

## Choice under Uncertainty

### Additional Materials

This handout includes more mathematical definitions of risk attitudes as well as the definition of maximum insurance payment. They seem unlikely to be tested at this point.

#### I. Risk Attitudes

##### Definitions

i. Risk Neutral

- Equals to linear utility function—Constant marginal utility (MU)

$$\alpha U(x_1) + (1 - \alpha)U(x_2) = U(\alpha x_1 + (1 - \alpha)x_2)$$

- $E[U(X)] = U(\Pr_{x_1} x_1 + \Pr_{x_2} x_2)$

ii. Risk Averse

- Equals to concave utility function—Diminishing MU

$$\alpha U(x_1) + (1 - \alpha)U(x_2) < U(\alpha x_1 + (1 - \alpha)x_2)$$

- $E[U(X)] < U(\Pr_{x_1} x_1 + \Pr_{x_2} x_2)$

iii. Risk Loving

- Equals to convex utility function—Increasing MU

$$\alpha U(x_1) + (1 - \alpha)U(x_2) > U(\alpha x_1 + (1 - \alpha)x_2)$$

- $E[U(X)] > U(\Pr_{x_1} x_1 + \Pr_{x_2} x_2)$

## II. Maximum Insurance Payment

### Maximum Insurance Payment

Let  $w$  be the initial wealth and  $r$  be the risk premium, the maximum amount willing to pay for insurance is

$$w - E[X] + r$$

