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EUROPEAN UNION



MINISTRY OF EDUCATION,  
YOUTH AND SPORTS



OP Education  
for Competitiveness



UNIVERSITY  
OF DEFENCE

INVESTMENTS IN EDUCATION DEVELOPMENT

## Lesson plan

**Course Name: Economics II**

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**Lecturer: Ing. Martin Pop**

**Topic: Consumer behavior and demand shaping**

### **Course Objectives:**

The aim of the first lecture is the analysis of consumer behavior. There will be explained assumptions of the rational consumer behavior, ways of benefits measuring and will be explained indifference analysis and consumer optimum.

The aim of the second lecture is to clear the issue of individual and market demand. To explain the influence of changes in income on demand, price change on the demanded quantity and the changes in prices of other goods.

The next goal is to clear the consumer decision making under the risk.

## 2. DEMAND

### 2.1 Individual Demand

Suppose the individual demand (demand per consumer) depends on the following factors:

- price of the estate,
- prices of other goods,
- consumers income.

Other factors, such as consumer preferences and expectations, we consider immutable.

Thus, it is possible to assemble the demand function, which expresses this dependence, and deal with the influence of various factors.

The shape of the demand function for n consumable goods is following:

$$X_1 = f_1(P_1, P_2, \dots, P_n, I)$$

$$X_2 = f_2(P_1, P_2, \dots, P_n, I)$$

$$X_n = f_n(P_1, P_2, \dots, P_n, I)$$

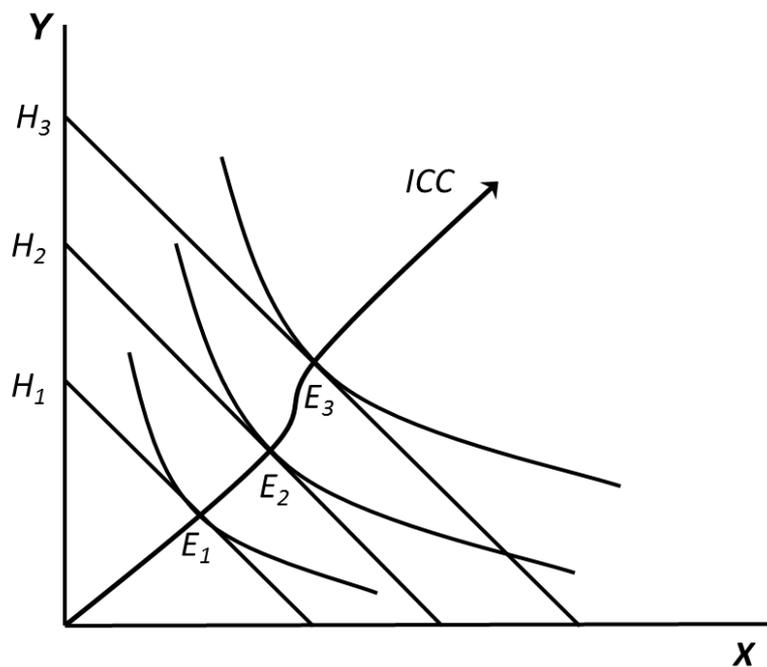
### 2.2 Effect of Changes in Consumer Income on Demand

First, assume that only consumers income is changed. Prices of all goods and other factors are constant.

#### Income consumer curve

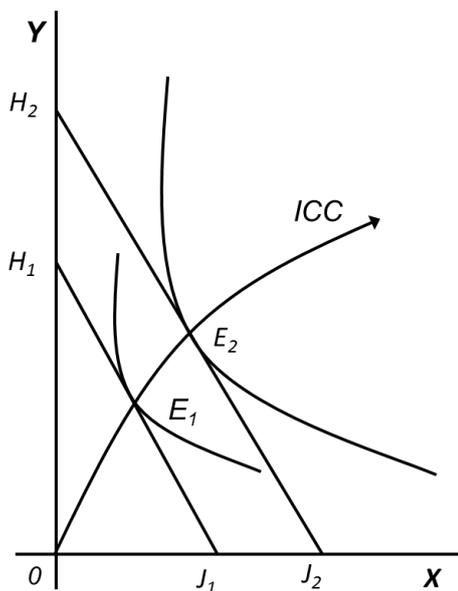
Income consumer curve (ICC) is the set of combinations of two goods, in which the consumer maximizes utility at different levels of income (for otherwise unchanged circumstances).

In the case of **normal goods** applies that with the growth of income the purchased quantity increases.



