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Suggested Answers in Final exam for MA course "Behavioral and Experimental Economics"

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Question 1: Experimental methods

a) Explain the following expressions
   - "replication": repeating a treatment under identical conditions
   - "ceteris paribus variation": repeating a treatment while varying only one aspect of the treatment, allows to isolate causal factors
   - "session": Sequence of periods / decision situations with the same subjects on the same day
   - "treatment": Specific combination of economic agents, environment, institution
   - "randomization": Assigning participants to treatment conditions in a non-systematic manner, thus neutralizing differences in subjects' observed characteristics
   - "Duhem-Quine problem": experimental results always present a joint test of the theory that motivated the test, and all the things that had to implement in the test (e.g. specifics of measurement, protocols)
   - "partner matching": participants are assigned to groups of constant composition in repeated interaction.

b) Explain the sufficient conditions to "induce" experimental subjects' preferences (Smith, AER, 1982).

(A: Medium of payment: money $m = (m_0 + \Delta m)$, where: m_0 : 'outside money', Δm : Money earned during the experiment. An experimental subject has unobservable preferences: $V(m_0 + \Delta m, z)$, where z : represents all other motives.
Three crucial assumptions (sufficient for inducement):
Monotonicity: V_m exists and is positive for each combination of (m, z) ; Salience: the payment Δm depends on the actions of the subject. (Show up-fee is not salient); Dominance: The changes in utilities of a subject during the experiment depend importantly on Δm. The influence of z can be neglected. Interpretations of z: 'transactional effort', boredom, experimenter demand effects etc.)

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: 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) Describe the Impunity Game (e.g. Bolton and Zwick GEB 1995)

(A: The impunity game has the move structure of the UG but the payoff structure of the dictator game. If the responder rejects s, the responders gets 0 but the proposer still gets $c - s$)

d) What do the findings from the Dictator game and the Impunity Game suggest for the interpretation of the findings discussed in b)?

(A: In both the DG and the Impunity game s is close to zero, at least after some periods of repetition and under anonymous conditions. This suggests that altruism is not a plausible explanation for the apparently generous offers by the proposer in the UG. Instead, some responders seem to willing to punish proposers for unfair behavior, and this willingness to punish seems to be anticipated by the proposers.

Question 3: Guessing game

Consider the standard guessing game with factor $p < 1$. Suppose a share $s < 1$ of the $n > 2$ players is irrational. These players choose a no matter what and a share $1-s$ is rational (i.e. have rational expectations) and choose a best reply r to what everybody else does.

a) Derive the choices of the rational players in equilibrium as a function of p, s and a

(A: rational players all choose $r^* = psa /[1-p(1-s)]$)

b) Derive the equilibrium average number M^* and decompose the total effect into a direct and the indirect effect of a change in s.

(A: $M^* = (1-s)r^* + sa = r^*/p = sa /[1-p(1-s)]$

c) Derive the value of μ (the multiplier) in the expression $\partial M^*/\partial s = \mu (a - r)$

(A: $\partial M^*/\partial s = 1/[1-p(1-s)] (a - r)$

d) How does μ depend on the degree of strategic complementarity and the share of irrationals?

(A: μ is large if the degree of strategic complementarity p is high (i.e. $\partial\mu/\partial p > 0$) and if the share of irrationals is low (i.e. $\partial\mu/\partial s < 0$)

e) Calculate (i) the total effect, (ii) the direct effect and (iii) the indirect effect for the values $p = 0.8$, $a = 50$ is s changes from $s_1 = 0.1$, to $s_1 = 0.2$

(A: total effect: 9.9 (= 27.8–17.9), direct effect: 3.6 = (0.2-0.1)*(50-14.3) and indirect effect: 6.3 (= 0.8*(22.2-14.3))

Question 4: Labor markets

a) Describe the treatment GEM (stands for gift exchange market) in Fehr, Kirchler, Weichbold and Gächter (JOLE 1998) (Hint: $\pi = (v - w)e$; $U = w - c(e) - 20$; where: $v = 120$)

Firms repeatedly and anonymously post wages to a group of workers on a competitive market. There are 9 to 12 workers and 6 - 8 firms; Each firm can at most employ one worker. Incomplete contract: firms post prices to a group of workers (i.e. Posted Bid Auction), workers accept or reject. If reject, payoff is 0. If accept, worker chooses effort at cost c to him.

b) What is the standard game-theoretic prediction in the GEM?

(A: If agents are rational and selfish: $w = 21$, $e = 0.1$

c) How do observations in the GEM compare to the treatment BGE (stands for bilateral gift exchange)? What do the authors conclude from this observation?

(A: the main finding of the study is that competition in the GEM does not affect wage formation, i.e. it is essentially the same as in BGE. The conclusion is that gift exchange is robust to competition, i.e. that equilibrium rents and non-market clearing wages can exist in competitive markets, as long as contracts are highly incomplete)

d) What is the main difference between the GEM and treatment AE in Fehr and Falk (JPE, 1999)?

