Written Exam for the M.Sc. in Economics Summer 2010

Health Economics

Master's course

June 15, 2010

3-hour closed book exam

Please note that the language used in your exam paper must correspond to the language of the title for which you registered during exam registration. I.e. if you registered for the English title of the course, you must write your exam paper in English. Likewise, if you registered for the Danish title of the course or if you registered for the English title which was followed by "eksamen på dansk" in brackets, you must write your exam paper in Danish.

If you are in doubt about which title you registered for, please see the print of your exam registration from the students' self-service system.

—

This exam consists of three essay problems. Each problem has approximately equal weight in the final grade. A problem consists of different sub-questions that do not necessarily have equal weight. All answers must be explained.

Problem 1 (The market for pharmaceuticals). Several biotech firms are currently trying to develop vaccination against different forms of cancer. If they succeed, they will take out a patent giving them a monopoly on the sale of the drug for 20 years.

1.1. Give a description of the optimal behavior of the pharmaceutical company with respect to when to take out the patent and how to obtain patent protection for as long a period as possible.

1.2. When the patent protection terminates, every firm is allowed to produce and possibly to market the drug in question. What can the patent owner do in order to retain a considerable market share without lowering the price to the competitive level?

1.3. Assume now that the drug to be developed is to be used for vaccination against a disease which almost exclusively occurs in poor countries. How does that influence the behavior of the pharmaceutical company contemplating its development?

Problem 2. (The QALY concept). Suppose that the health of a person is described by a health profile (Q, T) where T is a number of life years and Q is a health state.

2.1. Formulate and interpret a QALY model, and describe as many methods as you can think of for assessing the quality-adjustment factor.

2.2. A QALY model represents individual preferences over health profiles if certain assumptions about individual preferences hold. Give a description of a list of such assumptions. N.B.: distinguish between two cases: (i) preferences for certain health profiles and (ii) preference for lotteries over health profiles. Discuss differences and similarities between the assumptions required for case (i) versus case (ii).

Problem 3. (The monetary value of life-saving programs). Monetary valuations of the benefits of health care programmes that reduce the risk of premature death can be used to inform health care providers.

3.1. Describe the human-capital approach and the willingness-to-pay approach to valuing life saving health care programmes. Discuss the circumstances under which either approach will be appropriate and how one could do these valuations in practise.

Assume that an individual i is facing probability σ_i of survival. The utility of individual i is given by $u(L, y_i)$ in the case of survival and by $u(D, y_i)$ in the case of death, both functions being concave in y_i. For a fixed income y_i the expected utility is

$$U_i(\sigma_i, y_i) = \sigma_i u(L, y_i) + (1 - \sigma_i)u(D, y_i).$$

3.2. For given σ_i and y_i, what is the marginal willingness-to-pay for an increase in the probability of survival? Discuss how the marginal Willingness-to-Pay relates to the Value of a Statistical Life (VSL) in a population.