Cameron ECON 132 (Health Economics): SECOND MIDTERM EXAM (A) Fall 19

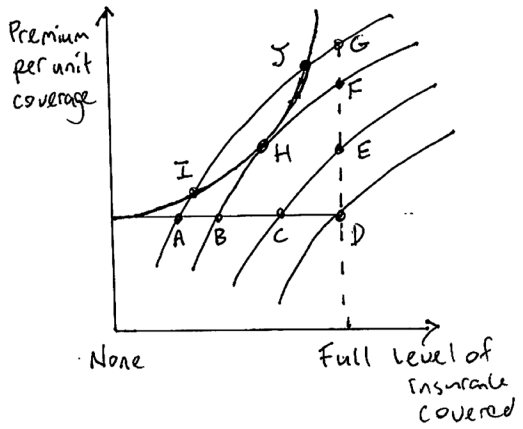
Answer all questions in the space provided on the exam.
Total of 36 points (and worth 22.5% of final grade).
Read each question carefully, so that you answer the question.

Short Answer (6 points each question)

1.(a) For the following diagram

(i) Which of points A to J is society's optimum in the absence of moral hazard?

(ii) Which of points A to J is society's optimum in the presence of moral hazard?



(b) Consider the market for used cars as presented in class and in the course notes.
Let X = value of the car.
Sellers know the value of the car they sell and their utility is U(X) = X.
Buyers only know that car value is uniformly distributed on (50,150) and their utility is 1.2×X.
Suppose the posted price for used cars is 90. Will consumers buy a car at this price? **Explain your answer.**

(c)(i) Is adverse selection in health insurance markets more likely to occur as consumer's risk aversion rises?

A simple **YES** or **NO** will do.

(ii) Is market failure due to adverse selection in health insurance markets more likely to occur if the same standardized insurance policy (with the same deductibles, coinsurance, etc.) is offered to all individuals at the same price, and the only choice for a consumer is this insurance policy or no insurance?

A simple **YES** or **NO** will do.

2. A Research study in the August 22/29 2017 issue of the *Journal of the American Medical Association* considered the cost-effectiveness and cost-benefit of augmenting standard statin therapy with a PCSK9 inhibitor (namely the pharmaceutical drug evolocumab) that lowers LDL (low-density lipoprotein) cholesterol readings with the benefit of reducing the risk of major adverse cardiovascular events.

Assume

- All numbers given below are for lifetimes and are appropriately discounted to today.
- 10 million U.S. adults with preexisting cardiovascular disease need additional lipid lowering in addition to ongoing statin therapy.
- the PCSK9 inhibitor evolocumab leads to a lifetime reduction in major adverse cardiovascular events (MACE) that leads to 0.5 life-years saved per person. Each life-year saved has a QALY adjustment factor of 0.8.
- the PCSK9 inhibitor evolocumab has a lifetime cost per person of $250,000.

(a)(i) Calculate the incremental cost effectiveness ratio (dollars per quality-adjusted life year-saved) of adding the PCSK9 inhibitor to standard statin therapy.

(b)(i) If a quality-adjusted life-year is valued at $100,000, at what range of lifetime costs would the drug evolocumab be cost-effective? **Explain your answer.**

(ii) For the target population the probability of a major adverse cardiovascular event (MACE) in any one year is three percent. The manufacturer of evolocumab has offered to provide a refund to any person taking evolocumab who experiences a MACE.
Would this improve considerably the cost-effectiveness of evolocumab? **Explain your answer.**

(c) This part is unrelated to the preceding.
Consider the following screening test for cancer applied to 10,000 people of whom 100 have cancer. Each test costs $20, picks up 90% of cancer cases, and additionally 10% of the time falsely diagnoses cancer. Detection of cancer (rightly or wrongly) leads to a further exact diagnostic test that costs $200. Correct early detection of cancer by the test is valued at $5,000.
Is the first test worthwhile? **Explain your answer.**

3. Circle True or False to each of the following statements about the U.S. health market. [One point each.]

(a) True False Moral hazard is the primary cause of an insurance death spiral.

(b) True False Under community-rating poorer people necessarily pay less for health insurance.

