

UNIVERSITY OF VICTORIA  
DEPARTMENT OF ECONOMICS

ECONOMICS 318  
HEALTH ECONOMICS  
MIDTERM EXAMINATION I  
Spring 2013

INSTRUCTIONS. Answer all questions. Write your answers on the exam paper. No electronic devices, including but not limited to calculators and cell phones, are necessary and no such devices may be used during the exam. Remember to clearly label the axes and other objects in graphs. Good luck.

NAME: \_\_\_\_\_

STUDENT #: \_\_\_\_\_

# 1 MULTIPLE CHOICE QUESTIONS (24 MARKS).

**Instructions.** Select the best answer to every question. Clearly record your answers on this page.

## MULTIPLE CHOICE ANSWERS

- |    |                                     |                                     |                                     |                                     |     |                                     |                                     |    |                                     |
|----|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-----|-------------------------------------|-------------------------------------|----|-------------------------------------|
| 1. | A.                                  | <input checked="" type="radio"/> B. | C.                                  | D.                                  | 7.  | <input checked="" type="radio"/> A. | B.                                  | C. | D.                                  |
| 2. | A.                                  | <input checked="" type="radio"/> B. | C.                                  | D.                                  | 8.  | A.                                  | <input checked="" type="radio"/> B. | C. | D.                                  |
| 3. | <input checked="" type="radio"/> A. | B.                                  | C.                                  | D.                                  | 9.  | A.                                  | <input checked="" type="radio"/> B. | C. | D.                                  |
| 4. | A.                                  | B.                                  | C.                                  | <input checked="" type="radio"/> D. | 10. | A.                                  | B.                                  | C. | <input checked="" type="radio"/> D. |
| 5. | A.                                  | B.                                  | <input checked="" type="radio"/> C. | D.                                  | 11. | A.                                  | <input checked="" type="radio"/> B. | C. | D.                                  |
| 6. | A.                                  | B.                                  | <input checked="" type="radio"/> C. | D.                                  | 12. | <input checked="" type="radio"/> A. | B.                                  | C. | D.                                  |

1. Victor Fuch's "Tale of Two Cities" highlights the fact that
  - (a) living in an urban center has a large effect on mortality.
  - (b) lifestyle has a large effect on mortality.
  - (c) quality of health care has a large effect on mortality.
  - (d) access to health care has a large effect on mortality.
  
2. In Grossman's model, the aging process is represented by
  - (a) MEI schedules which are monotonically decreasing in age.
  - (b) eventually increasing rates of depreciation of health stock.
  - (c) decreases in the efficiency of health investment.
  - (d) decreases in "effective education" levels as memory fades with age.
  
3. It is an empirical regularity that people with high school educations are on average more healthy than people who do not graduate from high school. We should infer that
  - (a) a randomly selected person with a high school education is likely to be healthier than a randomly selected person without a high school diploma.
  - (b) policies which increase high school graduation rates will improve public health.
  - (c) either the high school curriculum or social interactions among high school students lead to health-promoting behaviors.
  - (d) the government should consider diverting resources from health care to public education.
  
4. The term *positive economics* refers to
  - (a) value judgements, based on analytical economic models, regarding policy proposals.
  - (b) economic analysis which assume that voluntary economic transactions are positive-sum.
  - (c) economic analysis which involves applied econometrics, as opposed to pure theory.
  - (d) description and explanation of economic phenomena.

5. Which of the following is evidence that higher income causes better health?
- (a) Using a large population survey, it is found that income and health are positively correlated.
  - (b) Analysts discover that patients randomized to a more effective treatment also had higher incomes.
  - (c) People who win the lottery are found to be in better health than lottery players who did not win.
  - (d) Statistical results demonstrate that people who place relatively large weight on future outcomes are likely to obtain more education and less likely to smoke than others.
6. Life expectancy in Canada is much higher in 2011 than it was in 1800 primarily because of
- (a) improvements in medical technology.
  - (b) massive increases in labour and capital devoted to health care (such as physicians and hospitals).
  - (c) improvements in living standards such as housing, nutrition, and sanitation.
  - (d) reductions in smoking and other unhealthy behaviors that allow people to now commonly live into their 80s and 90s.
7. The First Fundamental Theorem of Welfare Economics asserts that
- (a) all competitive equilibria are Pareto efficient.
  - (b) welfare is maximized when social indifference curves are tangent to the PPF.
  - (c) welfare payments are a more efficient manner of redistributing income than trade on Pareto manifolds.
  - (d) any Pareto efficient allocation may be obtained as a competitive equilibrium.
8. The elasticity of population health to national health care expenditures in the U.S. is thought to be
- (a) highly elastic and positive.
  - (b) highly inelastic and positive.
  - (c) highly inelastic and negative.
  - (d) unknown; it is impossible to estimate that relationship.

