Psychology and Economics Field Exam
August 2012

There are 2 questions on the exam. Please answer the 2 questions to the best of your ability. Do not spend too much time on any one part of any problem (especially if it is not crucial to answering the rest of that problem), and don't stress too much if you do not get all parts of all problems.

Question 1 (from 219A):

This is a question in which we consider whether Jong-Oh will forego watching his usual TV show in favour of a two-night miniseries, and variously involves questions of present bias, projection bias, and belief-based preferences.

Every single night of his infinite life Jong-Oh watches television.

He has always watched the show "South Fork". But now he has the chance to watch the two-night, two-part miniseries "North Fork". This is "on demand" TV: he can watch each part on any day he wants; it is available forever and ever.

On any night on which Jong-Oh watches South Fork and *either* he has never seen either part of North Fork *or* he has seen both parts in his life Jong-Oh gets a (normalized) payoff of 0. Jong-Oh gets instantaneous utility x on the first night (if ever) he watches Part 1 of North Fork, and $-\infty$ if it is the 2nd time he has seen Part 1. On any night in which Jong-Oh watches Part 2 of North Fork after having earlier seen Part 1 he gets instantaneous y. If he watches Part 2 after having watched it once before or before watching Part 1 he gets instantaneous utility $-\infty$. On *every* night in which Jong-Oh has seen Part 1 of North Fork any time in the past but has never seen Part 2 and is watching South Fork that night, he gets payoff z.

I have said nothing about the values of x, y, z; they can be positive or negative, and have any relationship to each other. Note that Jong-Oh will experience utility of x at most once, and y at most once, in his life Carefully note: once Jong-Oh sees Part 2 of North Fork, he will experience payoff 0 in all future periods, not z. He gets z only during any interim (or permanent condition) after he's seen Part 1 but has not seen Part 2 of North Fork. So there is no remembered utility per se; think of $z < 0$ as if he'll live with the frustration of unresolved ending. ($z > 0$ may be harder to interpret, but please consider it anyhow.)

In all questions below, don't worry about any knife-edge cases of parameters equaling each other or equaling zero or any other annoying measure-zero values, except when explicitly told to concentrate on such a case.

Throughout consider only the case where Jong-Oh is arbitrarily close to fully patient in the long run, $\delta \to 1$. It is probably better to think through the logic of arbitrarily close to fully patient than to formally include δ in your equations and take the limit.

You'll be asked to say observed behavior as a function of parameters. You get full credit for specifying what behavior happens for the full array of exhaustive and exclusive combinations of parameters; you don't need to simplify or collect the cases. That is, any (correct) exclusive and exhaustive list of "If x, y, and z meet these conditions, then Jong-Oh will do this ... " will get you credit.

a) For all combinations of x, y, and z, what will Jong-Oh do if he is perfectly rational and maximizes the present discounted value given the utilities specified?

b) Suppose that Jong-Oh is present biased $\beta = \frac{1}{2}$, and Jong-Oh is **naive**: $\widehat{\beta} = 1$. For all combinations of x, y, z, what will he do? (You are *not* going to be asked to do the sophisticate case or any other value of β, so I'd advise against solving general $(\beta, \widehat{\beta})$.)

c) Suppose now that Jong-Oh is *not* present-biased. But he has (implausibly severe) form of projection bias: whatever his current period's utility would be from watching South Fork, North Fork Part 1, or North Fork Part 2, he believes he will get the same instantaneous utility for each of those options in all future periods irrespective of what he does in the interim. (Recall he gets $-\infty$ for some of his choices.) For all combinations of x, y, z, what will he do?

d) Now suppose Jong-Oh is neither present-biased nor projection-biased. But consider the following modification to the utility function (with all else in the set-up remaining the same). Jong-Oh always gets payoff of zero when he watches South Fork (so $z = 0$). He gets utility y for watching Part 2 of North Fork, which can be positive or negative as before. But: Jong-Oh gets utility x^{yes} for seeing Part 1 if he thinks there is a 100% chance he will see Part 2 in the future; he gets utility $x^{no} < x^{yes}$ for seeing Part 1 if he thinks there is less than 100% chance he will see Part 2. For all combinations of $x^{yes}, x^{no} < x^{yes}, y$, what will Jong-Oh do, assuming that he plays a time-consistent, "personal equilibrium" given these preferences?

e) Consider again the utility function from part (d). But suppose Jong-Oh can commit his future behavior. For all combinations of x^{yes}, x^{no}, y, what will Jong-Oh do?