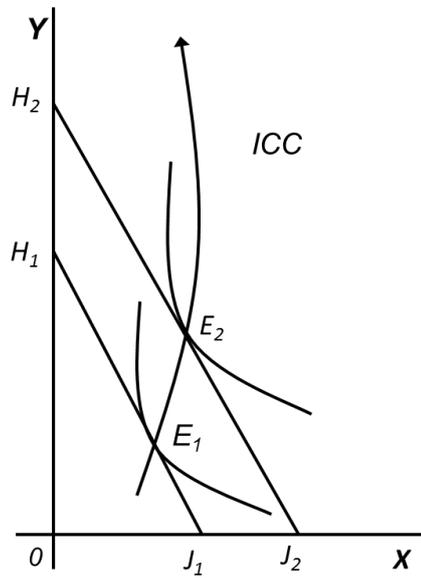
In the case of **luxury goods**:

*b) X je luxusní statek*

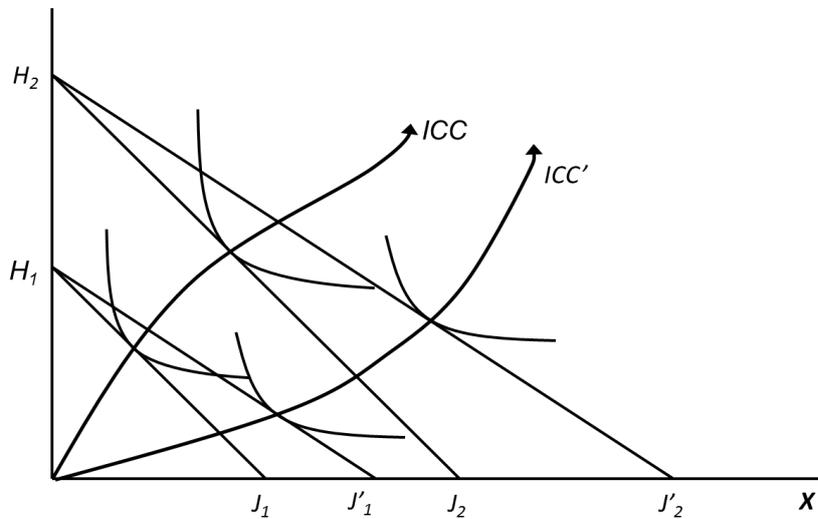


In the case of **inferior good** applies that with the growth of income the purchased quantity decreases.

c) *X je méněcenný statek*

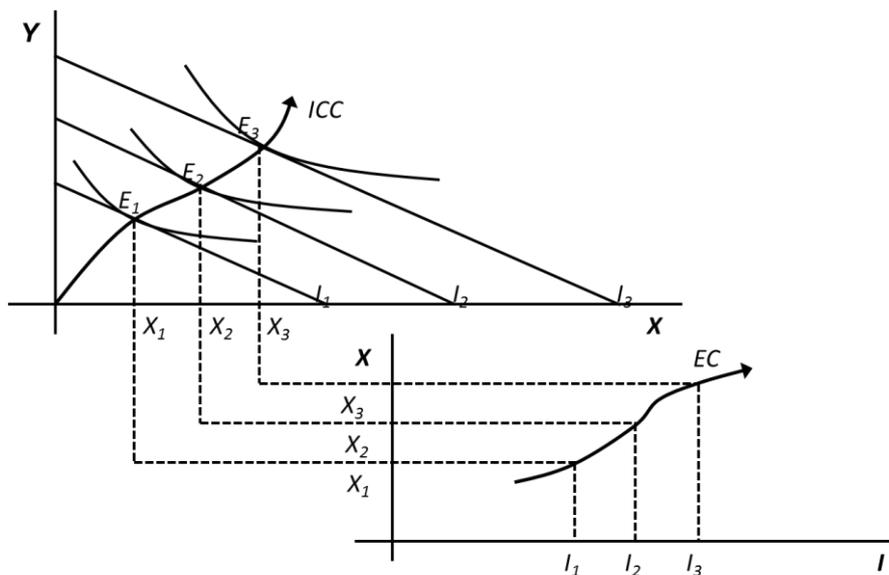


**Decrease in price of the good X:**



## Engel curve

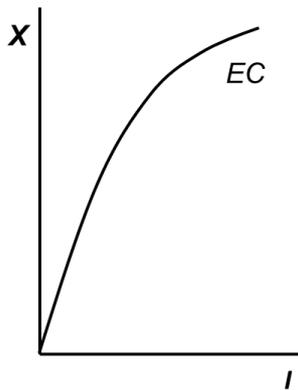
Using indifference curves and budget line, we can track changes of the optimal combination of goods X and Y in response to changes in income. However, we can see the relationship between total income and the purchased amount of particular firm. This relationship expresses called **Engel curve (EC)**. In the case of normal goods with the growth of consumer income the purchased quantity increases, Engel curve is rising and has a positive slope.



