

Assignment No. 5  
Microeconomics I (Prof. Alberto Iozzi)

Gabriele Beccari

*PhD student in Economics and Finance*  
*Department of Economics and Finance*  
**“Tor Vergata” University of Rome**  
*gabriele.beccari@uniroma2.it*

Academic year 2019-20

Please return your answers by the beginning of the last practice (12/12/2019).

## Exercise 1

Suppose that an individual has preferences represented by the *Von Neumann–Morgenstern* utility function of the form

$$u(x) = \alpha - \beta e^{-\gamma x} \quad (1)$$

where  $x$  is a payoff and  $\alpha, \beta, \gamma$  are parameters.

1. What restrictions are needed on the parameters for the individual to be risk averse?
2. Assuming that the individual is risk averse, compute the coefficients of absolute risk aversion  $r_A(x)$  and relative risk aversion  $r_R(x)$ . Are they decreasing, constant or increasing?
3. Suppose now that the individual faces a lottery that yields either  $x = 0$  or  $x = \ln(3)$  with the same probability. Define and compute:
  - (a) the certainty equivalent;
  - (b) the risk premium and
  - (c) the probability premium, given  $\gamma = \beta = 1$ .  $\square$

## Exercise 2

An individual faces four lotteries:

1. win \$1,000 with probability .6 or \$10,000 with probability .4 ;
2. win \$1,000 with probability .8 or \$10,000 with probability .2 ;
3. win \$1,000 with probability .2 or \$10,000 with probability .8 ;
4. win \$1,000 with probability .4 or \$10,000 with probability .6 .

He declares that  $2 \succ 1$  and  $3 \succ 4$ . Are these preferences consistent with *expected utility theory*?  $\square$

### Exercise 3

Suppose you own a store that is valued  $W$ .

The store faces a probability  $p$  to catch fire and, in case, your expected loss is equal to  $L$ .

You can purchase insurance that will pay you back  $M$  dollars in case of fire. Given the premium per dollar of the coverage  $\pi$  the amount of money that you have to pay is  $\pi \cdot q$ .

1. How much coverage would you be willing to purchase if you were risk neutral?
2. And if you were strictly risk averse?  $\square$

### References

- Mas-Colell, A., Whinston, M. D., & Green, J. R. (1995). *Microeconomic theory*. Oxford University Press.  
– Chapter 6: **Choice under uncertainty**.