Cameron ECON 132 (Health Economics): SECOND MIDTERM EXAM (A)   Winter 18

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 study in the May 4 2004 issue of the *Annals of Internal Medicine* considered the cost-effectiveness and cost-benefit of screening people with hypertension (blood pressure of 140/90 or higher) for Type 2 Diabetes among people with hypertension. Assume

- 5 percent of people with hypertension have undiagnosed diabetes.
- Early diagnosis of diabetes saves 0.2 years of life per person with previously undiagnosed diabetes.
- A year of life is valued at $100,000.
- Early diagnosis of diabetes increases health costs (due to treatment of diabetes for a longer period of time) by $10,000 per person with previously undiagnosed diabetes.

We consider the costs and benefits of diabetes screening **for 10,000 people** with hypertension and with undiagnosed diabetes. In parts (a) and (b) assume that there are no direct costs for the actual screening tests, the only cost is the indirect cost of receiving more health care, and that the screening detects all cases of undiagnosed diabetes.

(a) Perform a **cost-benefit analysis** of diabetes screening for this group.
Does it favor screening?

(b) What is the **cost of screening per life-year saved?**

**(c)** Now additionally suppose that there are direct costs for the actual screening tests:
- an initial screening test (a capillary blood glucose test) costs $25 per person tested
- this picks up 90% of those with undiagnosed diabetes, but also wrongly suggests that 10% of those without diabetes have diabetes.
- a confirmatory test (a fasting plasma glucose test) costs $20. This is only given to those diagnosed using the initial screening test and is perfect in detecting who really has diabetes.

What is the **direct cost of screening 10,000 people?**

2.(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?
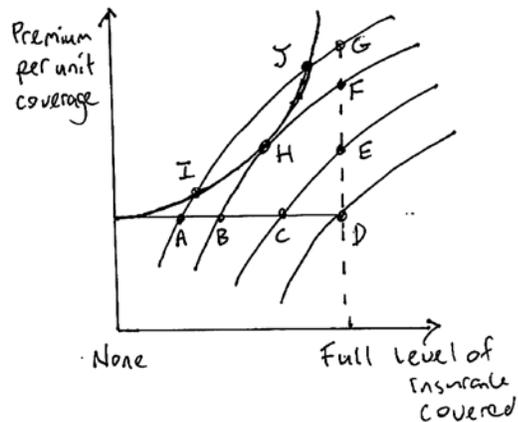
(b) Suppose all individuals face a loss distribution that is uniformly distributed on ($3,000, $9,000). Each individual knows his loss but the insurance company does not. If all individuals are risk neutral will the insurance company make a profit if it sells a complete-cover insurance policy for $6,000 (and faces administration costs of $1,000 per policy)? **Explain your answer.**

**(c)(i)** Provide a definition of adverse selection.

(ii) Explain what is meant by a health insurance death spiral.

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

(a) True   False   Given adverse selection, private health insurance markets cannot provide a standardized policy with the same premium and benefits for everyone.

(b) True   False   The sixth stool Guaiac test article showed that one test was optimal.

(c) True   False   Cost-benefit analysis attempts to replace market demand & supply curves.

(d) True   False   U.S. government agencies place the value of a life at over $5 million.

(e) True   False   The main reason for a gatekeeper is to reduce adverse selection problems.

(f) True   False   A limitation of the difference-in-differences method is that it cannot be used to obtain estimates that can be given a causal interpretation.

4.(a) Consider the following tradeoff between health capital (H) and consumption of other goods (Z). Suppose new medical technology leads to improved health outcomes at no additional cost.
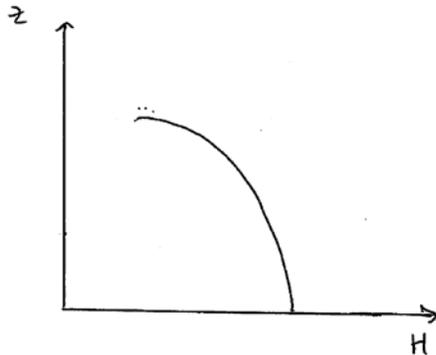
(i) Show the effect of this change on the above diagram.

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

(b) The World Health Organization (WHO) is considering sending 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 $100,000 per team spent and they estimate the following effectiveness:

Number of teams   Lives saved

1	500
2	600
3	610
4	612
5	613
6	613

Suppose saving a life is valued at $20,000. What is the optimal number of teams? **Explain your answer.**

(c)(i) Provide the definition of a QALY.

(ii) Explain the benefit in health settings of using cost-effectiveness analysis rather than cost-benefit analysis.

5. We have data on medical spending (variable spending) for individuals who are in exactly one of three possible insurance plans. Variable plan1 = 1 if in plan 1 and = 0 otherwise. Variable plan2 = 1 if in plan 2 and = 0 otherwise. Variable plan3 = 1 if in plan 3 and = 0 otherwise.

```
. sum spending plan1 plan2 plan3
    Variable |        Obs        Mean    Std. Dev.       Min        Max
    spending |        616    1505.769    2403.662    10.1652    28519.2
       plan1 |        616    .3279221    .4698378          0          1
       plan2 |        616    .5454545    .4983343          0          1
       plan3 |        616    .1266234    .3328208          0          1

. regress spending plan1 plan3, vce(robust)
             |              Robust
    spending |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
       plan1 |  -530.4282   202.5152   -2.62   0.009    -928.136   -132.7204
       plan3 |  -780.6911   201.3257   -3.88   0.000   -1176.063   -385.3194
       _cons |   1778.561   155.2871   11.45   0.000    1473.602    2083.521
. test plan1 plan3
 ( 1)  plan1 = 0
 ( 2)  plan3 = 0
       F(  2,   613) =    7.60
           Pro
b > F =    0.0005
```

(i) For which plan was medical spending the highest? **Explain your answer.**

(ii) Is the difference in spending across the three plans statistically significant at the 5% level? **Explain your answer.** If there is not enough information to answer this question then say so.

(iii) What is the difference in the average amount of spending in plans 1 and 3? **Explain your answer.**

(iv) Suppose we additionally have a variable **income** that has data on annual income. Give Stata commands that would enable us to compute the income elasticity of health spending.

(v)-(vi) The following table gives the sample mean of variable **waz**, studied in the Stata exercise in assignment 3. Given these data, give an estimate of the treatment effect. **Show computations.**

	Treatment = High	Treatment = Low
Year==93	−0.54	−0.44
Year==98	0.32	−0.07

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

1. Which of the following countries has universal government provided single-payer insurance

a. Britain

b. Germany

c. United States

d. Afghanistan

2. Standard health policy methods for estimating the value of a life are

a. willingness to pay to avoid risks

b. willingness to accept risks

c. neither a. nor b.

d. both a. and b.

3. The main motivation for the individual mandate component of the original Affordable Care Act was to

a. reduce moral hazard

b. reduce adverse selection

c. improve chance of Republican support in the U.S. Congress

d. none of the above.

4. We estimate the model $y = \beta_1 + \beta_2\, T + \beta_3\, S + \beta_4\, T \times S +$ error, where T=0 pre-treatment and T=1 post-treatment and S=1 if treated and S=0 if not treated, The difference-in-difference estimate of treatment is

a. β_2

b. β_3

c. β_4

d. none of the above.

5. In homework 3 the variable **waz** measured

a. weight

b. weight divided by age

c. weight at each age standardized to have mean near 0 and variance near 1.

d. none of the above.

6. The traditional model for consumer demand is adequate for explaining the impact on individual demand for health of

a. changes in the prices of health care

b. sickness of an individual

c. both a. and b.

d. neither of the above.