

SUGGESTED ANSWERS for

Final exam, M.Sc. in Economics summer school 2014

Behavioral and Experimental Economics

Question 1: Methodological aspects

- a) In what ways is it problematic when an experimental study does not implement a ceteris paribus variation?

(Hint: Slembeck and Tyran JEBO 2004 is an example).

(A: If the variation is controlled the experimenter can still identify a causal effect of the variation if behavior is systematically different as a result. But if treatments differ along several dimensions, it is impossible to tell exactly which of the changes caused the behavioral change between treatments, and to what extent).

- b) Can experiments which fail to induce preferences as explained in the Induced Value Theory (Smith, AER 1982) nevertheless be interesting? Use an example to illustrate.

(A: Control in the sense of inducing preferences is critical for some experiments (e.g. for those wanting to test the capacity of Double Auction vs. Posted Offer markets to equilibrate) but may be less important for other experiments. Sometimes, we would like to measure social preferences rather than to induce preferences. Example: In the ultimatum game (or the cooperation game with punishment stage) we measure to some extent the willingness to punish unfair behavior etc.)

- c) Explain the expression “experimenter demand effect”. Why are such effects a problem? What can be done to mitigate the problem?

(A: Experimenter demand effects occur when the experimenter (knowingly or not knowingly) suggests a particular type of behavior to experimental subjects (e.g. by the wording of instructions).

Possible solution in the lab: Neutral behavior/wording, experimenter does not know the theoretical prediction or purpose of the experiment

Experimental subjects believe that they should behave in a particular manner (e.g. economically rational) because they are observed by the experimenter (e.g. an economist).

Possible solution: The degree of observation or subject anonymity can be varied in the lab. Example: Double blind procedure, in online experiments (e.g. iLEE) subjects participate remotely and are completely anonymous to the researcher.

Alternative solution: implement a “natural field experiment” in which participants do not know that they are participating in an experiment

- d) “First-wave” behavioral economics has been criticized as being irrelevant for economics. Use the example (from assignment 1) in which Swedish human resource managers are asked questions about workers’ responses to wage cuts to illustrate some of these critiques (name three issues, describe the scenarios first). How can these issues be addressed in “second-wave behavioral economics” type of research? (Hint: refer to experiments by Fehr and Tyran in GEB 2007 and in ECMA 2008 but be brief)

(A: the scenario, taken from Agell and Bennismarker, 2003, is as follows:

Assume hypothetically, that your enterprise is making a small surplus. There is no inflation and unemployment is high. There are many job seekers applying for a job at

your unit. Under these circumstances you decide to propose a wage cut of 5%. How do you think that your employees would find this proposal? (94.3% of the managers believed that this proposal is not acceptable to workers). Alternative scenario: 10% inflation and 5% wage increase. Now, only 50.4% of the managers thought that workers would find the proposal not acceptable.

Potential problems: Surveys are not salient, i.e. there are no incentives for responding thoughtfully or truthfully. It is not clear from the answers whether the managers are prone to nominal loss aversion / money illusion or whether they think that workers are prone to it (Fehr and Tyran GEB 2007 disentangle the total effect (efficiency loss due to coordination failure) into a direct vs. an indirect effect by either letting subjects play a strategic game against others or by lettering them play against pre-programmed computers). Interaction may multiply or mitigate biases (as discussed in Fehr and Tyran, ECMA: strategic complements multiply, strategic substitutes mitigate)

- e) Cappelen et al. (JEEA 2013) investigate how needs and entitlements shape dictator giving. They use a real effort task to study the issue. Describe the task. How does performance in this task depend on the origin of participants (*Hint*: participants were from HI- and LI-countries). How do participants respond to differences in incentives? In what ways are these observations (answers to the last two questions) problematic and how can they be explained?

(A: subjects copy a text in English by typing it for 30 and are paid a piece rate. Subjects from HI-countries (Germany and Norway) are much more (about three times) productive than subjects from LI-countries (Uganda and Tanzania). Productivity, i.e. the number of correctly typed words, is totally unresponsive to changes in incentives. The reasons are that students from LI-countries are not used to typing, probably because they do not own computers. Labor supply is unresponsive because subjects were in a corner solution, i.e. they already worked as hard as they can at the low piece rate. While surprising and probably unanticipated by the researchers, these facts are not a problem because they focus of the study is not on labor supply responses to some intervention (e.g. a tax change) and having a systematic component in income differences does not hamper interpretations too much. A possible limitation is that there are few observations when a HI meets a LI player where the LI had contributed more to the common pie, and this might induce some asymmetry in estimates of τ .)

