Exercises:

# Utility, Expected utility, Discounted utility

1. Answer to the following questions:
   1. Compute the expected value of the following lottery: a fair coin is tossed three times. With three tails the prize is 100 euro, with two heads the prize is 50 euro.
   2. Paul’s utility function is and he has an initial endowment of 15 euro. Paul could buy the following lottery at price of 9 euro. Does Paul buy it? (hint: compute the expected utility in the case he does not buy, then compute the expected utility in the case he buys the lottery)
   3. Compute the risk premium of the lottery assuming the utility function

**Solution**

1. We can represent it as a lotter
2. Paul does not buy the lottery. His utility is

Paul buys the lottery: then he has the lottery plus 6 euro. By probability he wins the lottery and has 26 euro (20 + 6), by probability he loses the lottery and remains with 6 euro. Then it is equivalent to the lottery . Paul’s expected utility is: . Then Paul buys the lottery.

The expected utility is

Certainty equivalent: 🡪

1. Consider the lotteries and . Suppose . Find the preferred lottery. Repeat with ?

**Solution**

Suppose . Expected utilities are

Both are preferred (the subject is indifferent)

Suppose . Expected utilities are

Lottery q is preferred (the subject is indifferent)

1. Today Pippo buys the ticket for the final match of tambour championship. Pippo has the following options for the payment: he can pay today or with the delay of 1, 2 and 3 weeks. The following table shows the ticket price in according the payment optins.

|  |  |
| --- | --- |
| Delay of | Price |
| 0 weeks | 600 |
| 1 weeks | 700 |
| 2 weeks | 800 |
| 3 weeks | 1000 |

1. Which option will Pippo prefers if his discount rate is R=0.25?
2. Write the (compact) formula to compute the discounted value at time 2 of a flow of payments of 100 starting at time 5 and ending at time 97, when the discount factor is 0.9

# Efficiency of competitive markets

1. Consider the following inverse demand function and the following inverse supply function for good X. The equilibrium price is 10.

* Compute the deadweight loss of a policy that imposes a minimum price of 12.

**Solution**

At the equilibrium price the (equilibrium) quantity is 10.

At the minimum price, the quantity traded in the market is

1. Use the same supply and demand of the above exercise and suppose that is possible to import good X at price of 8. Compute the change of the consumer surplus and of the producers’ profits with respect to the previous exercise.

**Solution**

Consumer surplus in the previous case is

With import at price of 8, consumers consume . In this case consumer surplus is

With respect the previous case, consumer surplus increases of:

With respect the previous case, the consumer profit decreases of:

1. Consider exercise 2. Suppose the government like to impose a tariff on the imports of good X. Find the optimal tariff that maximizes the government revenue from the tariff. Furthermore compute the tariff that maximizes the producers’ profits.

**Solution**

Imports are denoted by I. Demand function is and supply is

By a tariff, the price in the market will be for . Import are

The revenue f rom the tariff is:

The optimal tariff that maximizes the government revenue is given by the solution of the problem

The tariff that maximizes the producers’ profits is , because with this tariff imports are 0 and all demand is supplied by home’s firms.

# Monopoly and Monopsony

1. Consider the following inverse demand function and the following inverse supply function for good X. The equilibrium price is 10. Compute the deadweight loss of in the case on monopoly and in the case of monopsony.

**Solution**

For the **monopoly** this is a special case where we have a limit solution at and

So let we use a bit different inverse demand, (equilibrium price is not more equal 10)

The revenue is:

The marginal revenue is:

The equilibrium quantity is given by the solution of

Let be the solution and the equilibrium quantity in the competitive case, the deadweight loss is

**Monopsony**

(here we use the demand in the text of the problem)

🡪

Equilibrium condition:

🡪

the deadweight loss is

1. In the case of the previous exercise and in the case of monopoly, compute the markup, the Lerner index, the elasticity of the demand.

**Solution is a straight application of the formula on the slides**

1. In the case of the previous exercise and both in the case of monopoly and monopsony, compute the effect of a tax of 1 per unit

**Solution. Increase the (inverse) supply by the tax and follow steps as in exercise 1**

**(in case of monopoly change the demand as in exercise 2)**

1. In the case of the previous exercise and both in the case of monopoly and monopsony, compute the effect of a subsidy of 1 per unit

**Solution. Decrease the (inverse) demand by the subsidy and follow steps as in exercise 1**

**(in case of monopoly change the demand as in exercise 2)**

# Markets for factor inputs

1. Suppose the production function of the firms operating in a competitive market it is where is the output of firm is the amount of used in firm (unique input). Input costs per unit
2. Assume that firms are price takers, compute the labor demand of firm for a generic price of the output
3. Repeat the exercise assuming monopoly and an inverse demand
4. Compute the equilibrium price (as function of w) in in the previous question and show that at this price the labour demand under competitive conditions (as in point A) is higher.

# Game theory

1. Considera il seguente gioco sequenziale tra le persone A e B. A e B possono contribuire a un bene pubblico con 1 o 2 ECU. Il profitto di ciascuna persona è dato dalla somma delle contribuzioni moltiplicata per 0.75 meno la sua contribuzione. All’inizio del gioco A decide se contribuire o no. B osserva la sua decisione. Nel caso che A decida di non contribuire, il gioco termina con profitto di 1 per A e di 0 per B. Nel caso che A decida di contribuire, le due persone decidono simultanemente la loro contribuzione.
   1. Rappresenta il gioco in forma estesa
   2. Rappresenta il gioco in forma normale
   3. Quanti information sets ha il giocatore A? quanti il giocatore B?
   4. Quanti subgames?
   5. Trova tutti gli equilibri di Nash perfetti nei sottogiochi