Public Health 126: Introduction to Health Economics and Public Policy

FINAL EXAM

Thursday, May 15, 2008, 12:30–3:30pm

You have three hours to complete the exam. Each question is worth 12 points, yielding a total of 72 points. *Your answers must be wholly contained in the space provided for each question to receive credit.* Be sure to write clearly and concisely.

Name	

Question	Score
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total	

1 Analytical questions

Answer *all four* of the following questions in the space provided.

1.1 Monopoly and subsidies

Lipitor is a statin that controls a patient's cholesterol level and is under Pfizer's patent protection. Demand for Lipitor is $P_D = 14 - 2Q_D$ and the supply is $P_S = 2 + 2Q_S$. Quantity is in millions of pills; price is per pill.

a. Find the optimal (i.e., competitive) price and quantity in the market.
Solution: The quantity is 3 million pills and the price is \$8.

b. Find the monopoly price and quantity.
Solution: The quantity is 2 million pills and the price is \$10.

Suppose that the government not only offers Pfizer patent protection, but also gives the company a subsidy of \$6 per pill.

c. What is the price and quantity in this scenario?
Solution: As in the competitive market, the quantity is 3 million pills and the price is \$8.

d. How would these results change if the subsidy was instead given to consumers to purchase the pills?
Solution: It does not matter whether the subsidy is given to Pfizer or to consumers. Economic incidence is determined solely by the elasticities of demand and supply and may be quite different from the statutory incidence. Hence, the answer to part (c) does not change if the consumers received the subsidy.

e. What fractions of the incidence of the subsidy do producers and consumers bear? Explain.
Solution: The absolute value of the elasticities of supply and demand are equal at the equilibrium $\left(\frac{4}{3}\right)$ and thus the incidence of the subsidy is split equally between the parties.

f. What are the arguments for and against giving Pfizer this subsidy?
Solution: The benefit of the subsidy is that it induces a monopolistic market to reach the efficient equilibrium. It is politically unpalatable to give a subsidy to a firm that is already earning monopoly rents, however. This is a classic case of a trade-off between efficiency and equity.

1.2 Coinsurance and moral hazard

The market for physicians' services has a demand of $P_D = 275 - 4Q_D$ and a supply of $P_S = 25 + Q_S$. Quantity is in millions of man-hours; price is per-hour.

a. Find the equilibrium in this market.
Solution: The quantity is 50 million man-hours and the price is \$75.

b. Calculate the elasticities of demand and supply at this equilibrium.
Solution: The elasticity of demand is $-\frac{3}{8}$ and the elasticity of supply is $\frac{3}{2}$.

Suppose that the government provides universal health insurance with a constant coinsurance rate of 20% (i.e., all citizens have coverage and each patient must pay 25% of his bill).

c. Find the equilibrium in this market.
Solution: Here, the quantity is 125 million man-hours and the price is \$150.

d. What price do consumers pay out-of-pocket? Is this higher or lower than the price that they paid without insurance?
Solution: Consumers pay $37.50, which is less than the $50 that they paid without insurance.

Instead of universal coverage, suppose that the government enacts a price ceiling of $35.

e. What happens under this proposal?
Solution: Consumers would like to consume a quantity of 60 million man-hours, but producers are only willing to supply a quantity of 10 million man-hours. There is no equilibrium in the market; a shortage arises.

f. How is health care allocated in the presence of price ceilings?
Solution: Queues for elective visits form and consumers pay for health care in time-costs, rather than through market prices. This system is less efficient than one the utilizes a market-determined price for care.

1.3 Adverse selection and insurance

There are four equally-sized groups in the population with expected health costs and values of insurance given in the following table. Insurance companies are unable to distinguish between the groups.

	1	2	3	4
Expected cost	$400	$1,600	$2,500	$7,500
Value to consumer	$500	$2,000	$3,200	$9,500

a. Why would the groups value insurance more than they expect to pay in health care costs?
Solution: The consumers are risk averse; they are willing to pay a premium to assure a certain outcome, rather than accept the inherent risk in future health outcomes.

b. What would the actuarially fair price be if everyone bought insurance?
Solution: The actuarially fair price would be $3,000.

c. Which groups would actually buy insurance as this price?
Solution: Since the values to groups 1 and 2 of insurance are less than $3,000, they would not voluntarily purchase insurance. Groups 3 and 4 would want to purchase insurance for this price.

