Nova School of Business and Economics Public Economics – Fall 2017

Practical Session VIII – Social insurance (part 1)

1. What is consumption smoothing? How does insurance help people smooth consumption?

2. Suppose that you have a job paying €50,000 per year. With a 5% probability, next year your wage will be reduced to €20,000 for the year.

a) What is your expected income next year?

b) Suppose that you could insure yourself against the risk of reduced consumption next year. What would the actuarially fair insurance premium be?

3. There are two types of drivers on the road today. Speed Racers have a 5% chance of causing an accident per year, while Low Riders have a 1% chance of causing an accident per year. There are the same number of Speed Racers as there are Low Riders. The cost of an accident is €12,000.

a) Suppose an insurance company knows with certainty each driver's type. What premium would the insurance company charge each type of driver?

b) Now suppose that there is asymmetric information so that the insurance company does not know with certainty the driver's type. Would insurance be sold if:

(i) Drivers self-reported their types to the insurance company?

(ii) No information at all is known about individual driver's types?

4. Your utility function is U=log(2C) where C is the amount of consumption you have in any given period. Your income is 40,000 Euro/year and there is a 2% chance that you will be involved in a catastrophic accident that will cost you 30,000 euro next year.

a) What is your expected utility?

b) Calculate an actuarially fair insurance premium. What would your expected utility be were you to purchase the actuarially fair insurance premium?

c) What is the most that you would be willing to pay for insurance, given your utility function?

5. Chimnesia has two equally sized groups of people: smokers and nonsmokers. Both types of people have utility U = ln(C), where C is the amount of consumption that people have in any period. So long as they are healthy, individuals will consume their entire income of €15,000. If they need medical attention (and have no insurance), they will have to spend €10,000 to get healthy again, leaving them with only €5,000 to consume. Smokers have a 12% chance of requiring major medical attention, while nonsmokers have a 2% chance. Insurance companies in Chimnesia can sell two types of policy. The "low deductible" (L-) policy covers all medical costs above €3,000, while the "high deductible" (H-) policy only covers medical costs above €8,000.

a) What is the actuarially fair premium for each type of policy and for each group?

b) If insurance companies can tell who is a smoker and who is a nonsmoker and charges the actuarially fair premiums for each policy and group, show that both groups will purchase the L-policy.

Suppose that smoking status represents asymmetric information: each individual knows whether or not they are a smoker, but the insurance company doesn't.

c) Explain why it is impossible, at any prices, for both groups to purchase Lpolicies in this setting. Which groups, if any, do you expect to buy L-policies, and at what price?

d) Show that it is possible for both groups to purchase insurance, with one group buying L-policies and one group buying H-policies.

6. The problem of adverse selection in insurance markets means that it is generally a bad deal for companies to offer insurance at the same price for all potential customers. Why then do we observe some insurance companies (such as those selling trip insurance that refunds money to people who purchase trips that they are unable to take) do exactly this?

7. Professors in the U.S. are only paid nine months out of the year. Suppose that they were fired each summer and rehired each fall and thereby eligible for unemployment insurance benefits. Do you think that would affect her consumption smoothing over the year, relative to what they do right now, when they are not fired annually? Explain your answer.