

BEM/Ec 146
Fall 04
Prof. Colin Camerer

Homework #1: Available 9 am Th October 14. Due Wednesday 20 October (beginning of class, in my Baxter mailbox, 130 pm).

Homework must be typed although mathematical symbols can be handwritten if that saves you time and if they are legible to the TA. **Think carefully before you write.** **Many questions only require a paragraph—essentially a one-phrase answer with some elaboration.** Some questions have 1 or ½ page limits; any material longer than these (12 point font, 1.5 line spacing) will be ignored. Late homework will be reduced in grade by 50% for each day late and not accepted after two days. The only standard exception is a medical excuse approved by me at least 24 hours in advance (and certified in writing by a health care professional). You can try to email me for other extensions but I am generally very unsympathetic to granting an extension for a reason that was foreseeable in advance. (For example, if you are on a recruiting or science trip that you knew about at the beginning of the term, I won't grant an extension.) The collaboration policy is to work alone.

1. (10 points, <1 page) The President of Red Lobster (645 middle-end seafood restaurants) was fired in 2003 when a promotion backfired. The chain offered “all you can eat” specials on Alaskan King Crab (and side dishes) and charged \$20. Describe (a) the mistake the chain probably made in offering the promotion and (b) how the mistake could have been avoided. (see http://www.stpetersburgtimes.com/2003/09/26/State/All_you_can_eat_was_t.shtml for details).
2. (5 each, <1 page) When you rent a car, it is usually very expensive to buy special insurance to cover any damage to the car (e.g. on a recent trip to New Mexico they quoted a rate of \$17.95 per day!?).
 - a. Explain why, *in theory*, adverse selection and moral hazard (or “hidden information and hidden action”) could justify this large charge.
 - b. In fact, there is little evidence of adverse selection or moral hazard in regular car insurance. (That is, drivers who buy insurance do not have more accidents than uninsured drivers, controlling for observable variables like the driver’s gender, age, and accident record.) Give a psychological explanation of why the two “hiddens” (information and action) do **not** lead to more accidents, contrary to the prediction in part (a) above.
3. (10 points) Often times a scandal in a large institution is blamed on one or more “rogue individuals” (think of Enron, the Daiwa Bank trading scandal, Abu Ghraib prison scandals in 2004 in Iraq, etc.) What does “attribution theory” tell us about these explanations? Are such “one bad apple” explanations likely to be equally common in the West (e.g. America) and in the East (e.g. Japan)?
4. (5 each, <1 page total) Give two examples (one each) of a positive and negative externality that affect you personally. Why isn’t the externality “internalized” by a financial (or other) exchange with the person or institution creating the externality?

5. (20 points) Pirate problem: There are 5 pirates on an island, ranked by age (which is commonly known by everyone). They have 100 gold pieces to divide. The oldest pirate goes first, proposing a division (smallest unit is one) of how the 100 pieces will be divided across all 5 pirates. If a weak majority of pirates vote for the division (i.e., 50% or more vote for it), the gold is split accordingly and the game is over. If the vote does not pass, the oldest pirate is killed. Then the next-oldest pirate offers a division and the remaining four vote on it, using the same weak-majority rule (i.e., if two or more vote for it, the division passes). For simplicity, assume that if a pirate is offered an amount which is exactly as good as she expects to get in the future, she will turn it down.
- (8) Assume the pirates are all purely self-interested (they do not care how much gold other pirates get) and plan ahead and this fact is common knowledge. How much will each pirate offer if they get to offer a division to himself and the remaining pirates? (I.e. solve for the subgame perfect equilibrium.)
 - (2) If you can solve the 5-pirate game, can you figure out how many pieces of gold the oldest pirate would get if there were 88 pirates?
 - (10) Now assume the pirates have Fehr-Schmidt preferences (see text). To make it simple, assume that each pirate has an envy coefficient $\alpha=1$ and a guilt coefficient which is certainly $\beta=0$. Also let's change the rules slightly: Assume that a division only passes if it has a strict majority (i.e., if strictly more than 50% vote for it— this means with an even number of pirates, a tie vote fails to pass). (Hint: Keep in mind that pirates care about *utility*, not money; and note that you may lean very strongly on the precise concept of subgame perfection.) Compute the subgame perfect equilibria for up to 5 pirates, or for as many as you can.
 - Think about (but don't write down your answer): Do you think the prediction in (a) assuming self-interest, or the prediction in (c) is likely to be a more accurate prediction about how people who are playing this for the first time would behave? What about experienced bargainers who have done this many times?
6. (10) Consider the BOS big-fish/little-fish game in the text.
- A “correlated equilibrium” is a Nash equilibrium in which all players observe a public variable, and then choose strategies conditional on the value of that variable. A classic example is a traffic light: Without a traffic light people have trouble coordinating who goes first when two cars arrive at an intersection at the same time. (Should the Hummer go first? The car on the right? The newest car?) But if all drivers can observe the light's color, and use the convention “go on green; wait on red” then traffic is perfectly correlated by the observation of the light. Suppose there is a public announcement in the BOS big-little fish game that says either “The government thinks the row player Chris should get the big fish” or “The government thinks the column player Pat should get the big fish”. Both players hear the announcement and can choose strategies which depend on what the announcement was. What are *all* the correlated equilibria of this

game (i.e., all the sets of announcement-dependent strategy choices, for both of the possible announcements)? To make your notation compact, denote the pure strategy Nash equilibria (without correlation) which favor Chris and Pat by C and P, respectively, and the mixed equilibrium by M. Call the announcements pro-C and pro-P according to whether they endorse giving the big fish to Chris or Pat.

7. (10) Hotelling on a circle: Imagine a circle which represents a continuum of consumers who are uniformly distributed on the circle. Index circle locations from 0 to 1, moving clockwise (i.e., location .5 corresponds to the 6 on a clock). Three firms will locate in order on the circle. Once they locate, they cannot move. After all three have located, consumers will shop at the firm nearest to them on the circle. (To make it more precise, assume that firms want to maximize their “market share” of customers who patronize their firm, but also want to treat other firms “fairly”, so fixing their own share, they will locate so as to balance the loss of market share to the two competitors.) Find the subgame perfect equilibrium which describes where the three firms will enter to maximize the expected number of consumers who shop at their firm. Without loss of generality, assume the first firm locates on the top of the circle (where 12 would be on a clock).
8. (10, <1/2 page) Think like an economist: In some communities, zoning which permits new construction of residential houses is controlled by politicians who are often influenced by property developers. (Assume for the sake of argument the politicians and developers do not live in the community, or if they do have, a diversified portfolio of real estate and other financial assets.) In other communities the zoning boards are controlled by homeowners. Holding everything else constant (demographics, smog, local economic conditions), in which community are housing prices likely to be higher? Explain.
9. (5 points, <1/2 page) Suppose you observed that people who paid \$20,000 to join a golf club played golf there more often than guests who can play for \$100/round. Explain.
10. (5 each, <1 page) Define each term and give an **original example** not mentioned in class or in the text material:
 - a. property rights
 - b. partial equilibrium analysis
 - c. adverse selection/hidden information
 - d. moral hazard/hidden action