Question #2 (Gift Exchange)

Consider the gift exchange game in Fehr-Kirchsteiger-Riedl (QJE, 1993) in simplified format. At $t = 0$, a firm makes a take-it-or-leave-it offer to a worker by promising a pay $w \geq 0$, which the worker accepts or rejects. The worker's reservation utility is 0. The pay is *unconditional* on effort, that is, the contract is a flat wage. At $t = 1$, after observing w, the worker exerts effort $e \geq 0$. The firm payoff is $x_f = ve - w$, with $v > 0$ capturing the return to the firm of the worker effort e; the worker payoff is $x_w = w - ce^2/2$, with $c > 0$ parametrizing the cost of effort. The game is one-shot (given that workers and firms are re-matched every period).

a) Stepping back briefly, consider two persons s and o (s for $self$ and o for $other$) and associated monetary payoffs by π_s and π_o. Charness and Rabin (*QJE*, 2002) consider the following simple formulation of the preferences of $self$:

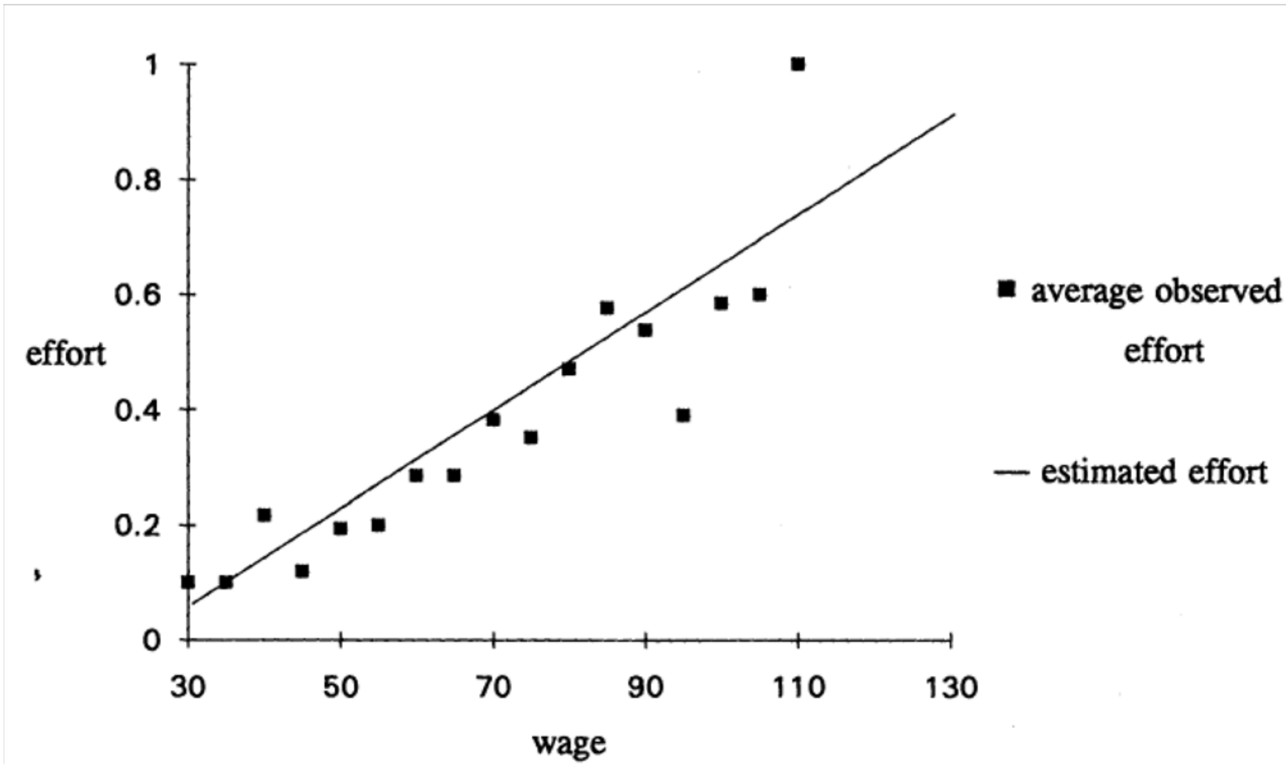
$$(1 - \rho r - \sigma s)\pi_s + (\rho r + \sigma s)\pi_o,$$

where $r = 1$ (resp. $s = 1$) if $\pi_s > \pi_o$ (resp. $\pi_s < \pi_o$) and zero otherwise. Explain how the parameters ρ and σ allow for a range of different theories of social preferences; provide at least two examples.

b) Consider now the gift exchange game in the selfish version with $\rho = 0$ and $\sigma = 0$; that is, the utility function of the firm is $U_f = x_f$ and the utility function of the worker is $U_w = x_w$. Solve for the sub-game perfect equilibrium in this game.

c) Solve for the 'efficient' w and e, that is, the ones that solve the utilitarian sum of utilities, that is, $x_f + x_w$. Compare this to the result of (a).

d) Consider the following Figure which plots the observed effort and wage in Fehr-Kirchsteiger-Riedl (FKR). Keep in mind that in FKR, the minimum effort is 0.1 and the reservation wage a little higher so the minimum acceptable wage is 30. Describe the results captured in the Figure and relate them to your answer to (b). Do the results support the predictions of the standard model?