Question 2: Social Preferences

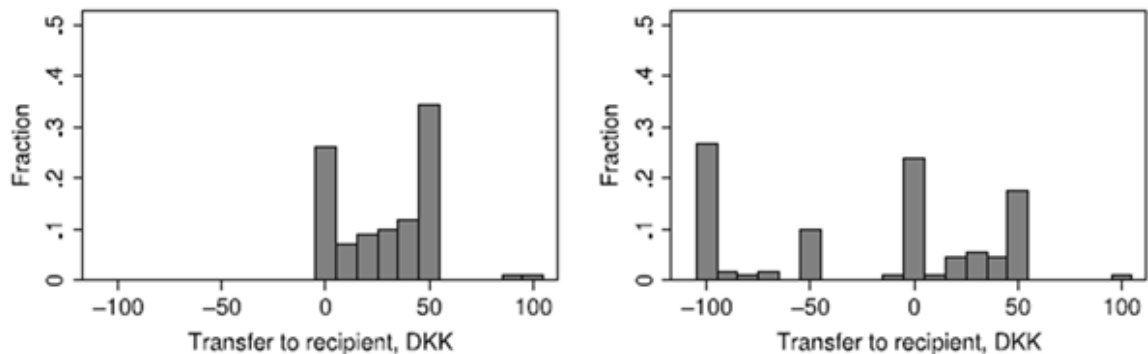
- a) Describe the Ultimatum Game (Güth et al., JEBO 1982). What is the subgame-perfect Nash-equilibrium in this game?

(A: Two players. One is endowed with c by the experimenter. This player (the proposer) suggest a share s to the other player (the responder). The responder decides whether to accept (in which case the payoffs are $c - s, s$) or to reject, in which case both get zero. The subgame-perfect Nash equilibrium prediction is to send the minimum amount ε which is accepted by the responder. Note that there are many Nash equilibria).

- b) What are the main stylized facts observed in the Ultimatum Game (UG)?

(A: According to Fehr and Schmidt (QJE 1999): Virtually no offers above $s = 0.5$; Almost no offers $< 0.2c$ (approx. 5% of offers) ; Most offers are in the range $0.4c$ to $0.5c$ (approx 70% of offers) ; Responders frequently reject very uneven proposals and the probability of rejection decreases with s)

- c) What are the approximate shares of players in the Dictator game (DG) who give nothing and who give half of the “pie” according to the meta study by Engel (ExEC 2011)?
(A: about a third (36%) of subjects give nothing, about a fifth (17% give half of the pie)
- d) What has been concluded from behavioral differences in UG and DG concerning “generosity” as a motive for giving?
(A: Much of the generous offers observed in the UG are not driven by generosity but by fear of rejection. Note: rejection is not possible in the DG).
- e) The figure below is taken from (Cappelen et al. Economics Letters 2013). Explain the design, including treatments Give and Take. How do the authors interpret the main result with respect to “generosity”?



(A: Dictator (= player A) is «tentatively» allocated 200 kr., other 100 kr. In GIVE: Dictator can send from 0 to 100 kr. to other player. In TAKE: as in Give but can also take 0 to 100 kr. So, if A sends 50 kr., they both end up with 150 kr. which is “fair”. But: self-interest: take 100 kr. (i.e. A gets everything, B nothing).

Main result: the share of positive giving falls about by half (from 74% to 34%), and the median transfer falls to 0 in TAKE (from 30 in GIVE). Interpretation: the drop in positive share of giving is not compatible with pure generosity as a motive for DG giving but is consistent with «manners». What is appropriate to give is to some extent determined by contextual cues.

- f) Describe the study by Franzen and Pointner (ExEc 2012). In what ways does this study shed light on the “generalizability” of findings in the dictator game?

