ECON 455, Discussion Section 8

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Office: SS 6470. OH: Wed 8:00-9:30am; Thu 4:15-5:45pm; or by appt.

1. (Watson 7.1.c - Iterated deletion using mixes) Use iterated deletion of strictly dominated strategies to find the unique Nash equilibrium in the following game.

1\2	L	C	R
U	6,3	5,1	0,2
M	0,1	4,6	6,0
D	2,1	3,5	2,8

2. (Behavioral Pirates) Five pirates (Antonio, Beatriz, Carla, David and Elvin) have obained 100 gold doblónes and have to divide up the loot. Antonio proposes a distribution of the loot. All pirates vote on the proposal. If half or more agree, the loot is divided as proposed by Antonio. If Antonio fails to obtain support of at least half the the crew (including himself), then he will be killed, in which case the pirates start over with Beatriz as the proposer. If she gets half the remaining crew (including herself) to agree, then the loot is divided as she proposes. If not, then she is killed, and Carla then makes the proposal. If Carla's proposal is not agreed on by half the remaining crew, including herself, then she is killed. Finally, David makes a proposal – if it isn't accepted by half the crew, including himself, he is killed. If everybody but Elvin is killed, he takes all the loot. The pirates are infinitely sophisticated and rational (as all pirates are). When a pirate is indifferent between voting to kill or supporting a proposal, he votes to kill. You cannot split a doblóne, so proposals must be whole numbers of doblónes. For each of the following questions, solve using backward induction.

   (a) First, assume each pirate cares only about how many doblónes she ends up with (the more the better). What is the maximum number of doblónes Antonio can keep without being killed?

   (b) Now, in a more *behavioral* approach, lets assume pirates quite like to see their colleagues killed. In particular, getting to see a colleague killed yields each the utility equivalent of x doblónes.

      i. What is the maximum Antonio can keep if $x = 2$?

      ii. What is the minimum x such that Antonio will definitely be killed, regardless of the offer he makes?

3. (Lemons (Akerlof 1970)) Suppose sellers in a used car market know whether their cars are good or bad but buyers do not and the valuations for buyers and sellers for the two types of cars are as follows:

	Good	Bad
Buyer	60	20
Seller	50	10

   Suppose that a fraction α of the cars on the market are bad, and this is public information. Assume sellers accept offers if indifferent.

   (a) Describe what it would mean for an outcome to be Pareto efficient in this game.

   (b) If $\alpha = 1/6$, what should buyers offer for a car?

   (c) If $\alpha = 1/2$, what should buyers offer for a car?

   (d) How does this relate to the auction example we saw in class?

4. (Estimating preferences) Consider the following Prisoner's Dilemma with the monetary payoffs, v_1 and v_2, listed, and suppose we know that i) people always believe their opponent will choose C and ii) always choose C themselves when $x > 6$ but always choose D when $x < 6$.

1\2	c	d
C	x,x	0,x+1
D	x+1,0	1,1

(a) Suppose $u_i(v_i, v_j) = v_i + \gamma v_j$, where $\gamma > 0$ represents how much people care about others. Calculate γ.

(b) Suppose $u_i(v_i, v_j) = v_i - \psi|v_i - v_j|$, where $\psi > 0$ represents how much people are bothered by *unfair* (unequal, really) outcomes. Calculate ψ.

(c) Is it possible that people hate one another and actually have $u_i(v_i, v_j) = v_i - kv_j$, with $k > 0$, given the information we have above? Why or why not?

5. (Rotten kid theorem (Becker 1974)) A child chooses an action that affects both his own income and his parent's income. He chooses $A > 0$ and incomes for child and parent are:

$$I_C(A) = A - A^2 \qquad\qquad I_P(A) = A - \frac{1}{2}A^2$$

What level of action A maximizes the child's income? Call this A_C^*. What level of action maximizes the joint income (i.e. the sum of the two incomes above)? Call this A_J^*.

Now suppose that the child does not care about his parent - he only cares about how much money he has. On the other hand, the parent does care about the child, and may choose to transfer an amount of money B to the child - think of this as a bequest. Their utility functions are as follows:

$$u_C = \sqrt{I_C(A) + B} \qquad\qquad u_P = \sqrt{I_P(A) - B} + \frac{1}{2}u_C$$

The child chooses A before the parent chooses B, and the parent observes A before choosing B. Use backward induction to solve this game. That is, you should first find how the parent best responds to the child's choice of A. Then, given this, you should find what A the child chooses. Once you have found the subgame perfect Nash equilibrium (SPNE) through backward induction, comment on how it compares to A_C^* and A_J^*.

Finally, try the problem again except consider the case in which the parent cares very little about his son. That is, replace u_P of above with $u_P' = \sqrt{I_P(A) - B} + \frac{1}{10}u_C$, holding everything else constant. How does this change the child's choice of A in the SPNE?

(Hint: This problem has a fair amount of algebra. And you'll need to use the chain rule in taking derivatives. Life is hard – get used to it.)