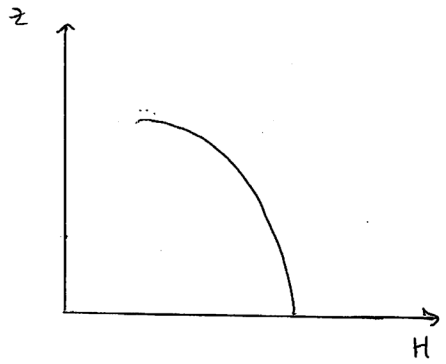
(c) True False The U.S. is unusual among highly developed countries in not having universal health insurance

(d) True False For the colon cancer Guaiac tests example (Neuhauser and Lewicki) it would actually be better to not screen at all than to perform all six tests.

(e) True False The ICER is a key tool for cost-effectiveness analysis.

(f) True False The income elasticity of demand for health care is positive.

4.(a) Consider the following tradeoff between health capital (H) and consumption of other goods (Z). Suppose increased access to health insurance makes it cheaper to see doctors.



(i) Show the effect on consumer choice of this change on the above diagram.

(ii) For your diagram show whether this change has led to increased or decreased health capital.

(b)(i) What is the advantage of the graph in part (a) compared to a graph using the consumer demand model that shows a tradeoff between consumption of medical goods and consumption of other goods?

(ii) This part is unrelated to the preceding. For which type of individual is the marginal efficiency of health capital curve felt to be shifted out more: **low educated** or **high educated**?

(c) This question is unrelated to parts (a) and (b)(i).

(i) U.S. government agencies use cost-benefit analysis and the statistical value of life in determining whether to implement government policies such as those on pollution control.

A simple **YES** or **NO** will do.

(ii) Medicare uses cost-benefit analysis to decide whether a medical procedure is worthwhile.

A simple **YES** or **NO** will do.

5. A policy change led to increased access to health insurance for individuals in certain regions. The change took effect in 2015. We have data on individuals in 2014 and a sample of different individuals in 2016.

The variable **year** takes value 0 in 2014 and value 1 in 2016.
The variable **treat** takes value 1 if in the treated group (i.e. in a region with increased access to health insurance) and value 0 otherwise.
The variable **expend** equals annual total health expenditures in dollars.

The following data summarizes the data on variable **expend**

	Obs	Mean	Std. Dev.	Min	Max
2014 control	823	5867.026	7288.419	72.04307	62274.52
2016 control	844	6046.06	7435.809	140.1227	86921.84
2014 Treated	1,151	5534.806	7918.108	99.85682	118181.6
2016 treated	1,305	6659.308	8360.218	108.3021	77539.38

(i) What slope coefficient do you expect from the command **regress expend year if treat==0? Explain your answer.** If there is not enough information to answer this question then say so.

(ii) What value do you expect from the command **ttest expend if year==1, by(treat)? Explain your answer.** If there is not enough information to answer this question then say so.

(iii)-(iv) Calculate the average difference-in-differences estimate of the effect of increased access to health insurance. **Show computations.**

(v) Define the indicator variable **d** to equal 1 if **year==1** and **treat==1.** We run the regression **regress expend year treat d, vce(robust)**. What value do you expect the coefficient of **d** to be? **Explain your answer.**

(vi) You want to directly estimate the income elasticity of health care use. What OLS regression would you run?

Multiple Choice (1 point each) Note: You should spend 15-20 % of time on these!

1. In Akerlof's model for the market for lemons, adverse selection is reduced if

a. the buyer has better information on used car quality

b. the seller has better information on used car quality

c. neither a. nor b.

d. both a. and b.

2. The World Health Organization plans to send in teams of experts to deal with an outbreak of a disease in a distant country. Sending more teams will prevent more fatalities. It costs $30,000 per team sent and they estimate the following effectiveness:

Number of teams	1	2	3	4	5
Lives saved	500	600	610	612	613

Suppose saving a life is valued at $10,000. What is the optimal number of teams?

a. 1

b. 2

c. 3

d. 4

e. 5.

3. A weakness of applying standard cost-benefit analysis to health care is

a. there is difficulty in placing a dollar value on the benefit of health care

b. standard cost-benefit analysis does not maximize society's surplus

c. neither a. nor b.

d. both a. and b.

4. The study "does Abolishing User Fees Lead to Improved Health Status? Evidence from Post-apartheid South Africa" is

a. an example of a randomized experiment

b. analyzed using the differences-in-differences method

c. neither a. nor b.

d. both a. and b.

5. The statistical value of a life saved can be calculated using

a. willingness to pay

b. willingness to accept

c. neither a. nor b.

d. both a. and b.

6. The marginal efficiency of health capital curve is a plot of

a. marginal cost against marginal benefit

b. rate of return on health investments against level of health capital

c. expenditure on other goods against level of health capital

d. none of the above.