Review questions for EC782 midterm. Prof. Ellis

Midterm exam is rescheduled for **Monday March 20, 2017 in** class

The midterm will be for 1.5 hours and have two parts. In the first part there will be four questions chosen from the following seven and you will be asked to answer **three**. The actual wording and information requested will generally differ from those shown here, or be simplified. In the second part there will be questions that give you an empirical table from one or two of the papers in the course and ask you to comment on the interpretation and meaning. Short, well organized answers will be preferred to long, disorganized ones**.**

1. The Rand Health Insurance Experiment (HIE), conducted in the mid 1970's, remains the classic and largest controlled experiment done in the health services field. Key literatures include Manning et al (1987) and the important new evaluation of the same data by Aron-Dine, Einav and Finkelstein (2013).

a. List three research questions that motivated the HIE.
b. Describe two reasons why a controlled experiment may be superior to using a natural experiment for answering these questions.
c. Describe two weaknesses of a controlled experiment relative to using observational data from a natural experiment to answer these questions. In this part and the previous one, use examples from the literature if possible.
d. Discuss one study (with the author(s), journal, and year) that we have discussed in class or is on the reading list that extends one of the three research questions from the HIE.
e. Briefly describe a new study that YOU could imagine doing that would improve upon either this study from part (e) or the Rand HIE results.

2. a) Why might supply side cost sharing be superior to demand side cost sharing?
b) What form of cost sharing is predominantly used in the US to control costs? What form predominates in Europe?
c) In the terminology and notation of Ellis and McGuire (EM) (1986), what is a perfect agent? What payment system can achieve the first best if hospitals are perfect agents? Briefly, explain why.
d) Briefly list three criticisms of the EM model.
e) Alice Chen and Darius Lakdawalla (2016) extended the EM model of physician behavior by assuming that doctors care not only about benefits of treatment but also the consumer's out of pocket costs. (You do not need to read their paper, but it is linked here.) A simplified version of their model of FFS payment (ignoring that that they also introduce a substitute good S) is the objective function

$$\max_{x} U(x) = (1-\alpha)[Px^*x - C(x)] + \alpha[B(x) - c^*Px^*x]$$

where they assume $C'>0$, $C''>0$, $C'''>0$, $B'>0$, $B''<0$, and $B'''<0$, and c is the consumer cost share, the share of the provider payment that is paid for by the consumer with $0 < c \leq 1$.

Derive the first order condition for the physician's utility maximizing choice of x, x*.

f) For what value of Px and c will the physician's choice attain the social optimum?
g) Use this foc to derive and expression for the effect of Px and c on x*. Can you sign this expression?

3. This original question is an extension of the model developed by Colleen Carey (2017) as presented at the BU/Harvard/MIT health seminar on 3/1/2017 about US company side payments to doctors made to influence their prescription practices. You do not have to read her paper to answer it. The question is not necessarily well-developed and may need more assumptions, which you should state before trying to answer the question. (This model could also be thought of as applying to drug prescriptions in China.)

Imagine a doctor trying to decide which of exactly two drugs A and B to prescribe for a single representative patient. The factors that enter into the doctor's utility from prescribing each drug include:

i)The payments received from the pharmaceutical companies for each drug as bribes, which can be thought of as persuasion payments, not information payments, P_A and P_B.

ii) The benefit to the patient expected for each drug, calculated in terms of its efficacy E where E_A and E_B and without loss of generality assume $E_A > E_B$. Implicitly we assume E is measured in dollars.

iii) the out of pocket cost to the patient for each drug, $O_A = \theta D_A$ and $O_B = \theta D_B$ where = θ is the fraction of the fee paid by the consumer for either drug, and D_A is the price chosen for the drug, of which the consumer pays fraction θ

For simplicity, assume that the marginal cost of both drugs is \$0. And that B is off patent and competitively supplied, so that $D_B = 0$ = Marginal cost.

The doctor cares about revenue P as well as E and O, although perhaps is an imperfect agent.

Hence $U_i = P_i + \alpha E_i - \beta \theta D_i$ where i = A, B

Where $0 < \alpha <= 1$ is the EM agency weight

$0 < \beta <= 1$ is a new weight assigned to out of pocket costs

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Assume that the only revenue to the doctor from the prescription is P_A or P_B, and that if the doctor is indifferent she chooses A.

a) Write out an expression characterizing the physician's choice given this structure.

b) What can you reasonably predict about P_B?

c) Suppose $\alpha = \beta = \theta = 1$ (perfect agents and no insurance) and that $E_A - E_B = 10$, i.e., A is much more valuable (effective) than B.

d) If P_A is not allowed, so $P_A = 0$, then what will be the welfare maximizing price for A to choose, D_A?

e) If $P_A = 0$, then what will happen to D_A as θ goes to zero? Calculate the profit-maximizing D_A for θ = 1/10.

f) If $P_A = 0$, then what will happen if $\theta = 1$ but β goes to zero. Calculate the profit-maximizing D_A for α = 1/10.

g) Now suppose that $P_A = 0$, α=1/10 and θ = 1/10. Calculate the profit-maximizing D_A.

h) Still assuming α=1/10 and θ = 1/10, what happens to D_A if $P_A = 10$.

i) Think of one extension of the model and show how this adds new insights.

