Preliminary Examination: Economics
Spring Semester, 2007

Candidacy for the Ph.D. in
Health Policy and Management
University of Minnesota

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Please answer question 1, and any 2 of the next 3 questions. Each question is weighted equally. You have 5 hours to complete the exam, with a ½ hour break for lunch.

1. Recently, two classes of policy initiatives have been implemented that seek to improve the quality of care at hospitals: pay for performance and quality report cards. Pay-for-performance (P4P) links reimbursements to quality performance while quality report cards simply measures and makes public various dimensions of quality. This question asks you to analyze these policies in formal economic model.

Consider a profit maximizing hospital that produces two services, $o_1$ and $o_2$. The demand for the services is a function of their respective quality, $q_1$ and $q_2$. The production function for quality is given by:

$$q_1 = x_1^\frac{1}{2} \text{ and } q_2 = x_2^\frac{1}{2} - \frac{x_1}{\alpha}.$$ 

Where $x_1$ and $x_2$ are inputs that the hospital purchases in a competitive market. The demand for the services are given by: $o_1 = a + b q_1$ and $o_2 = c + d q_2$. In this model there is only one payer who pays $p_1$ and $p_2$ per patient for service 1 and 2, respectively. The patient does not incur any out-of-pocket expense for treatment.

1. Derive the optimal levels of quality for the hospital as a function of the input prices, the payer price, demand parameters and the production technology parameters.

2. Now consider the impact of two different separate quality reports -- one for service 1 and one for service 2. Suppose that quality reporting can be modeled as increasing the slope of the demand for a service (increasing $b$ and $d$). What is the impact of each of these reports on the quality of both services? What does the impact of these reports depend upon? Provide some intuition about the relationship between the production technology and the impact of the reports.

3. Now suppose that a P4P program is instituted for service 2. Now the hospital receives a bonus payment independent of the number of patients treated for each unit of quality. The bonus is given by $g q_2$. What is the impact of this program on the quality of both services? Provide some intuition for your results.
2. Suppose that population health (H) is produced by two inputs according to the function \( H = H(X_1, X_2) \). Both inputs are normal.

a. In this part of the problem, assume that the government wants to maximize population health subject to a budget constraint, \( Y = p_1X_1 + p_2X_2 \). Find the first-order conditions for maximum health production.

b. Now suppose the government wants to minimize the expenditure needed to produce a constant level of population health. Find the first-order conditions for a minimum and show that the optimal choices of \( X_1 \) and \( X_2 \) are the same as in part (a).

c. Let the price of input \( X_1 \) fall. Find \( \frac{dX_1}{dp_1} \) in the health maximization problem (part a) and in the expenditure minimization problem (part b). Show that: \( \frac{dX_1}{dp_1} \) for health maximization is greater than \( \frac{dX_1}{dp_1} \) for expenditure minimization.

d. Draw a graph of your answer and explain why the “comparative statics” effects in parts (a) and (b) are different even though the first-order conditions are the same.

3. In 2006, the U.S. Census estimated the number of uninsured individuals to be approximately 46.6 million. During the past several years, various stakeholder groups have advocated for further eligibility expansions of public insurance programs such as Medicaid, as a way to reduce the number of uninsured and to improve health outcomes of this population.

(a) Begin by defining the concepts of insurance eligibility, take-up, and crowd-out.

(b) Next, use indifference curve analysis and show how one could measure the “take-up” and “crowd-out” effects of a policy proposal that would expand eligibility to all non-elderly individuals with household incomes below 133% of the federal poverty level, regardless of family structure or medical condition. In your discussion, identify and clearly explain at least three factors that may either increase or decrease the extent of “crowd-out.”

(c) What did the early empirical evidence find with respect to the impact of Medicaid expansions on health outcomes? (Gruber, 1997; Currie and Gruber, 1996). In your discussion, identify and explain at least three econometric challenges that researchers must address when estimating the impact of public insurance eligibility expansions on health outcomes.

4. Adverse selection considerations have influenced many economic evaluations of health insurance and much of the behavior of health insurers. Write an essay where you define adverse selection and trace the history of adverse selection in economic analysis of health insurance and the behavior of health insurers. How important is adverse selection in analysis of health insurance and the behavior of health insurers? That is, is it of crucial importance or is its importance overstated? Take a position and defend your position using evidence from the literature.