219A – Final Exam – Fall 2009

Good luck!

Question #1 (Social Preferences in Experiments)

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. Illustrate the typical indifference curves for different prototypical preferences. What happens when ρ and σ increase proportionally? What happens when the ratio ρ/σ increases?

- How the theories of social preferences encapsulated in Charness-Rabin model were tested in the laboratory by Charness and Rabin, Andreoni and Miller (*Econometrica*, 2002), and Fisman et al (*AER*, 2007). Discuss *in detail* the differences between the experiments.

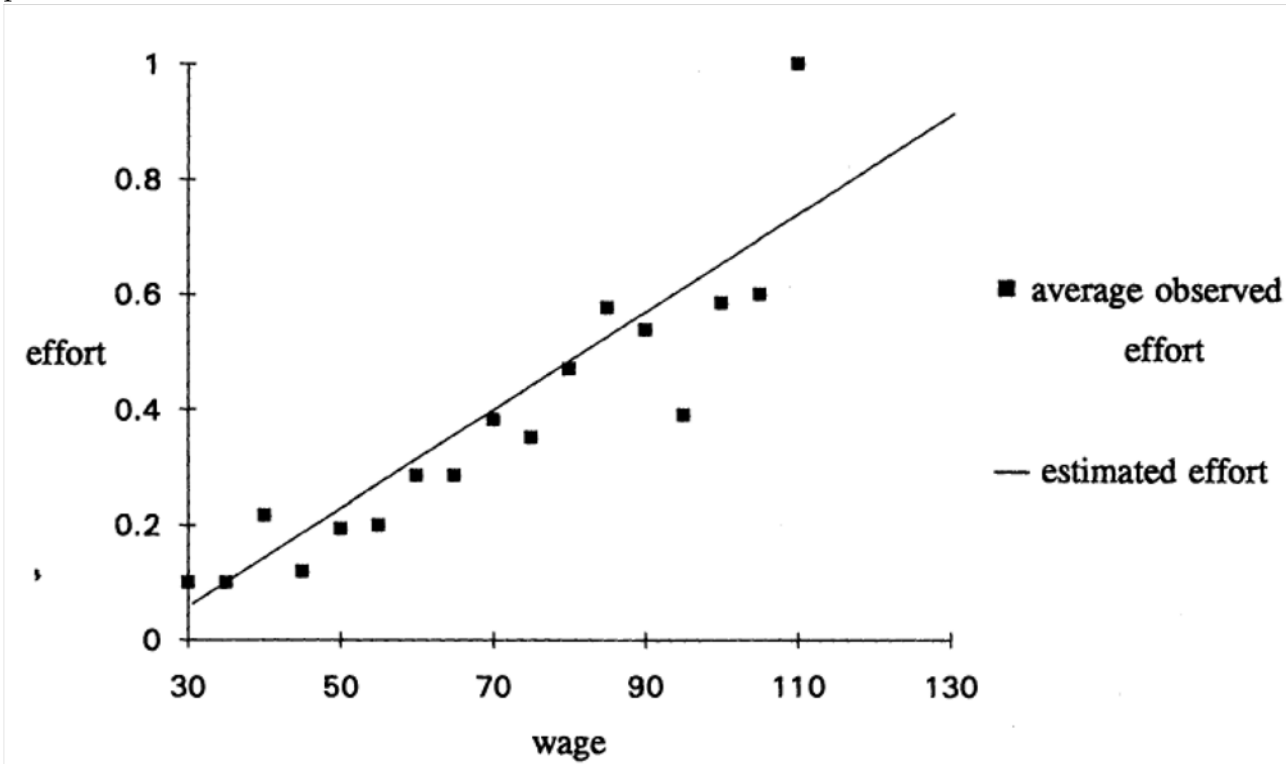
Question #2 (Gift Exchange)

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 wage 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 $v > 0$, and the worker payoff is $x_w = w - ce^2/2$, with $c > 0$. The game is one-shot (given that workers and firms are re-matched every period).

a) Consider the preferences above 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.

b) 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).

c) 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 observed patterns in the Figure and relate them to your answer to (a). Do the results support the predictions of the standard model?



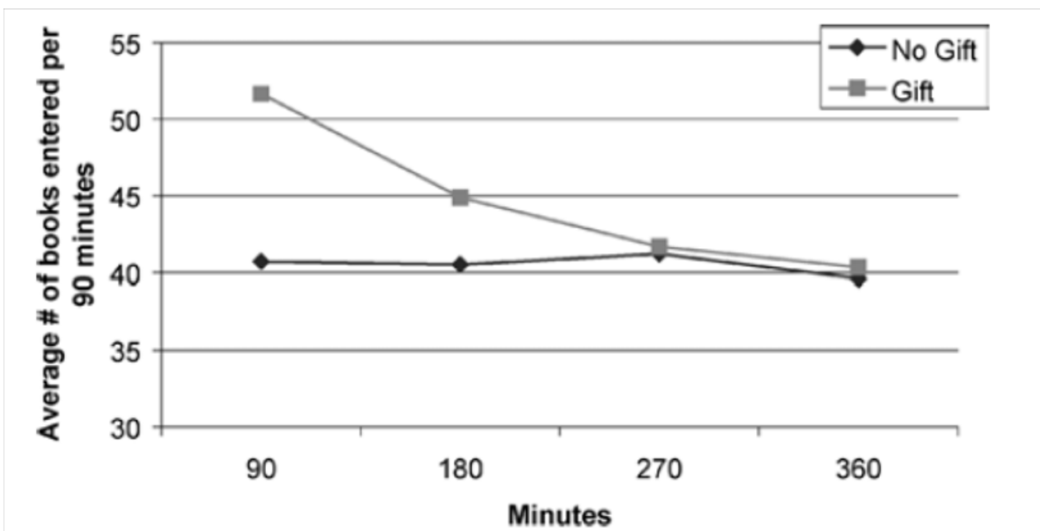
d) Now consider a Charness-Rabin / Fehr-Schmidt model with ρ and σ different from zero. To simplify, assume that the firm is still selfish, but the worker is characterized by the preferences in Question 1 with $\rho > 0$ and differential altruism if ahead ($\rho > \sigma$). To start with, also assume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