9. Suppose a vaccine which prevents a communicable disease is produced by competitive firms. The market outcome will
- (a) be efficient, as demonstrated by the Second Welfare Theorem.
  - (b) involve too few vaccinations, because of the uncaptured positive externality.
  - (c) involve too many vaccinations, because of the uncaptured positive externality.
  - (d) involve too many vaccinations, because of the uncaptured negative externality.
10. A recent study estimated that a 10% increase in Canadian health care expenditures would increase life expectancy by 2.1%. The implied elasticity of life expectancy to expenditures is
- (a) 2.1%.
  - (b) 2.1.
  - (c) 0.21%.
  - (d) 0.21.
11. The RAND Health Insurance Experiment showed that
- (a) more generous health insurance did not lead to higher health care expenditures, but did improve health.
  - (b) more generous health insurance led to higher health care expenditures, but did not improve health.
  - (c) providing insurance to someone who would otherwise be uninsured improved mental health.
  - (d) providing insurance to someone who would otherwise be uninsured unexpectedly harmed mental health.
12. The *relative income hypothesis* holds that
- (a) holding individual income constant, an increase in other people's incomes may affect a person's health.
  - (b) holding other people's income constant, an increase in a person's income increases that person's health.
  - (c) holding average income constant, an increase in income inequality will decrease average health.
  - (d) holding average income constant, an increase in income inequality will increase average health.

## 2 TRUE / FALSE / UNCERTAIN QUESTIONS (18 MARKS).

INSTRUCTIONS. Respond true, false, or uncertain to each assertion and write a brief justification of your answer, including a graph and/or equations if helpful. No marks will be awarded to undefended answers

1. Currently, life expectancy is higher in Canada than in the United States, yet health care expenditures per capita are higher in the United States than in Canada. Therefore, the U.S. health care system is less efficient than the Canadian system.

**Answer.** FALSE. There are many causes of health other than the health care system, so the poor U.S. health outcome could result from any of these other factors rather than inefficiency of the health care system. A graph showing production functions for health as a function of health care may be used to illustrate.

2. A new law, which can be enforced at no cost, requires people to exercise, which makes them healthier. The law increases social welfare.

**Answer.** FALSE. People face a tradeoff between health and other goals. A law forcing people to be healthier than they would otherwise choose makes them worse off, because the benefit of the extra health does not offset the cost of more exercise. A graph showing a health/entertainment PPF, moving from a tangency point to a point on the PPF with more health but on a lower indifference curve, may be used to illustrate.

Students may also correctly answer UNCERTAIN if they give some version of the point above AND point out there may be positive external effects from greater health.

3. For every person, health ( $h$ ) is caused by income ( $y$ ) and IQ according to:

$$h = 4 + (1/2)y - IQ,$$

and income is caused by IQ according to:

$$y = 10 + 2(IQ).$$

People differ in IQ. Data from this society would show no relationship between income and health.

**Answer.** TRUE. Substitute the second equation into the first to find

$$\begin{aligned} h &= 4 + (1/2)(10 + 2IQ) - IQ \\ &= 9. \end{aligned}$$

So in this society everyone has the same health,  $h = 9$ , but people with higher IQ have higher incomes, so data from this society show no relationship between income and health.

Students may also include a graph to illustrate in  $(h, y)$  space, but a graph is not necessary if the arithmetic and explanation are correct. A graph instead of arithmetic is acceptable if the graph is sufficiently detailed to adequately demonstrate the result.

### 3 SHORT ANSWER QUESTIONS (12 MARKS).

INSTRUCTIONS. Answer the question clearly and concisely. Write your answers on this paper in the space provided. Undefined answers are worth no marks.

1. Consider a society in which each individual's health ( $h$ ) is produced by her income ( $y$ ) according to

$$h = \sqrt{y}. \quad (1)$$

There exist two types of people in this society: rich people who have income  $y^R = 25$ , and poor people who have income  $y^P = 0$ . One-half the people in this society are poor and the other half are rich.

- Putting income on the x-axis and health on the y-axis, sketch the relationship between income and health. Label the health/income pairs for poor and for rich people.
- The government implements a redistribution program which taxes each rich person \$9 and gives each poor person \$9. By how much does average health change as a result of this program?
- Now suppose that the redistribution program is not costless. Each rich person is taxed \$9, but poor people receive only  $\$(9 - x)$ , where  $x$  represents the costs of redistribution. Find the largest value of  $x$  such that redistribution still increases average health.

ANSWER: (also use following page as needed.)

**Answer.**

(a) A graph showing the  $h = \sqrt{y}$ , with the points  $(0, 0)$  and  $(25, 5)$  labeled.

(b) Average health before the program:  $(1/2)\sqrt{0} + (1/2)\sqrt{25} = 2.5$ .

Average health after the program:  $(1/2)\sqrt{9} + (1/2)\sqrt{16} = 3.5$ .

So average health increases one unit, from 2.5 to 3.5. Students may show this on their graph, but they need not do so for full marks.

(c) The program would have no effect on health if  $x$  satisfies

$$(1/2)\sqrt{9-x} + (1/2)\sqrt{16} = 2.5$$



so

$$(1/2)\sqrt{9-x} = 0.5$$

$$\sqrt{9-x} = 1$$

$$9-x = 1$$

$$\rightarrow x = 8.$$

Therefore, so long as the program does not waste more than \$8 of the \$9 transfer, average health will increase.

ANSWER TO SHORT ANSWER QUESTION 1 CONTINUED:

EXTRA SPACE. *Use as needed to answer short answer questions, or as scratch space, or to sketch amusing cartoons.*

END.