

Problem Set 5 Health Economics

Bill Evans
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1. Graphically illustrate how the movement to fluoridated public water has altered the market demand for dental visits?
2. Do you think the elasticities of demand for the following health services will be “high” or “low” in absolute value and explain your answers:
 - a) diagnostic x-rays, such as those for broken bones
 - b) mammographies
 - c) *length* of hospital stays
 - d) plastic surgery
3. Medicare enrollees can purchase prescription drug coverage through the Medicare Part D program. Prior to passage of the Affordable Care Act, the coinsurance structure of Medicare Part D was as follows:
 - There was an initial \$295 out of pocket deductible before insurance began to pay anything.
 - Between \$295 and \$2700 in total costs, the coinsurance rate was 25%.
 - After \$2700 in total costs, coinsurance rates increased to 100%.
 - Once out of pocket costs reached \$4350, the coinsurance rate fell to 5%.

Use the specifics of the Medicare Part D prescription drug plan and graph a senior’s out of pocket expenses for prescription drugs (horizontal axis) versus the total expenditures on prescription drugs (vertical axis). Your graph should look similar to the one on slide 24 of the moral hazard slides. Does the structure of this cost sharing arrangement make sense from an economic point of view?

4. In some state Medicaid programs, the coinsurance rate for prescription drugs is 0 (recipients have no out-of-pocket expenses for prescription drugs). Assume the inverse demand for the number of prescriptions filled per month without insurance is $P=45-5Q$. Graph the demand curve with and without insurance. Over the past 20 years, many state Medicaid programs have adopted some form of cost sharing for prescription drugs. Suppose a state adopts a copayment rate of \$9 per prescription. Graph the demand curve in this case. Suppose the average prescription is \$15. What is demand under i) no insurance, ii) 0% coinsurance, and iii) \$9 copayment.
5. Suppose that in the absence of insurance, the inverse demand for office doctor visits is given by the equation $P_1 = 150 - 30Q$. Graph the demand curve. Graph the demand curve when the person has health insurance with a coinsurance rate of 25%. What is demand for visits with and without insurance when doctors receive \$60/visit?
6. The market demand for a particular doctor visits is given by the inverse demand curve $P_d = 100 - 5Q$ and the market supply is $P_s = 20+5Q$. Graph the market supply and demand and indicate the market equilibrium values for price and quantity. Suppose that the consumers in this market are then provided health insurance that pays for all services after consumers pay a 20% coinsurance rate for every visit. On the same graph, graph the demand for doctor visits generated by this insurance plan. What is the market equilibrium price and quantity with a 20% coinsurance rate. What is the dead weight loss of moral hazard under health insurance?

7. Not all medical costs for the elderly are covered by Medicare. For example, there is a yearly deductible that all recipients must pay, plus copayments on services like hospital visits. Many seniors purchase supplemental insurance policies called Medigap insurance that cover these “gaps” in Medicare’s coverage. Some of the most popular policies provide coverage against the copayments and deductibles. Is the purchase of these types of policies consistent with economic theories of the demand for insurance? One piece of information that may be helpful -- a large fraction of elderly meet the deductible payments each year.
8. Looking at the slide from the lecture notes the RAND HIE, use the data on the movement from free care to 50% coinsurance rate to estimate the arc elasticity of demand for a) doctor visits, b) dollars spent on hospital care, and c) total dollars spent on all medical care.
9. Starting in 2006, seniors could for the first time receive a prescription drug benefit through the Medicare program. For the purposes of this problem, assume that under this new plan, seniors will have to pay a 25% coinsurance rate on all prescription drugs. The program was passed as part of the “Medicare Modernization Act” and the new insurance plan is referred to as “Medicare Part D.” In the year prior to when the law became effective, about half of all seniors had some prescription drug coverage and their coinsurance rate was roughly about 25%. Also, half of all seniors had no coverage so their coinsurance rate was 100%. In 2005, spending on prescription drugs was estimated to be about \$29 billion annually among seniors without insurance and \$73 billion annually among those with insurance. Assume the elasticity of demand for prescription drugs is -0.4. With these numbers, please answer the following questions about the new prescription drug plan.
 - A) Under the new plan, what will be aggregate annual spending on prescription drugs among those who previously had insurance? Among those who previously did not have insurance?
 - B) Once the plan is fully implemented, what will the Federal government end up paying for prescription drugs? Remember, everyone previously insured on a private plan will now be covered by Medicare.
 - C) Some of the cost of the prescription drug benefit will be paid for by premiums paid by seniors and by state governments. It is estimated that these revenues will generate about \$22 billion in revenues. Using this and your estimate from B), once the benefit is fully implemented, by how much will Federal outlays increase as a result of this program.
 - D) The Congressional Budget Office has produced some cost estimates of the Part D program. Do a web search and find out what the CBO estimate the Part D program will cost the federal government program in 2007 (1st year of full implementation). How close did you get to this estimate?
10. In the previous problem, why is current annual spending on prescription drugs so much larger for those with insurance than those without. Explain.
11. In the early 1990s, an experiment was run in the Mississippi Delta where 500 rural school-aged children were provided health insurance through a program called *Get Smart*. Students were randomly selected to participate in the program. The program was designed to estimate how health insurance would alter the demand for medical care in a poor rural population. To evaluate this question, the authors of the study collected two years worth of data on health care use for the 500 children before the program was instituted and examined how these numbers changed over the next four years after the students were enrolled in the health insurance plan. The authors showed that four years after the

program was started, medical expenditures increased by 35% in the four years after students began being enrolled in the program. Please answer the following questions:

- A) The students enrolled in the program were picked at random from a population of uninsured children. What problems does the random selection of participants solve when one is interested in estimating the impact of insurance on medical care use?
- B) Even with the benefits of random assignment, why might the statistical model used by the authors systematically over or understate the impact of health insurance coverage on medical care use? How could the authors correct this shortcoming in their research design?