem? (Hint: refer to property rights)

Question 4: Biases in probability estimates

a) Consider the following scenario: For a woman at age 40 who participates in routine screening, the probability of breast cancer is 0.01. If a woman has breast cancer, the probability is 0.9 that she will have a positive mammogram. If a woman does not have breast cancer, the probability is 0.1 that she will still have a positive mammogram. Now imagine a randomly drawn woman from this age group with a positive mammogram. What is the probability that she actually has breast cancer?
(Hint: use Bayes' rule)

b) What probability would a person prone to the Base-rate fallacy estimate for the woman at age 40 to have breast cancer in the example above? (explain why)

c) Kagel, Ganguly and Moser (JRU 2000) translate a similar scenario into an asset market context in which an "analyst" provides a report (signal) about success or failure of some company. The authors find that individual estimates are systematically biased, but prices in the market reflect the correct (Bayesian) probability of success in some cases and were far off in other cases. Explain under what conditions (and why) either outcome prevailed.

Question 5: Voting and redistribution

The questions below refer to Höchtl, Sausgruber and Tyran (EER forthcoming).

a) Explain what the numbers in line/column (3;2) and (2;3), i.e. 0.51 and 0.99 show. (Hint: the calculations assume that the share of inequality-averse voters is 20%)

	1	2	3	4	5	6	7	8
1	-	0.96		0.97		0.98		0.99
2	0.64	-	0.99		0.99		1.00	
3		0.51	-	1.00		1.00		1.00
4	0.82		0.41	-	1.00		1.00	
5		0.66		0.33	-	1.00		1.00
6	0.90		0.66		0.26	-	1.00	
7		0.97		0.85		0.21	-	1.00
8	0.94		0.80		0.50		0.17	-

b) In all treatments, the prediction for voting of self-interested poor voters is to opt for $t = 8$, the prediction for the rich voters is $t = 1$.
Consider treatment PMV (when the poor are in majority). How do average votes by the poor and the rich compare to predictions? How does the aggregate outcome compare to predictions? Explain.

Question 6: Cooperation and punishment

a) What is the standard game-theoretic prediction in the Public Good Game (or, voluntary contribution mechanism) if played once? (Hint: $0 < a < 1 < an$).

b) Explain how the "strategy method" can be used to elicit cooperator "types" (e.g. in Thöni, Tyran and Wengström JPubE 2011). Describe the profile (slope) for a free rider and of a conditional cooperator. What distribution of "types" do the authors find in the Danish population?

c) Gächter, Herrmann and Thöni (Science, 2008) observe substantial variation across countries in the punishment game with "informal" sanctions (e.g. Fehr and Gächter AER, 2000). How do the authors explain this variation?

d) Markussen, Putterman and Tyran (2011, WP) implement a game with voting on formal sanctions. What is the prediction of standard theory for voting and contributions in treatment DC, i.e. when $s = 0.8$ and $c = 2$, if the alternative is no sanctions? How do these predictions change in treatment DE, i.e. when $s = 0.8$ and $c = 8$? How do experimental results compare for voting in DC and DE?

Hint:

$$\pi_i^{FS} = (1-s)(20-C_i) + 0.4\sum_{j\in g} C_j - c$$

$$= 20(1-s) + (0.4+s-1)C_i + 0.4\sum_{j\neq i} C_j - c$$

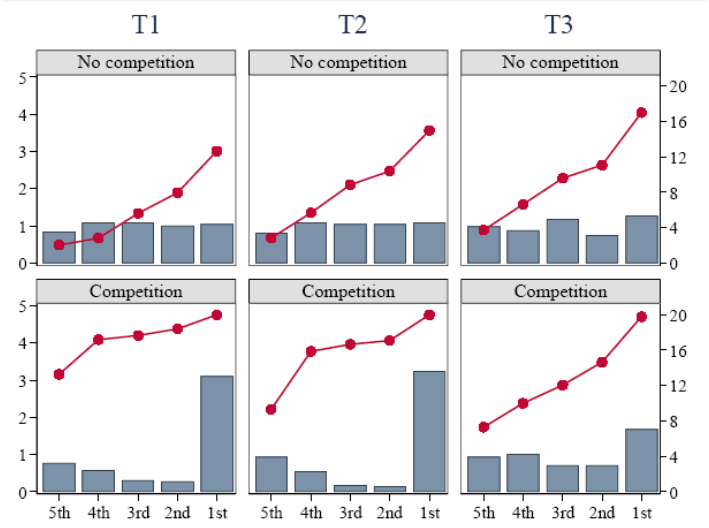
Question 7: Cooperation and competition

In Reuben and Tyran (EJPE 2010) $k = 5$ groups of $n = 3$ players compete as follows

$$\pi_{ik} = \pi_i \times f(r_k),\ \pi_i = y - c_i + \alpha\sum_j c_j,$$

a) What is the profit-maximizing contribution choice for player i in the following situation? Suppose $E = 20$, $\alpha = 0.4$. The average contribution in each of the other k-1 groups is 12, and the other n-1 members of player i's group contribute 20 on average.

b) Consider the following figure from Reuben and Tyran (EJPE 2010).



- How do treatments T1, T2, T3 differ?
- What do the red lines show in the diagram above? (briefly comment on the findings)
- What do the bars show? (briefly comment on the findings)