

Public Economics

José Mesquita Gabriel

Mail: jose.gabriel@novasbe.pt

Office Hours: Tuesday afternoon (15h30 – 16h50) – or simply e-mail me

Public Economics | José Gabriel – 2024/2025

4- Social Insurance

4.1) Benefits and Costs of Insurance (Chapter 12 Gruber)

Social Insurance – Expected Utility Theorem

- $E(X) = \sum_{i=1}^{N} p_i x_i$: Expected income of a lottery is an average of the income levels of each possible state of nature, weighted according to the respective probabilities
- $E(u(X)) = \sum_{i=1}^{N} p_i u(x_i)$: Expected utility of facing a lottery is an average of the utilities of each possible state of nature, weighted according to the respective probabilities.
- E(u(X)) = u(CE): For any agent, there is an amount of money, such that she would be indifferent between facing the lottery or receiving that amount for sure. That amount is the **Certainty Equivalent.**



Social Insurance – Expected Utility Theorem

- RP = E(X) CE: The **Risk Premium (RP)** will be the difference between the expected income of a lottery and the Certainty Equivalent. This is the amount of income an agent is willing to give up in order to avoid the risk and receive a certain payment instead of facing the lottery. If agents are risk-averse, this will be positive; if risk-lovers, RP is negative.
- AFP = E(Loss): The Actuarially Fair Premium (AFP) is the expected loss of a lottery, which corresponds to the amount a risk-neutral insurance company would require from an agent to provide insurance in a competitive market.
- *WTP* = *AFP* + *RP*: The Maximum Willingness to Pay (WTP) for full for full insurance is equal to the "face value" of the insurance itself (AFP) plus the additional amount the agent is willing to pay to avoid the risk (RP).



Ex.5) Changnesia 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 Changnesia 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.

Ex.5) ... Smokers have a 12% chance of requiring major medical attention, while nonsmokers have a 2% chance. Insurance companies in Changnesia can sell two types of policy. The "low deductible" (L-) policy covers all medical costs above \notin 3.000, while the "high deductible" (H-) policy only covers medical costs above \notin 8.000.

- 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 L-policies 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.

Ex.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? How does insurance help people smooth consumption?

- In some markets, people have no better information about their risk exposure than the firm. In this case, adverse selection will not operate.
- Sometimes it is too costly for firms to collect information necessary to distinguish different risk groups.
- In the case of trip insurance, which covers a very short period of time with a low risk of a claim being made, insurance companies set the premium high enough to cover the traveller who knows he is at a high risk for cancellation.

Ex.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.

- Unemployment insurance is less likely to have a *crowding out* effect (more likely to be effective) when the event is unpredictable, and the agent has difficulties to self-insure.
- Since this is a very predictable event, and Professors likely do not have liquidity concerns, they will simply save on their own (self-insurance).

Ex.1) Describe the dimensions along which moral hazard can exist. Can you think of ways in which the government can reduce the prevalence of moral hazard along each dimension?

Moral Hazard - individuals have incentives to **alter their behaviour** when their risk or baddecision making is borne by others.

Before loss or adverse event has occurred:

- **Reduced precaution** against entering the adverse state;
 - Government can mitigate this problem by actively screening claims (denying claims where the insured was partly responsible).

After loss or adverse event has occurred:

- **Increased expenditures** when in the adverse state;
- Supplier responses to insurance against the adverse state;
 - Government can set fixed payment amounts, limits on services, restrict supply of services to a list of acceptable responses to each event.

Ex.2) Why does the government mandate individuals to purchase their own insurance in some cases – such as automobile liability insurance – but directly provide insurance to people in other situations – such as health insurance?

- Firms will charge higher premiums to individuals they can identify as having higher risks
- In providing social insurance, the government can effectively pool different risk types together so that high-risk and low-risk individuals pay the same premiums (taxes) for social insurance
- Thus, social insurance can make high-risk individuals better off than they would be with just a mandate, but at the expense of making low-risk individuals worse off
- Redistribution may be more desirable in some contexts rather than others:
 - Health insurance: "high-risk" individuals are the people unlucky enough to be sick or injured
 - Auto-insurance: "high-risk" individuals are the reckless drivers (it is not inherent to people they could change their behavior) --> redistribution can be seen as unfair in this case

Public Economics | José Gabriel – 2024/2025

4- Social Insurance

4.2) Social Security (Chapter 13 Gruber)

PS 9: Social Security

Ex.3) The government of Westlovakia has just reformed its social security system. This reform changed two aspects of the system:

- 1) It abolished its actuarial reduction for early retirement, and
- 2) It reduced the payroll tax by half for workers who continued to work beyond the early retirement age.

Would the average retirement age for Westlovakian workers increase or decrease in response to these two changes, or can't you tell? Explain your answer.

- 1) An actuarial reduction for early retirement is a reduction in your social insurance benefits to compensate for the fact that individuals who retire early receive benefits for more years
- 1) Abolishing the reduction would make early retirement even more attractive: the benefits are just as high, and you are paid for a longer period Lower the average retirement age
- 2) Reducing the payroll tax in case you continue to work would make working later in life more attractive Raise the average retirement age
- Overall effect: It depends on several factors
 - **Discount rates:** people with a lower discount rate (very patient) will choose to work longer as they value more their consumption later in life
 - **Personal life expectancy:** if you believe you have a high chance of living long you are more likely to work longer

PS 9: Social Security

Ex.4) Dominitz, Manski, and Heinz (2003) present survey evidence suggesting that young Americans are extremely uncertain about the likelihood that they will receive any Social Security benefits at all.

How might demographic trends contribute to this concern?

• The rate of return provided by an unfunded Social Security to "middle generations" depends on the rates of population and wage growth (and, possibly, payroll taxes)

In America and Europe, we have:

- 1. Increased Life Expectancy: increase in the amount of people receiving benefits;
- 2. Decrease in birth rates: less workers contributing for each pensioner.
- Thus, there has been a decrease in the labour force population.

Possible Solutions:

Lower benefits; Higher payroll taxes; Incentivize (or force) older retirement; Promote immigration of people in the labour force; Pro-natal policies

PS 9: Social Security

Ex.5) Does Social Security provide much benefit in terms of consumption smoothing over the retirement decision?

Contrast Social Security with a different social insurance program, unemployment insurance, which provides income support for half a year to individuals who have lost their jobs.

Do you think that unemployment insurance is likely to provide more or less consumption smoothing than Social Security?

- As we saw before, insurance is more likely to be effective (less likely to have a *crowding out* effect) when the event is unpredictable, and the agent has difficulties to self-insure.
- However, retirement is anything but a surprise: in the absence of a Social Security system, a rational agent would save enough early in life to retirement.
- People tend to be myopic and not save enough!! After the introduction of Social Security systems in different countries, the poverty rate amongst elders sharply declined. While there is evidence of a partial *crowding out* effect, social security is associated with a significant increase in consumption smoothing
- Since unemployment is a much more unpredictable event (and it tends to have people with more liquidity constraints than average), it provides more consumption smoothing than social security

Public Economics

José Mesquita Gabriel

Mail: jose.gabriel@novasbe.pt

Office Hours: Tuesday afternoon (15h30 – 16h50) – or simply e-mail me

