Cameron ECON 132 (Health Economics): SECOND MIDTERM EXAM (A) Spring 22

Answer all questions in the space provided on the exam.
Total of 36 points (and worth 20% of final grade).
Read each question carefully, so that you answer the question.

Short Answer (6 points each question)

1.(a) Consider data from the article by William Black et al. (2014), "Cost-effectiveness of CT Screening in the National Lung Screening Trial", New England Journal of Medicine, 371: 1793-1802. The study was a randomized trial on 50,000 people aged 55-75 years who had a smoking history of at least 30 pack-years. Some participants received three low-dose computerized tomography (CT) chest scans per year, while the remainder received no screening.

For those in the no screening group, subsequent lung-cancer treatment costs averaged $900 per person and the quality-adjusted life expectancy averaged 10.87 years per person.
For those with CT screening, the screening costs (total for the three scans) were $800 per person, subsequent lung-cancer treatment costs averaged $1,100 and quality-adjusted life expectancy was 10.97 years per person.
Is the CT screening worthwhile if the threshold is $25,000 per QALY? **Explain your answer.**

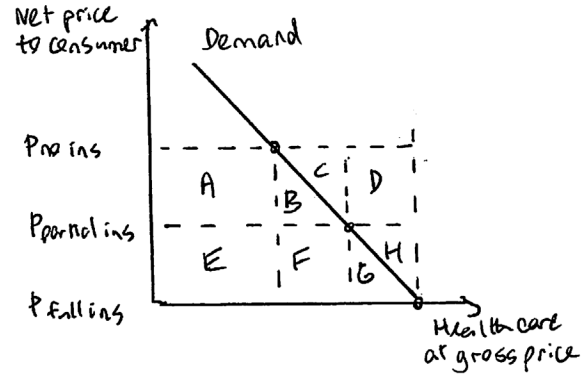
(b) The following table gives costs and benefits of sending teams of different sizes to treat a disease outbreak in a poor country.

Team size	Total cost	Total lives saved
0	0	0
5	250,000	600
10	500,000	1,000
15	750,000	1,200
20	1,000,000	1,300
25	1,250,000	1,350
30	1,500,000	1,370

What is the optimal team size if saving a life is valued at $5,000? **Explain your answer.**

(c) Consider the following screening test for cancer applied to 100,000 people of whom 1,000 have cancer. Each test costs $50, picks up 80% 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 $100. Correct early detection of cancer by the test is valued at $5,000. Is this test worthwhile? **Explain your answer.**

3.(a) Consider the following diagram.



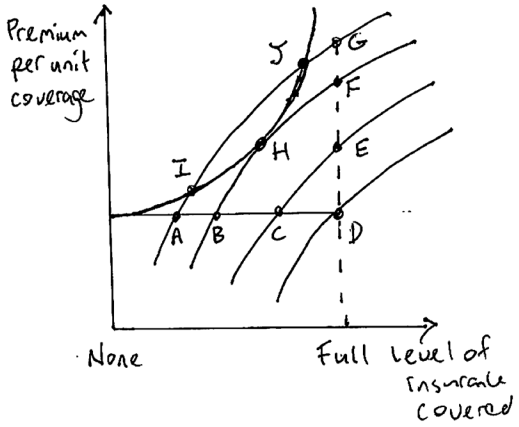
(i) Give the combinations of A, B, …, H that show change in society's health expenditures in going from partial insurance to complete insurance.

(ii) Give the combinations of A, B, …, H that show the change in society's well-being in going from partial insurance to complete insurance.

(b) For the following diagram (no explanation to your answer is needed).

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

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



(c) Suppose all individuals face a loss distribution that is uniformly distributed on ($0, $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 $5,000 (and faces administration costs of $1,000 per policy)? **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 Universal health insurance need not be solely government-provided.

(b) True False The sixth stool Guaiac test article showed that no tests were better than six tests.

(c) True False A limitation of cost-benefit analysis is the need to place a dollar value on the benefits of treatment.