4. Managed care is pervasive in US health care markets, although relatively rare in other countries still.

a) What is managed care?

b) Speculate on why managed care is more common in the USA. What problem or problems is it designed to fix? Describe an alternative approach used in at least one other country to solve these same problem(s).

c) Explain carefully how selection complicates the assessment of the impact of managed care on total health care spending. Give an empirical example.

d) We have studied several papers that touch on managed care. (Manning et al, 1987; Burgess, Carey and Young, 2005; Shen and Melnick, 2005; and Glied, 2000, more in health seminars) Summarize briefly what this literature says about the effectiveness of managed care in controlling costs or improving quality.

e) What is the managed care backlash? Is it still happening today?

5. Using the Finkelstein and Einav budget constraint representation of health care spending in which consumer out-of-pocket spending (OOP) plus premium is a function of medical spending (M), draw the appropriate budget constraints for both of the following plans on one diagram. Assume an income of $10,000. Be sure to label any intercepts, kinks, or intersections.

a) Budget constraint corresponding to full insurance at a $3000 premium. (Plan A).

b) Budget constraint with the following features. (Plan B)

$2000 premium

There is no deductible.

50% coverage until the consumer has spent $2000 out of pocket on health care beyond the premium;

Full coverage above this point.

Redrawing this diagram three times, once for each person, draw sets of indifference curves consistent with the following three people.

c) Carol is healthy and chooses to buy $500 of health care in both insurance plan A or B.

d) Donna has moderate health care needs and ex post is just indifferent between Plan A and Plan B.

e) Erica is very sick and buys $8000 per year of health care in both Plan A and in Plan B.

f) Explain why you should or should not expect to observe consumers exactly spending $2000 on health care in Plan B. Under what alternative richer models might this be observed?

6. Daniel Kahneman's book "Thinking, Fast and Slow" is a careful analysis of the insights from behavioral economics, and includes review of the concepts of
   i) Priming
   ii) Framing
   iii) Base rate neglect
   iv) Cognitive ease
   v) Anchors
   vi) Availability bias
   vii) Intuitive prediction
   viii) Optimism bias
   ix) Prospect theory
   x) The Endowment effect
   xi) The possibility effect
   xii) The certainty effect
   xiii) Overestimation and overweighting of rare events
   xiv) Avoiding regret
   xv) WYSIATI

(Even if you have not read the book, you can read about any of these concepts through articles on the web, including Wikipedia).

a) Choose ONE of these topics and describe it briefly.

b) Choose one (and only one) article from the course readings (or the BU/Harvard/MIT Health Economics Seminar) and describe the new insights from any one or more of the above topics on that paper. In short, describe in detail the insights of behavioral economics to the article you have chosen.

7. Ellis, Martins and Zhu (2016) Health Care Demand Elasticities by Type of Service develop a new IV approach to estimating demand elasticities for individual procedures, drugs and services.

a) Briefly describe their identification strategy.
b) Criticize their instruments or identification strategy.
c) What price would you recommend they use as their best price for individual choices?
d) Why can't they estimate elasticities for inpatient based services such as room and board or surgery?
e) Can you think of a better way of getting at elasticities for these services?
f) For what services do you think that the short run price elasticities will also be long run price elasticities?

8. Consider the following two frameworks for consumer and provider decisionmaking.

Exhibit 1 Two possible illness processes

Model 1: Informed patient choice model:	**Model 2: uninformed, passive patient choice**
1. Consumer chooses health plan k given the status θ_t	1. Consumer reliably remains in same health plan regardless of health status
2. Provider announces price P and offered and treatment intensity Q, given k and θ_t	2. Consumer chooses provider j given plan k without knowing θ_t
3. Consumer chooses provider j knowing θ_t, k, P, Q	3. Provider tells patients their health status θ_t, and chooses Q, at price P given k

a. Develop an analytical model that allows you to reflect and compare the difference between these two decision processes. Be explicit about your assumptions about competition between health plans and providers, states of the world, provider objectives, provider heterogeneity, and consumer demand, and or or consumer attachment to a particular provider.

b. Identify at least two articles that help with making predictions about the difference between these two frameworks.

c. Describe how the predictions of these two frameworks differ based on your model.

d. Develop at least one empirical test to distinguish between these two models of behavior that you could test using claims data, and describe the specification that you would use to conduct this test. Assume that you have figured out how to calculate empirical counterparts of:

   plan k generosity, summarized in the plan cost sharing c_k
   health status θ_t
   Provider pricing P
   provider treatment intensity Q

Key constraint: Assume empirically that you know something about the providers actually visited, but not about the choice set of all providers potentially visited by the consumer.