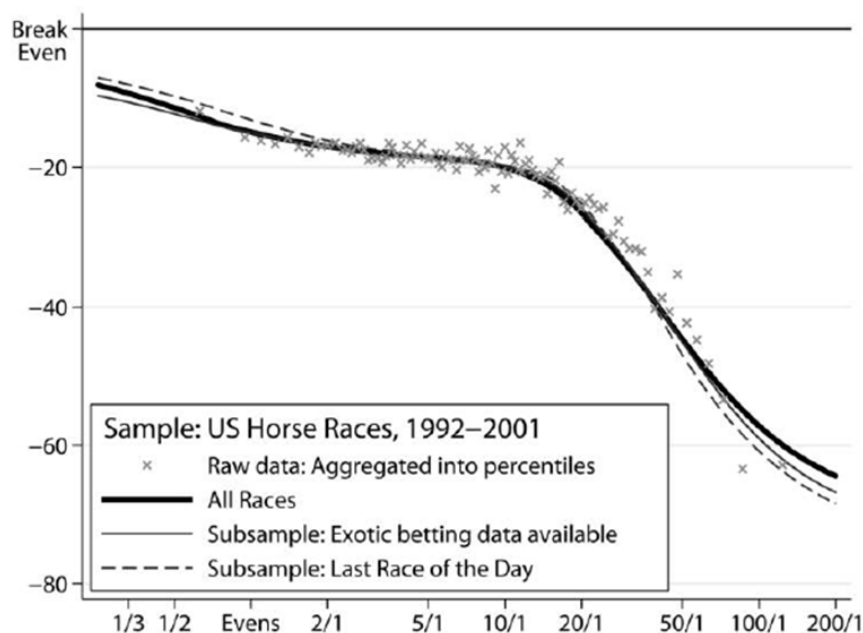
(A: Participants first do a DG in the lab, some time later they (unwittingly) get a “misdirected letter” containing money (student sample, letter is a grandma sending her grandchild money for good grades). Study finds a positive correlation between giving in the lab and tendency to return the misdirected letter. Thus, support for external validity.

Question 3: Biases in probability judgments

- a) Name and briefly explain the four key assumptions of Prospect theory (Kahneman and Tversky, ECMA 1979).
(A: 1. Risky prospects are not evaluated in terms of outcomes (final wealth, as in EU) but in terms of changes w.r.t. to a *reference point* r (often initial wealth). 2. Losses weigh more heavily than gains of equal size (kink at the reference point): *loss aversion*, 3. Concave in gains but convex in losses → risk aversion in gains but *risk loving in losses*. 4. *Probability weighting*: people do not proportionally perceive differences in probabilities («weight») but think in terms of «does not happen», «may happen», «will

happen» (people tend to overreact to small probability events but under-react to medium and large probabilities).

- b) The figure below shows the main finding in Snowberg and Wolfers (JPE, 2010) who study horsetrack betting in the United States. What is approximately the rate of return per dollar bet for a “long shot” and a “favorite”, respectively? How can this finding be related to prospect theory?



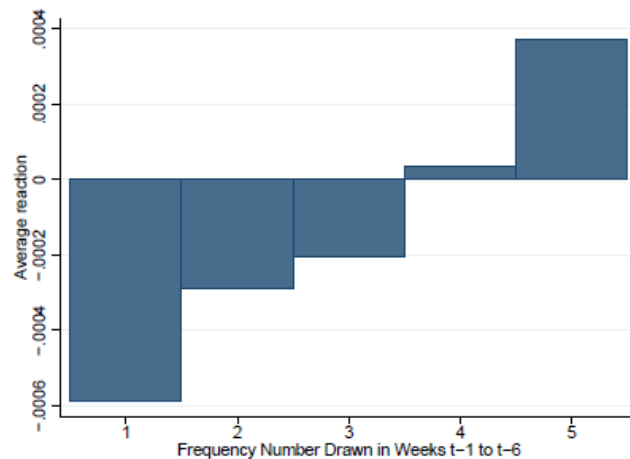
(A: long shot: about -60%, i.e. the typical bet results in a loss of 60 cents per Dollar, “favorite” about -10%. The finding is compatible with the assumption of probability weighting in prospect theory (small probabilities receive too much weight))

- c) Friedman (AER 1998) observes that subjects do not “switch” as often as predicted by standard economic theory in the standard Monty Hall Game. Explain this game and the standard prediction. Name two treatment variations that can mitigate the “anomaly” and explain why these manipulations are expected to work.

(A: The subject initially picks one of three face-down cards. Then the conductor turns over a non-prize card that the subject did not choose and offers her the opportunity to switch to the other face-down card. Finally, both face-down cards are turned over, one of which was the prize card. Each trial the subject earns 40 cents when her final choice turns out to be the prize card and 10 cents otherwise.