(d) True False Using a high discount rate, compared to a low discount rate, is likely to make a costly one-time medical intervention appear to be more cost-effective.

(e) True False Adverse selection is the primary cause of an insurance death spiral.

(f) True False A main reason for the creation of U.S. Medicare is to reduce moral hazard in health insurance markets.

4.(a) On an appropriate diagram show **consumer choice between consumption of non-health goods and the level of health**.
Now suppose the person becomes seriously ill. **On the same diagram**, show the effect on consumer choice between consumption of non-health goods and level of health.

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

(c) Consider a policy change that came into effect in 2010. We have data for 2005 and 2015. The outcome variable in 2015 was 10 in communities affected by the policy and 12 in communities not affected by the policy. The outcome variable in 2005 was 5 in communities affected by the policy and 10 in communities not affected by the policy.

Give the difference in differences estimate of the effect of the policy. **Show computations.**

5. We use the Rand Health Insurance Study data studied in various homeworks.
There are five indicator variables for different levels of health insurance: coins0, coins25, coins50, coins95 and coinsindiv (where the last is the individual deductible plan). We also consider variables age (age in years) and bad_health (= 1 if health is bad and = 0 otherwise). The outcome variable is out_infl (outpatient spending) and later lnout = ln(out_infl).

```
. regress out_infl coins25 coins50 coins95 coinsindiv age bad_health, vce(robust)
                |               Robust
    out_infl |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     coins25 |  -505.0152   191.7015    -2.63   0.009    -881.2554   -128.7749
     coins50 |  -748.8159   195.0987    -3.84   0.000    -1131.724   -365.9082
     coins95 |  -660.1127   208.0777    -3.17   0.002    -1068.494    -251.732
  coinsindiv |  -688.5892   189.4542    -3.63   0.000    -1060.419   -316.7595
         age |   34.59961   4.573439     7.57   0.000     25.62362    43.57561
  bad_health |     500.96   380.1701     1.32   0.188    -245.1755    1247.096
       _cons |   860.6539   136.3986     6.31   0.000     592.9531    1128.355
```

(i) Does bad health have a statistically significant relationship with outpatient spending at 5%? **Explain your answer.**

(ii) What Stata command would you give after the above **regress** command to establish whether the level of health insurance has a statistically significant effect on outpatient health spending? Give the complete command including any relevant variables.

(iii) For this dataset can the result from part (ii) be given a causal interpretation, or is it merely a correlation? **Explain your answer.**

(iv) The Stata command

```
regress lnout coins25 coins50 coins95 coinsindiv age bad_health,
vce(robust)
```

led to a coefficient of 0.0840 for variable **bad_health**. Give a simple meaningful interpretation of the impact of bad health on the level of outpatient health expenditures.

(v) The Rand study sample was selected at the family level (with family identifier the variable **famid**) and regression errors may be correlated within family. How would you adjust the command in part (iv) to control for this?

(vi) Is the sample used in the regression in part (iv) likely to be exactly the same as the sample used in the regression in part (i)? **Explain your answer**.

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

1. Methods to control moral hazard include

a. gatekeeping

b. coinsurance

c. neither a. nor b.

d. both a. and b.

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

a. willingness to pay to avoid risks

b. willingness to accept risks

c. both a. and b.

d. neither a. nor b.

3. In the Grossman model the health production possibilities curve gives the relationship between

a. health capital and medical inputs

b. health capital and consumption of goods other than medical inputs

c. medical inputs and consumption of goods other than medical inputs

d. none of the above.

4. The income elasticity of health care in the U.S> over time is

a. less than zero

b. between 0 and 1

c. between 1 and 2

d. more than 2.

5. In highly developed countries other than the U.S. it is standard to have

a. universal health insurance

b. provision of health services entirely by the government

c. both universal health insurance and provision of health services entirely by the government

d. neither universal health insurance nor provision of health services entirely by the government

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

a. weight

b. weight divided by age

c. weight divided by age and standardized to have mean near 0 and variance near 1.

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