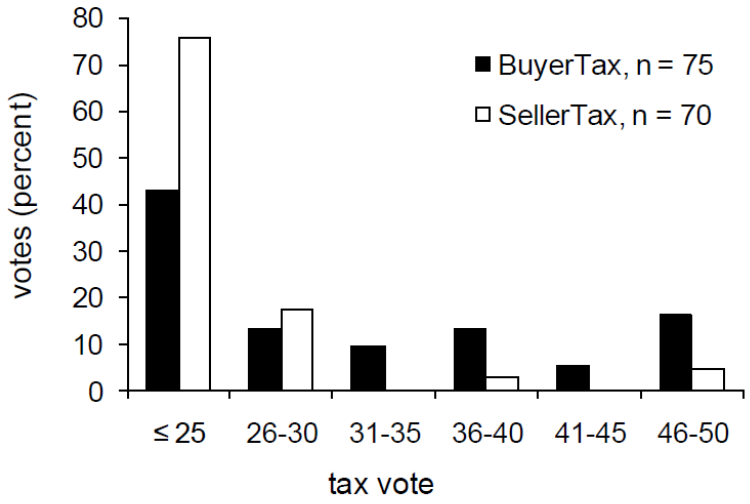
(A: the main difference is the auction type. In GEM, the authors use posted bid markets, in AE they use double auction markets in which both firms and workers can offer wages. Because double auction markets are more competitive than posted bid markets, the paper provides a robustness test for the finding in c)

e) What is the main finding for treatment AE (with effort choice) in Fehr and Falk (JPE, 1999).

(A: In AE, contracts are incomplete. Workers are keen to underbid each other. Due to the excess supply, many are willing to work at very low wages, close to the reservation wage. However, the firms do not accept such offers and prefer to make a contract with workers at high wages. This finding is in line with gift exchange theory.)

Question 5: Voting on taxes in goods markets

Sausgruber and Tyran (JPubE 2011) study voting on taxation in goods markets. The figure below shows some results from this study.



a) Describe how the goods market in Sausgruber and Tyran (2010) is organized.

(A: It is a Uniform-price sealed bid/offer market with 5 buyers and automated sellers. Bids are ordered from high to low, asks from low to high. The uniform price is determined by the last accepted bid. Information about values is private)

b) Explain treatment BuyerTax (Hint: Explain the difference between *t* and τ, how either of those is implemented, and why the procedure is "incentive compatible").

(A: The tax on buyers is exogenously set at $t = 25$. Each buyer proposes a seller tax τ_i. The median τ_{si} of those is determined. A random draw τ_s (between 0 and 50) is realized. If $\tau_s >= \tau_{si}$ → buyer tax of t = 25 is implemented. If $\tau_s < \tau_{si}$ → seller tax $\tau_s >$ 25 is implemented)

c) What is the main finding from the comparison of treatment BuyerTax with SellerTax? (Hint: refer to the figure above). Why is it important to implement treatment 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) Describe treatment "Deliberation"
(A: Same as BuyerTax, but participants can discuss the tax proposal for 5' through a computerized chat within their group. Communication is voluntary, public, non-structured, free, and non-strategic.)

e) What is the main finding in "Deliberation" as compared to BuyerTax?
(A: Deliberation is related to voting. Evidence of group polarization

Question 6: Cooperation and punishment

a) What is the standard game theoretic prediction in the Public Good Game (or, volutary contribution mechanism) if played once? (Hint: $\pi_i = c_i + a \Sigma_j g_j = (E_i - g_i) + a \Sigma_j g_j$)

(A: free riding ($g_i = 0$) is dominant, and zero contributions by all participants is the unique (inefficient) equilibrium.)

b) What constraint do such games impose on a and n?

(A: $0 < a < 1 < an$. Marginal payoff from private account is 1, from group account is $a < 1$. Hence, zero contribution is a dominant strategy (and the unique equilibrium). However, as $an > 1$, it is efficient to contribute all 20 points to the group account.)

c) Explain how the "strategy method" can be used to elicit cooperation profiles (e.g. in Thöni, Tyran and Wengström 2010). What are the characteristics of the profile for a free rider and of a conditional cooperator?

(A: In the strategy method, players indicate their contributions conditional on all possible contribution levels by others. The set of all conditional choices constitutes a cooperation profile. If a player indicates a flat profile at zero, he is classified as a free rider. If a player indicates a monotonically increasing profile, he is classified as a conditional cooperator. Thöni et al. find that conditional cooperators are the most common group in a (close to) representative Danish sample.)

d) Describe the "punishment" game by Fehr and Gächter (AER, 2000).

(A: Two stages. The first is the usual contribution stage in which n players decide on how to allocate 20 points to either a private or a public account, payoffs are as shown in formula in question a). The second stage is a punishment stage. Participants are informed about the contributions of other group members in the first stage and can assign punishment points. Punishment is costly for the punisher and (even more so) for the punished (usually 1:2 or 1:3). Treatment comparisons are with and without punishment (and change of sequence).

e) What are the standard game-theoretic predictions if the game in Fehr and Gächter (AER, 2000) is played once?

(A: There should be no sanctions (As they are costly, this is a second-order public good problem), and no cooperation.)

f) What are the main findings in Fehr and Gächter (AER, 2000) with respect to contributions over time and to punishment patterns?

(A: There is a lot of punishment (of those that contribute below average by those who contribute above average). On average, punishment is very effective in increasing contributions to the public good (Contributions jump from the last period in the treatment without sanctions to the first period in the treatment with sanctions, showing that people anticipate being sanctioned). The punishment mechanism works better in "partner" (group composition remains constant) than in "stranger" treatment. However, efficiency is not improved much (in particular in early periods) as sanctions are waste.)

g) Gächter, Herrmann and Thöni (2008, Science) observe substantial variation across countries in the punishment game. How do the authors explain this variation?

(A: depends strongly on the tendency to engage in antisocial ("perverse") punishment of cooperators which in turn is shaped by "norms of civic cooperation" and "rule of law" as measured in surveys)

h) 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:

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

(A: The predictions for DE and DC are the same: s = 0.8 means formal sanctions are deterrent, i.e. rational and self-interested agents do not free ride: C_i = 20. Therefore, both DE and DC will be accepted in voting. The results show that DC is mostly accepted – in phase 6 almost 90% vote for DC – but support is much lower for DE – only about 30% vote for DE over no sanctions.)