Ways to mitigate: i) use many doors rather than only 3. The reason is that with 3 doors, the strategies “remain” and “switch” have relatively similar payoffs (1/3 and 2/3) which means that the difference is hard to learn for someone who holds the prior that it is 50%. With 10 doors, say, the contrast gets much stronger (1/10 vs. 9/10). ii) Another option is to let a different subject (or the computer) choose the first door. This reduces “regret”. Other options discussed in Friedman are “track record” (show counterfactual success rates) which is supposed to facilitate statistical learning, intense incentives (pay more for finding the prize) which is supposed to induce added cognitive effort, “advice” (subjects may not be able to formulate the correct solution but are supposed to recognize it when it is presented to them) the “compare” (learn from experience of others). But none of these has strong effects. Slembeck and Tyran (JEBO 2004) look at simple institutions like (rank order) competition (supposed to elicit more cognitive effort and allows for learning from others) and communication (learning from others, “wisdom of the crowds”). Jointly, these institutions are very successful.

- d) The figure below is taken from Jørgensen, Suetens and Tyran (WP 2011) who study Lotto gambling in Denmark. Explain the finding shown in the figure and how it relates to the theory forwarded in Rabin and Vayanos (RES 2010). (*Hint: be brief*)



(A: The authors study lotto gambling in Denmark (where lotto can be played over the internet), and where choices of individual players can be tracked over time. The figure shows how lotto players pick lotto numbers as a function of “hotness” of the number, i.e. how often the number has been drawn in previous weeks, given that it has been drawn in the week immediately preceding the current week. The bar at level 1 indicates that players “move away from” or “avoid” numbers that have been drawn in the previous week, consistent with the gambler’s fallacy GF. The GF is a tendency to falsely believe in negative autocorrelation in a series of independent random events. As the number gets “hotter” (i.e. has been drawn more often in the weeks before t-1), the players tend to bet more on such numbers, consistent with the Hot Hand (HH) fallacy. HH fallacy is the false belief in positive autocorrelation in a series of independent random events. This pattern (GF dominates for short streaks, HH fallacy dominates for long streaks) is consistent with the theory of Rabin and Vayanos, RES 2010).

Question 4: Voting

Questions a) to c) refer to Sausgruber and Tyran (JPubE 2011) who study voting on taxation in goods markets. Questions d) and e) refer to Morton, Piovesan and Tyran (WP 2012).

- a) “Tax LSE” serves as a benchmark to formulate the hypothesis of a “tax-shifting bias” in this paper. Explain these expressions and how they relate.

(A: Tax LSE stands for “tax liability side equivalence” and is a basic tenet of public economics that it does not matter (for the tax incidence) what side of a market is taxed. The authors mean by “tax-shifting bias” that buyers underestimate the extent to which a seller tax is shifted to buyers (compared to their estimate of the burden when an equivalent buyer tax is levied).

- b) Describe the mechanism determining the tax regime and the tax rate in treatment BuyerTax, and explain why the procedure is incentive compatible.

(*Hint: In treatment BuyerTax, the participants’ choice variable is τ_{si} .*)

(A: In BuyerTax, each buyer indicates a tax rate τ_{si} for a transaction tax to be levied on the sellers which makes them indifferent to a tax levied on buyers of $t = 25$ (this is the

default tax). The median of these tax rates $\text{med}(\tau_{si})$ is then determined. A random draw τ_s from the interval $[25, 50]$ is then compared to the $\text{med}(\tau_{si})$. If $\tau_s > \text{med}(\tau_{si})$: buyer tax of $t = 25$ is implemented. If $\tau_s < \text{med}(\tau_{si})$: seller tax of τ_s is implemented. Interpretation: $\text{med}(\tau_{si})$ reflects the indifference point of the median voter (it is a short-cut for majority voting). If the government were to propose a seller tax larger than $\text{med}(\tau_{si})$, it would be rejected by a majority vote, and vice versa for a seller tax smaller than $\text{med}(\tau_{si})$.

The mechanism is incentive-compatible because the voters have no incentive to distort their preference (i.e. not to indicate their true τ_{si} that makes them indifferent). The reason is that they never get the tax they indicate but the random draw (or the reference tax). For example, if they state a seller tax beyond their true indifference point, they run the risk (if they are the median) to obtain a seller tax that is so high that they would have preferred the default buyer tax. The logic is similar to a second-price auction.

- c) What is the main finding from the comparison of treatment BuyerTax with SellerTax?

(A: Voting is well in line with the theoretical prediction of $t = 25$ in treatment SellerTax, i.e. when the alternative is a given seller tax of 25, voters mainly opt for low taxes. However, when the buyer tax is exogenously set at 25, voters prefer high taxes on sellers which is in conflict with Tax Liability Side Equivalence.)

- d) Morton, Piovesan and Tyran (WP 2012) investigate information aggregation in majority voting. Explain the mechanism for the case of a committee with $n = 3$ voters when each voter is presented with two options and knows the correct answer with a probability of $2/3$.