d. What price would arise in the market? Which groups would buy insurance at this price?
Solution: If groups 3 and 4 purchase insurance, then the actuarially fair price is $5,000, but this price is higher than the value of insurance to group 3. The market is only in equilibrium when group 4 alone is purchasing insurance; adverse selection causes the market to unravel. This group will pay some amount between $7,500 and $9,500 for coverage.

e. Suppose that the government enacts an individual mandate that requires everyone to purchase insurance; citizens that do not acquire insurance are fined. What is the minimum fine necessary to achieve full coverage? Assume that the government can punish everyone who does not purchase coverage (i.e., it can "catch" all of the non-compliers).
Solution: Group 1 will require the largest punishment to induce them to purchase insurance. The lowest possible price of insurance in this market is the actuarially fair premium when everyone consumes as given in part (b); that is, $3,000. Since members of group 1 value insurance at $500, a fine of at least $2,500 would be necessary to force them to acquire coverage.

This figure would be higher if the government could not detect all of the non-purchasers or if insurance was sold above its actuarially fair price (as a result of competitive loading fees or monopolistic pricing).

f. Congress recently passed the Genetic Information Nondiscrimination Act, which prevents insurance companies from using the results of genetic testing to discriminate against or refuse coverage to consumers. Does this bill mitigate or exacerbate adverse selection? Explain.
Solution: This law exacerbates adverse selection in the market. If insurance companies could use genetic information to calculate premiums, the information asymmetry between the company and its customers would be reduced, prices could better reflect the health risk of each patient, and a larger proportion of society would be insurable. If insurance companies did use this information, however, those with genetic conditions would face higher premiums, which may run counter to society's concern for providing for its sickest members. Once again we observe a trade-off between efficiency and equity.

1.4 Elasticities

Topher does not have drug insurance coverage and currently takes 125 doses of Allegra to combat his allergies. Suppose that he has a demand elasticity for Allegra of -0.6 and is in a 20% tax bracket.

a. If his pharmaceutical expenses became tax deductible, how many doses of Allegra would he consume?
Solution: He will consume 15 more doses.

b. Does his total spending on Allegra go up or down when drug spending becomes tax deductible? Explain.
Solution: His spending will fall. Total spending rises when price rises under inelastic demand; the opposite relationship holds for elastic demand. Since his demand for Allegra is inelastic, his spending will fall when the price falls.

2 Short response questions

Choose *3 of the following 5* questions to answer in the space provided. Though the question consists of multiple parts, the essay responses should be coherent and clear while addressing the listed points.

2.1 Vaccinations

Influenza is a common and potentially deadly virus, though vaccines offer some protection from the ailment. In your response, discuss the following issues:

a. What might justify the government to encourage citizens to receive an annual inuenza vaccination?

b. Explain how each of the following policy options might work to achieve this goal:

   i. Subsidies for producers

   ii. Subsidies for consumers

   iii. Price floors

iv. Price ceilings.

For each policy option, explain the economic mechanics that underlie it.

c. Conclude by briefly making a recommendation to government officials based upon your analysis.

2.2 Reimportation of pharmaceuticals

Many policy makers have recommended allowing the reimportation of pharmaceuticals to the U.S. from other countries. Currently, the FDA bans this practice. Drug prices can be much lower in other nations due to the conscious pricing decisions of the firms or price controls set by foreign governments. Analyze the following issues:

a. What factors do pharmaceutical firms consider when devising their prices across countries?

b. How will this policy affect U.S. drug prices?

c. How will it affect prices in other countries?

d. How will future research and development investments be affected?

2.3 Mandates

In 2006, under then-governor Mitt Romney, Massachusetts enacted a health care mandate. Hillary Clinton advocates a national mandate plan backed by wage garnishment. In your response, examine the following issues:

a. Compare and contrast the following two proposals:

   i. A mandate requiring employers to provide coverage for all their employees

   ii. A mandate requiring every citizen to obtain insurance coverage

b. What qualities of the health insurance market would warrant a mandate?

c. What are the potential benefits of a mandate?

d. What are the potential drawbacks of a mandate?

e. Conclude offering a brief recommendation regarding mandates based upon the preceding assessments.

2.4 Medicare and cost shifting

Suppose that the Medicare reimbursement rate to hospitals and physicians is reduced and that these groups maximize profits. Discuss the following issues:

a. Define price discrimination and consider this pricing strategy within the context of Medicare markets.

b. What conditions must be met for a firm to be able to price discriminate?

c. Would doctors and hospitals recuperate this reduction in revenue by charging non-Medicare patients more?

2.5 Justifications for government intervention

What factors could motivate intervention in markets by the government? Be sure to discuss efficiency- and equity-enhancing justifications.