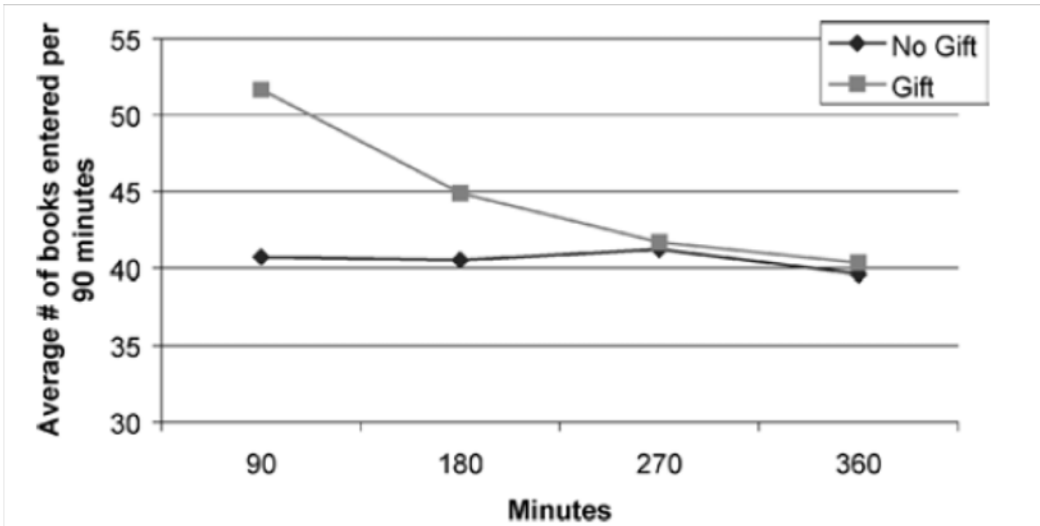


e) Now consider a Charness-Rabin / Fehr-Schmidt model with ρ and σ different from zero. To simplify, assume that the firm is still selfish, but the worker is characterized by the preferences in Question 1 with $\rho > 0$ and differential altruism if ahead ($\rho > \sigma$). To start with, also assume $\rho > 0 > \sigma$. What does this mean?

f) Solve, *in as much detail as you can,* for the optimal wage w and effort e in this game. To the extent that you cannot solve it fully analytically, describe the qualitative solution. [Hint: Discuss the case in which the worker is ahead and the one in which the worker is behind] How does the solution vary with ρ, σ, v, and c?

g) Now, assume that the firm, in addition to the payoffs of the gift-exchange game, has substantial income M from other projects. That is, the payoff of the firm is $x_f = M + ve - w$, where M is a very large, that is $M >> w - ce^2/2$ for any plausible e and w (I am not being precise here, but it's to simplify the solution). The payoffs of the worker do not change. Does this make a difference for the analysis of point (b) (where both firm and worker are selfish)? Does this make a difference for the analysis of points (e-f) (where the worker is inequity-averse)? Use your intuition here.

h) Let's now go to the field. Consider the Gneezy-List (Econometrica) paper where an employer randomly varies the pay and pays (after hiring) some workers \$12 an hour and others \$20 an hour. Describe briefly the findings, summarized by this Figure.



i) Setting aside the later decrease in effort, describe whether the following models can explain the initial effort increase in response to higher pay: (i) the standard model with no social preferences (point (b)); (ii) a model with inequity-averse workers (point (f)); (iii) a model with inequity-averse workers and rich firms (point (g)).

j) In light of this, is it likely that the observed gift exchange *in the field* describes inequity aversion? Could inequity aversion explain the Falk (Econometrica) findings on the post-cards and amount fund-raised?

k) Consider now an alternative explanation of the gift exchange in the field. The worker is not inequity-averse, she is altruistic towards the firm in a way that does not depend on the comparison of payoffs. However, the coefficient of altruism can vary with the gift. So the worker maximizes

$$\max_{e_j} w_j - c\frac{e_j^2}{2} + \alpha_j \left[ve_j - w_j\right]. \tag{1}$$

The coefficient α_j is the degree of altruism, with $j = Gift, Normal$. Take first-order conditions of problem (1) and solve for e_j^*. How does the solution depend on the various parameters?

l) Give conditions on α_{Gift} and α_{Normal} to reconcile the findings in Gneezy and List for the initial 90 minutes. In what sense is this a simple model of reciprocity?

m) *(Double credit for this part of the question)* Gneezy and List receive a referee report from a structural-oriented behavioral economist who writes 'I like the field experiment reduced-form results but would like to see a more structural interpretation. Consider model (1), I would like to see a structural estimation of the altruism parameter α both in the gift treatment (α_{Gift}) and in the no-gift treatment (α_{Normal}). It would be very interesting to see how the social preference parameter varies with the gift'. How would you respond to the report? Consider that we observe e_{Gift}^*, the observed productivity (no. of books entered) with the gift, and e_{Normal}^*, the productivity under the no-gift condition. We also know of course w_{Normal} and w_{Gift}. Can you address the referee report using the experimental treatments that Gneezy and List ran? Argue. If not, how could you change the design to get estimates for α_{Gift} and α_{Normal}?