(A: The committee is right when everyone picks the correct option and when two of the voters pick their correct option (and there are three such cases). That is, the committee is right with $(2/3)^3 + 3 \cdot (1 - 2/3) \cdot (2/3)^2 = 74.1\%$ which is more than the individual probability to be right ($2/3$). Thus, there is positive information aggregation in this case.

- e) Explain treatment “opinions” in Morton, Piovesan and Tyran (WP 2012) and why the authors implement it. What is the main finding? (*Hint*: refer to “easy” and “hard” questions)

(A: In “opinions” the subject get “social information” about how popular a particular policy is in the electorate (like opinion poll). That is, they learn what policies other voters prefer but not whether these are the “right” policies. This is implemented by informing voters about the proportion of votes for option a and b in another group (who did the experiment before). The treatment is motivated by the assumption in the Condorcet Jury theorem that signals have to be independent for information aggregation to work properly. The “opinions” treatment is intended to correlate signals. The authors expect a detrimental effect on information aggregation when voters face “difficult” or “hard” questions (i.e. when they have $p_i < 0.5$), but a positive effect when the problems are “easy” (in fact, voters should ignore their private signal for a when support for b in the other group is at least 60%, and vice versa for b). The hypothesis is supported by the evidence: Opinions improve efficiency (compared to baseline) when voters tend to get it right (91% vs. 81%) but reduce efficiency even further when they are biased (4% vs. 28%)

Question 5: Cooperation and Institutions

- a) Tyran and Feld (SJE, 2006) study the effect of voting on formal sanctions on cooperation. Describe treatment MildEnd.

Hint:

| | No law | Mild law | Severe law |
|------------|-------------------|---------------------|-----------------------|
| Exogenous | NoEx $n = 42$ | MildEx $n = 42$ | SevereEx $n = 42$ |
| Endogenous | NoEnd $n = 45$ | MildEnd $n = 36$ | SevereEnd $n = 39$ |

(A: A linear public goods game with $E = 20$, $n = 3$ and $a = 0.5$ is studied in 6 treatments. A sanction or “fine” is to be paid by those who do not contribute efficiently, i.e. $E = 20$ points, to the public good. The fine s has three levels: 0, 4, 14 points. The fine is either imposed by the experimenter or subjects can vote on the sanction (in this case, it is a two-stage game with majority voting in the first stage and contributions in the second stage. In MildEnd, $s=4$ and voting is on whether to have MildEnd or no sanction (NoEnd), Subjects have to indicate their expectations, this is a one-shot game).

- b) What is the prediction for MildEnd if all players are fully rational and egoistic?

(A: Sanction is rejected in first stage, zero contribution in the second stage)

- c) What do the authors observe in treatment MildEnd? How do contributions compare to MildEx? How do the authors explain these observations?

(A: 60% of voters accept the mild sanction of $s = 4$, and contributions in MildEnd are significantly higher than without sanction and higher than in MildEx. Voting for the mild sanction is interpreted as a signal of cooperativeness. Because most players are conditionally cooperative, this signal induces cooperation.)

- d) Markussen, Putterman and Tyran (RES, 2014) also implement a cooperation game with voting on sanctions. How does their treatment NC compare to MildEnd in Tyran and Feld (SJE 2006)?

(A: In MPT (2014), the basic game (treatment NS for no sanction) is a linear public goods game with $n = 5$ (partner), $E = 20$, $a = 0.4$, i.e. with a unique free-riding equilibrium. They also study majority voting for sanctioning institutions. But MPT has many periods while FT is a one-shot game (and uses the strategy method, MPT is computerized, TF was classroom). Decision is made by pairwise comparison of alternatives in 2 cycles. Formal institutions mete out a sanction s per point kept on the private account and come at a fixed cost c (there were no fixed costs in FT). MPT 4 types of formal sanctions in a 2x2 design: deterrent ($s = 0.8$) vs. non-deterrent ($s = 0.2$) and cheap ($c = 0.1E$) vs. expensive ($c = 0.1E$), yielding the four treatments, e.g. NC stands for Non-Deterrent and Cheap. In TF, MildEnd is also a non-deterrent sanction.

The purpose of the experiments is related but different. In TF, the purpose was to show that democratically selected institutions can have beneficial effects (perhaps because they are more legitimate) in a very simple setting. Institution was free (no fixed costs) and there was no attractive alternative (in MPT the alternative is informal sanctions which turn out to be rather popular).