Exam
Imperfect Information in Health Care Markets
March 21, 2019

1. Assume that all people in our economy are expected utility maximizers and have the same Bernoulli utility function $u(x) = \sqrt{x}$, where x is disposable income. A person has wealth $W = 25$ and falls ill with probability 1/2. When falling ill the person needs treatment costing $L = 16$. We assume perfect competition on the insurance market, e.g. there are many insurance companies maximizing expected profit by offering contracts consisting of a coverage level and a premium. Administrative and claim handling costs of insurance companies are assumed to be zero.

   (a) Determine the risk premium of a consumer. Which contract will be offered in equilibrium to the consumer? *(7 points)*

   (b) Suppose a genetic test becomes available: The test results can be either "high risk" (h) or "low risk" (l). Those that take the test have a 50% chance of getting either result. High risk people have probability 3/4 and low risk people have probability 1/4 of falling ill.

      i. Assume everyone gets tested and the insurance companies make their contracts dependent on the test result. What contracts will they offer in equilibrium? How do profits and expected utility change compared to (a)? Explain the intuition behind these changes. *(10 points)*

      ii. Assume that insurance companies are prohibited from making their contracts contingent upon the test results. How do expected utility and insurance profits change compared to (a) qualitatively? (Note: You do not need to calculate the equilibrium contracts explicitly to answer this question. Your answer may be verbal and may use results we derived in the lecture.) *(7 points)*

   (c) Discuss the welfare implications of genetic tests for insurance markets. *(10 points)*

2. This exercise is on moral hazard.

   (a) What is "moral hazard" in the health insurance context and why is it problematic for welfare? *(7 points)*

   (b) A consumer behaves as if maximizing the utility function $u(t) = \textit{consumption}(t) - (s-t)^2$, where $s \in [0,5]$ is the health state of the consumer and $t \in [0,s]$ is the money amount spent on treatment. The consumer has an insurance that has a zero copayment rate up to treatment expenditures of 2 and a copayment rate of 0.5 for treatment expenditures above 2, i.e. the insurance pays t to the consumer if $t \leq 2$ and $2 + \frac{1}{2}(t-2)$ if $t > 2$. Assume that the initial wealth of the consumer is 10 and the insurance premium is 4. *consumption* is all the money the consumer has left over (after paying his insurance premium and his contribution to the treatment expenses), i.e. $\textit{consumption} = 10 - 4$ if $t \leq 2$ and $\textit{consumption} = 10 - 4 - \frac{1}{2}(t-2)$ if $t > 2$.

      i. Determine the optimal treatment choice as a function of the health state. *(12 points)*

ii. Why can insurance contracts like the one above be used to empirically test whether moral hazard is relevant? (Also explain why this does not depend on the specific functional form of the utility function.) *(7 points)*