

Economics 4180/5180  
Health Economics  
Mid-Term Exam  
Professor Rous  
October 15, 2003

Name \_\_\_\_\_ **KEY** \_\_\_\_\_

Curve = (100 - raw score) \* .275 + 4

1. (9) What are three characteristics of the health care economy that prevent markets from allocating resources efficiently (e.g. why is the market for health care not like the market for toasters)? Briefly define and discuss each characteristic (what is it about the characteristic that makes it important to the functioning of the health economy?).

- *Externalities (demand does not match true societal marginal benefit. DWL results.*
- *Uncertainty ? Insurance ? Moral Hazard (effective demand does not match marginal benefit. DWL results.*
- *Asymmetric Information ? Uncertainty as to the marginal benefit of care coupled with induced demand may mean the demand curve does not reflect marginal benefit. DWL results.*

2. (10) The cost of a day in the hospital has increased from \$200 in 1970 to \$1,400 in 2000. After finding this out, Senator Weir Sobroke states “Finding the soaring health care cost culprit is easy. It is greedy providers. Just look at how much more expensive a hospital room is today compared to 1970.”

The CPI was 38.8 in 1970 and 172.2 in 2000 and the Medical CPI was 34.0 in 1970 and 260.8 in 2000.

Is the Senator justified in his complaint that the price of a day in the hospital has increased dramatically in 30 years?

*No, the prices provided are nominal prices. Accounting for inflation using the general CPI reduced the price increase from \$200 to \$315.45 (in 1970 dollars) which is not nearly so dramatic. If you use the medical CPI, the price actually decreased from \$200 to \$182.52 (in 1970 dollars).*

If you had a chance to meet with the Senator, what might you want to tell him about the price change that might cause him to change his mind?

*The CPI overstates inflation because it fails to account for substitution possibilities and, more importantly in the case of medical care, increases in quality. If the substitution problem is roughly the same for the General CPI and the Medical CPI, then the difference between inflation calculated using the two measures is due to a larger change in quality in the medical industry. That means*

*that the \$115.45 increase in price for a hospital room (in 1970 dollars) is mostly caused by the higher quality of a hospital room. The quality comes not only from electric beds, cable TV, etc., but also from better patient monitoring and care (from a better trained and more numerous staff).*

Does the difference in the change in the general CPI compared to the change in the Medical CPI clearly indicate that there has been more inflation in the medical care industry than overall in the economy?

*No, as mentioned above, the difference in inflation as measured by the different CPIs is largely due to greater increases in quality in the medical care sector.*

Are patients definitely worse off with the higher prices?

*Probably better off. If the changes in quality were not worth the higher cost, they would not have been adopted. Patients are paying more for health care in 2000 compared to 1970, but they get more consumer surplus now.*

- 3.(7) Explain the difference between the extensive and intensive margins as they pertain to medical care.

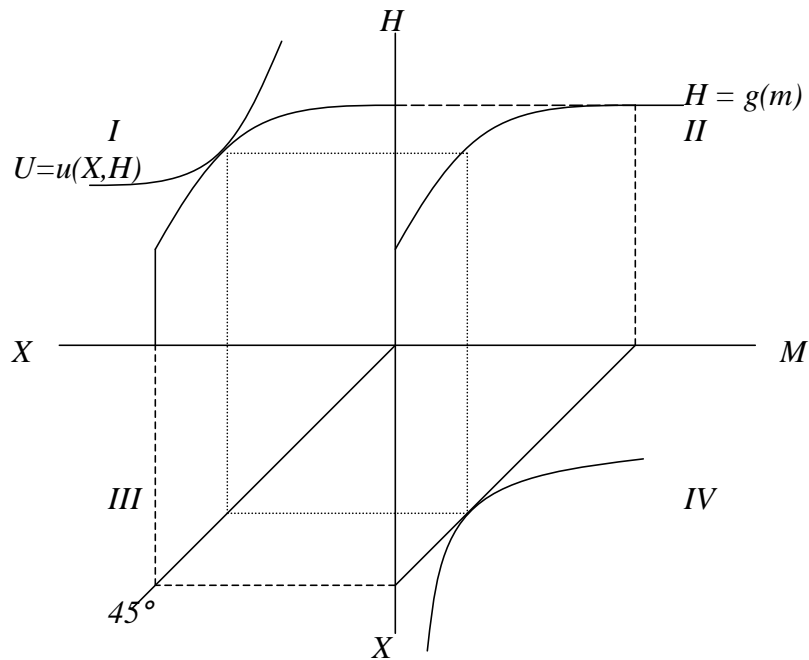
*Most of the time economists talk about doing more of something, it is fairly obvious what the action is. With health care, this is not the case. If more treatment is provided, there are two different directions the treatment can go. Treatment can be expanded by offering care to individuals who have not yet been treated at all, or treatment can be expanded by providing more care to those that are already being treated.*

