

Cameron ECON 132 (Health Economics): SECOND MIDTERM EXAM (A) Spring 2023

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 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:

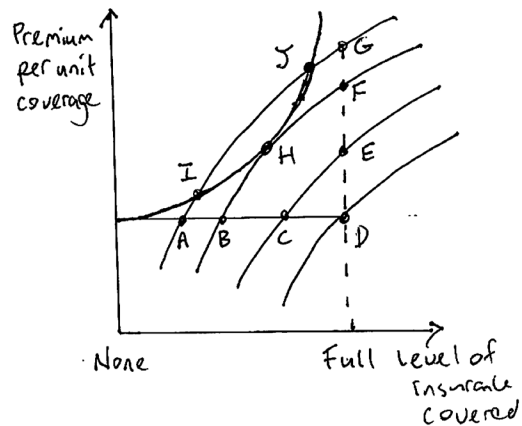
- an initial screening test (a capillary blood glucose test) costs \$25 per person tested
- this picks up 90% of those with undiagnosed diabetes, but also wrongly suggests that 10% of those without diabetes have diabetes.
- a confirmatory test (a fasting plasma glucose test) costs \$20. This is only 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 the estimates can never be given a causal interpretation.

4.(a) On an appropriate diagram show **consumer choice between consumption of non-health goods and the level of health.**

Suppose new medical technology leads to improved health outcomes at no additional cost.

On the same diagram, show the effect on consumer choice between consumption of non-health goods and level of health.

(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 \$500,000 per team spent and they estimate the following effectiveness:

Number of teams Total Lives saved

1	200
2	300
3	350
4	375
5	385
6	390

Suppose saving a life is valued at \$25,000. 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.

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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
      Prob
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 to enable regression that directly computes 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 $y = \beta_1 + \beta_2 T + \beta_3 S + \beta_4 T \times S + \text{error}$, 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.

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.