

## CHAPTER 2: TOPICS IN CONSUMER THEORY

### Exercise 1

The consumer buys bundle  $x^0$  at prices  $p^0$  and bundle  $x^1$  at prices  $p^1$ . State whether the following choices satisfy the Weak Axiom of Revealed Preferences (WARP):  $p^0 = (1,3)$ ,  $x^0 = (4,2)$ ,  $p^1 = (3,5)$ ,  $x^1 = (3,1)$ .

### Exercise 2

An expected utility maximizer with wealth  $w$  may invest  $B$ ,  $B < w$ , in an asset that has a rate of return  $a > 0$  with probability  $p$  and a rate of return  $b < 0$  with probability  $1 - p$  (i.e., investing  $B$ , with probability  $p$  he receives  $(1 + a)B$ ; with probability  $1-p$  he receives  $(1 + b)B$ ). Show that if the expected rate of return is 0, the agent will invest  $B = 0$  if he is risk averse.

### Exercise 3

Filipe plays soccer with a second league team. If he does not suffer any injury by the end of the season, he will get a professional contract with his team, which is worth 10000 euros. If he is injured, he will get a contract as a fitness trainer, which is only worth 100 euros. The probability of suffering an injury is 10%. He is likely to get through the season unscathed with a 90% probability. Assume that Filipe's von Neuman-Morgenstern utility function is  $u(x) = \sqrt{x}$ .

- How high is the expected value of this gamble?
- Is Filipe risk averse, risk neutral, or risk lover?
- How high is the expected utility of the gamble described above?
- Assuming that Filipe could buy insurance at price  $p$  that would pay him 9900 euro in the case of an accident, how high could the maximal value of  $p$  be for Filipe to still afford the insurance?
- How high is the certainty equivalent for the above gamble? How high is the risk premium?

### Exercise 4

A risk-averse individual with initial wealth  $w_0$  and vNM utility function  $u(\cdot)$  must decide

whether and for how much to insure his car. The probability that he will have an accident and incur a dollar loss of  $L$  in damages is  $\alpha \in (0, 1)$ . Let  $p$  denote the rate at which each euro of insurance can be purchased (i.e., when  $x$  units of insurance are purchased, the agent pays  $px$ ) and assume that insurance is available at an actuarially fair price (i.e., one that yields insurance companies zero expected profits). How much insurance,  $x$ , should he purchase?