*Expanding treatment on the extensive margin means more people will get the treatment. Expanding treatment on the intensive margin means those currently being treated will get more treatment.*

*This means when we discuss the benefit from expanding the amount of treatment provided, we need to be clear whether we are talking about the marginal benefit on the intensive or extensive margin. Side note: to be efficient, the extensive marginal benefit and the intensive marginal benefit should be the same, and equal to the marginal cost of the treatment.*

4. A. (15) Using the four quadrant diagram discussed in class, generate a demand curve for health care. Describe each quadrant and its importance to the model (one of them is only used to facilitate the model itself and carries no significance to the model or its results).  
B. (5) Explain what about the demand for medical care necessitates a four quadrant model when we can generate a demand for most other goods with only one quadrant (i.e. the consumer choice model).

A.



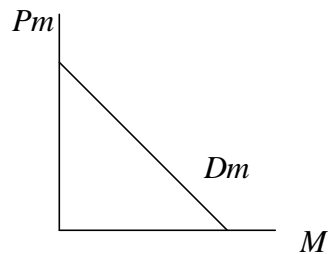
I. Utility as a function of  $X$  and  $H$ . It is maximized subject to an individual's production possibilities frontier. An individual buys  $X$  and produces  $H$  using the input  $M$  (medical care). Therefore, their ability to consume health depends on their ability to produce health.

II. The health production function. Health is produced by the individual and production exhibits diminishing marginal returns. The function can be affected by illness events, age, healthy (or unhealthy) behavior (including the consumption of goods,  $X$ , that can affect health).

III. The 45 degree line helps facilitate the model.

IV. Here is the budget constraint that illustrates the amount of  $X$  and  $M$  an individual can afford.

As the graph is drawn above, at the current price of  $M$ , a certain amount of  $M$  is demanded. The combination of  $P_m$  and  $M$  chosen makes up one point on the demand curve for  $M$ . If the price of  $M$  changes, so will production possibilities frontier and optimal  $X$ ,  $H$  choice in quadrant I. This will affect the chosen bundle of  $X$  and  $M$  in IV. The combination of the new price and the new quantity demanded in IV gives us another point on the demand curve for  $M$ .



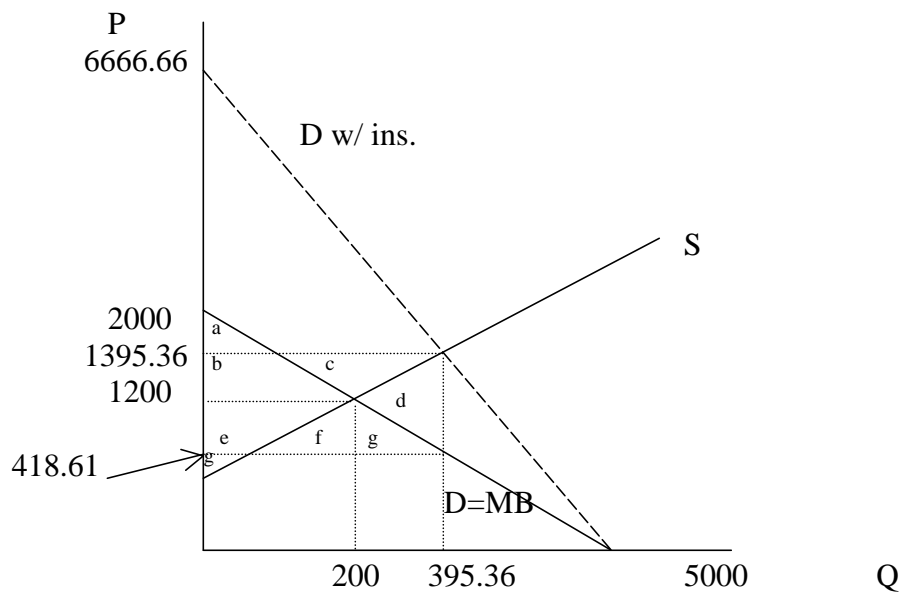
B. *The fact that we derive utility from consuming H, but can only purchase M (which we use to produce H), means deriving a demand curve for M is inappropriate. We need to use the four quadrant diagram to understand the connection between Health, Health Production and the demand for medical care.*

5. A. (8) Assume a market for knee surgery where no one in the market has insurance.

Let the demand for knee surgery be the following:  $P = 2000 - 4Q$ .

Let the supply for knee surgery be the following:  $P = 1000 + Q$ .