e) 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 came when the worker is ahead and when the worker is behind] This part is harder than the previous parts, so plan on spending more time here. How does the solution vary with ρ, σ, v, and c?

f) Qualitatively (do not attempt to solve fully), discuss whether and how results would change if the firm also has inequity-averse preferences with the same parameters.

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 (a) (where both firm and worker are selfish)? Does this make a difference for the analysis of points (d-e) (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 finding, 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 (a)); (ii) a model with inequity-averse workers (point (e)); (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? What is another social preferences model that would explain these phenomena?

Question #3

In this last Question we consider the deductible choice in the home insurance industry, as in Sydnor (2006)'s paper. A home insurance contract is characterized by a premium P and a deductible level D. The home insurance contract offers two possibilities (to simplify): a high-deductible contract (P_{Hi}, D_{Hi}) and a low-deductible contract (P_{Lo}, D_{Lo}), with $D_{Hi} > D_{Lo}$ and $P_{Hi} < P_{Lo.}$ The agent has wealth W and a utility function $U(C)$, where C is the amount of wealth left over after paying the premium and the (eventual) losses after the deductible. Finally, the probability of an accident is π and the loss in case of an accident is $L > D_{Hi}$.

a) Assuming expected utility, derive the condition under which the agent prefers the low-deductible to the high-deductible contract (assume that the probability of accident and the loss are independent of the deductible chosen).

b) Linearize now the utility function around W using the first-order Taylor approximation $U(C) = U(W) + U'(W)(C - W) + o(C - W)$. Neglect the term $o(C - W)$. Show that this implies that the agent chooses the low-deductible contract if (ad only if)

$$\pi (D_{Hi} - D_{Lo}) \geq P_{Lo} - P_{Hi}. \tag{1}$$

c) Consider Table 2a from Sydnor (2006). Consider the consumers that choose a \$500 deductible (D_{Lo}) over the \$1,000 deductible (D_{Hi}) (first row) [Neglect for now the existence of the \$250 deductible] For them, (1) must hold. Fill in the average observed values for $\pi, D_{Hi} - D_{Lo}$ and $P_{Lo} - P_{Hi}$ in equation (1). Is equation (1) satisfied? Argue that you reject the null hypothesis of approximate risk-neutrality.

Chosen Deductible	Number of claims per policy	Increase in out-of-pocket payments *per claim* with a \$1000 deductible	Increase in out-of-pocket payments *per policy* with a \$1000 deductible	Reduction in yearly premium per policy with \$1000 deductible	Savings per policy with \$1000 deductible
\$500 N=23,782 (47.6%)	0.043 (.0014)	469.86 (2.91)	19.93 (0.67)	99.85 (0.26)	79.93 (0.71)
\$250 N=17,536 (35.1%)	0.049 (.0018)	651.61 (6.59)	31.98 (1.20)	158.93 (0.45)	126.95 (1.28)

Average forgone expected savings for all low-deductible customers: \$99.88

* Means with standard errors in parentheses

d) To what extent risk aversion in the expected utility sense can rationalize this finding?

e) We now consider a reference-dependent utility model of the above decision (Read on to the next point to have a full picture). Assume that the value of an insurance contract $V(P, D, \pi)$ is given by $v(-P) + w(\pi)v(-D)$ where $w(\pi)$ is the probability weighting function, and $v(x)$ is the value function according to prospect theory. Assume a piece-wise linear value function:

$$v(x) = \begin{cases} x & \text{if} \quad x \geq 0 \\ \lambda x & \text{if} \quad x < 0 \end{cases}$$

(the reference point here is zero) Write the condition under which the agent prefers the low-deductible to the high-deductible contract and simplify it. Given calibrated values of λ and $w(\pi)$, does this formulation of reference-dependent preferences explain partially or totally the finding in Table 2a?

f) Assume now that there should be no loss-aversion for paying a premium, since one can get used to paying a premium; you suffer loss aversion only from unexpected losses if an accident occurs. Discuss the reasonableness of this assumption in light of what you know of models of reference points as rational expectations (Koszegi and Rabin, 2006) Follow this suggestion, and repeat the steps in point (e). Does this version explain partially or totally the finding in the Table above?

g) Now, let's take this to a broader setting. Do reference dependent preferences, as outlined here, predict over-insurance more generally? Discuss two cases, such as car insurance and health insurance.

From all of us: Season's greetings and best wishes for the holidays!!!