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

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Question 1: Behavioral economics

a) What is an "anomaly"? Name one example. (Hint: start by explaining the assumptions of standard economics)

   (A: The assumptions of standard economics are that economic agents are fully rational and strictly self-interested. Anomalies are systematic deviations of observed behavior from predictions based on these assumptions. Examples: framing (violates description invariance), Base-rate fallacy (violates Bayes' law), WTA/WTP-disparity, ...

b) Why do "cognitive biases" arise? How have such biases been demonstrated by "first-wave" behavioral economists and psychologists? Why have these demonstrations been criticized by economists?

   (A: Cognitive biases in decision making arise because we use simple heuristics that are often useful but sometimes lead us astray. Many demonstrations were based on hypothetical scenarios. Respondents were not motivated to respond thoughtfully or truthfully. Hence, these "demonstrations" were in many cases not even about actual behavior (but imagined or expected behavior). Example: Lottery choices: "What would you prefer to win x or to lose y ….". Later demonstrations involved actual choices, but most of these were one-off choices. Examples: Monty Hall problem, Wason selection task. It was argued that repetition may eliminated the anomaly.

c) What is the aim of "second wave behavioral economics"? Mention one example of research belonging to the "second wave"

   (A: The aim is to analyze how biases are transformed (multiplied and mitigated) by various institutional arrangements. For example, can people learn to overcome cognitive limitations? When will they learn more easily? What is the role of imitation? Of communication? Of voting? Etc. A specific example is Slembeck and Tyran (JEBO, 2004) who use communication and competition in the Monty Hall task to show that the incidence of rational choices greatly increases with these institutions)

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: Cooperation and punishment

a) Describe the standard linear Public Good Game (or, volutary contribution mechanism). (Hint: $\pi_i = c_i + a \Sigma_j g_j = (E_i - g_i) + a \Sigma_j g_j$)

(A: n players, each has 20 points to allocate to private or group account in each period $t = 1 \ldots T$. Payoffs: $\pi_i = c_i + a \Sigma_j g_j = (E_i - g_i) + a \Sigma_j g_j$. The game captures the aspect of a public good as all group members can benefit from contributions to the group account: exclusion is not possible.)

b) What is the standard game theoretic prediction in this game if played once?

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

c) 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.)

d) Explain the difference between "partner" and "stranger" matching

(A: In a partner design, the same group members remain together in a group for the entire duration of the experiment while with stranger matching group composition varies from period to period.)

e) Explain how the "strategy method" can be used to elicit cooperation profiles. 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)

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

(A: Two stages. The first is the usual contribution stage in which *n* players, as described in 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).

g) 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.)

h) 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.)

i) 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)

Question 4: 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 $1\text{-}s$ 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 5: 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) The figure below shows results for treatment AE (with effort choice) in Fehr and Falk (JPE, 1999). What do the dots in the figure show? What does the line show?

(A: the dots show workers' wage offers, the lines show average contract wages)

What is the interpretation of the fact that most dots are below the line? (Hint: refer to gift exchange theory)

(A: The figure shows that 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.)