Graph the supply and demand curves and find the equilibrium price and quantity. Note on the graph the consumer and producer surplus created in the market.



Pre insurance: C.S. = a+b, P.S. = e+g

And total surplus is a+b+e+g.

B. (8) Now assume everyone in the market buys an insurance policy that pays for 75% of any knee surgery (coinsurance rate = .25). **Redraw** the graph from part A. above and add the effective demand curve now that everyone has insurance.

What is the new equilibrium price and quantity? On the graph, illustrate consumer and producer surplus as well as any deadweight loss that may result from Moral Hazard.

*The new P and Q are noted on the graph.*

*Post insurance: C.S. = a+b+e+f+g, P.S. = b+c+e+g, DWL = d*

*But to get the insurance, consumers must pay at least  $b+c+d+e+f+g$ . So consumers really only get  $C.S. = a-c-d$ . So total surplus after ins. is:  $a-c-d+b+c+e+g$ , which reduces to  $a+b+e+g-d$ . This is smaller than the total surplus after insurance by the amount:  $d$ .*

C.(4) True or False. If the increase in consumer and producer surplus from having insurance is greater than the deadweight loss that results from the market after insurance is bought, then insurance increased economic well-being despite the deadweight loss. Please explain your reasoning.

*Once you consider the premium cost to consumers, total surplus is actually smaller with insurance.*

- 6.(8) Physician groups have three main ways of determining each physician's income. In some physician groups, doctors are paid a yearly salary. In other groups, physicians share (split evenly) the total group's profits at the end of the year (this method called "profit sharing"). Finally, in other groups, physicians are paid based on the amount of revenue THEY generate (this method called "fee-for-service").

True or False. Doctors in small profit-sharing firms would be expected to have incomes more like salaried doctors while doctors in large profit sharing groups would be expected to have incomes more like doctors in fee-for-service based compensation groups. Please explain your reasoning.

*False. Physicians in small, profit sharing firms should be expected to act more like firms where income is based on fee-for-service while physicians in large profit sharing firms should behave more like doctors in salaried firms. This is for two reasons. In larger firms, it is easier to monitor and prevent shirking (and passing work on to the staff, thereby increasing costs). But this is true in salaried physician groups too. The more important reason is that in small, profit sharing, firms, the shirker bears more of the cost of shirking compared to large, profit sharing firms. This is because a physician's share is equal to  $p/N$  where  $p$  is profit and  $N$  is the number of doctors in the firm. In a firm with 20 doctors missing that same appointment costs the doctor only \$2. In a firm with two doctors, missing an appointment where the profit generated = \$40 costs the doctor \$20. At the extreme, a physician in a profit sharing group that has one doctor (solo-practice) would act exactly as a doctor in a fee-for-service group.*

7. (6) Why do doctors study physician induced demand but not coffee induced demand by Starbucks? (That is, why do economists think it might be possible for there to be induced demand in one market, but not the other).

*Economists study physician induced demand but not coffee induced demand because of the differences in the buyers and sellers information in the two markets. With coffee, the consumer has pretty good knowledge (or can easily get*

*knowledge) about the benefits of a drink at Starbucks. Starbucks may try, through advertising, to convince you that drinking a Grande, Low-fat, High-foam, Decaf, Caramel Macchiato will make you seem cooler than you really are, but that is about the extent of it. Their ability to induce demand is, therefore, rather limited. Doctors, on the other hand, have vastly more knowledge about their patient's health and the benefit from various treatment options. It is very hard for patients to learn on their own about the benefits of those options. This makes it possible for doctors to induce demand by telling their patients that the benefit from a particular treatment option is higher than it really is.*

8. (10) A. Verbally and graphically explain McGuire's model of physician behavior.  
B. According to McGuire's model, why do physicians advocate maintaining a long-term, close, personal relationship with a doctor?

*See page 223-225 in the text.*

9. (10) Explain what happened to make economists suspect doctors were inducing demand? Why don't doctors all induce demand to maximize income (that is, why is it only doctors in areas with higher supply)? Give one alternative explanation for those findings.
- a. *Fuch's study showing that once you controlled for the level of demand (held demand constant), areas with more surgeons also had more surgeries.*
  - b. *If doctors derive utility from the well-being of their patients (as well as from income), then as they begin to induce demand, the benefit from higher income is higher than the disutility of lower patient well-being. However, as they induce more, the income benefit from inducing diminishes and the disutility from lower patient well-being gets larger until they are equal and the doctor no longer benefits from further inducing demand.*
  - c. *In areas with a higher density of doctors, the travel and waiting costs to see a doctor are lower and demand might be higher as a result.*