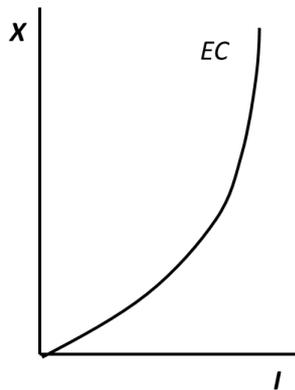
However, it is necessary to distinguish the following two cases:

- **Necessary** good grows the purchased quantity slower than income consumers, Engel curve is concave;
- **Luxury** good grows the purchased quantity faster than income consumers, Engel curve is convex.
- In the case of **Inferior goods** with the growth of consumer income the purchased quantity decreases, Engel curve is falling, has a negative slope.

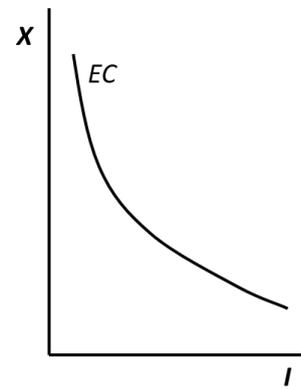
a) nezbytný statek



b) luxusní statek



c) méněcenný statek



### Income elasticity of demand

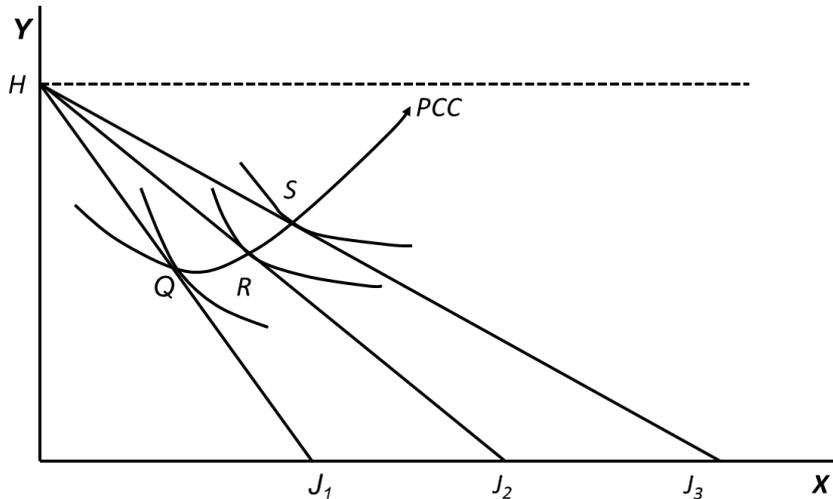
Income elasticity of demand can be expressed as a percentage change in demanded quantity of the good X divided percentage change in consumer income. From the above it follows that the income elasticity of demand can be calculated by formula:

$$e_{ID} = \frac{X_2 - X_1}{X_2 + X_1} : \frac{I_2 - I_1}{I_2 + I_1}$$

- Luxury goods –  $e_{ID} > 1$
- Inferior goods -  $e_{ID} < 0$
- Essential goods -  $0 < e_{ID} < 1$

## 2.3 Effect of Changes in Prices on Demanded Quantity

**Consumer price curve (PCC)** is the set of combinations of goods X and Y maximizing the benefit of consumers at different prices of good X (assuming ceteris paribus).

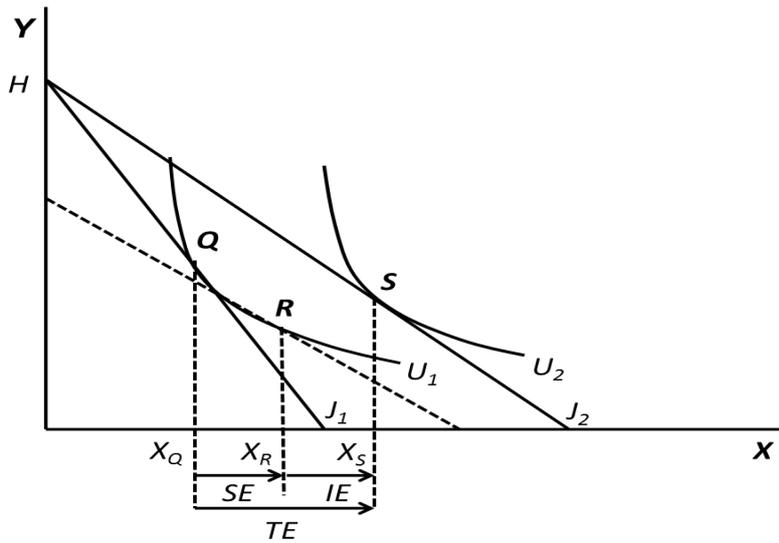


### Substitution and income effects

The influence of price changes can be decomposed into substitution and income effects.

**The substitution effect** is the change in demanded quantity due to substitution of relatively more expensive good by relatively cheaper good. It is a shift along the indifference curve reflects changes MRSc while maintaining the same benefit.

**Income effect** is the change in demanded quantity due to changes in real income.



### Demand price elasticity

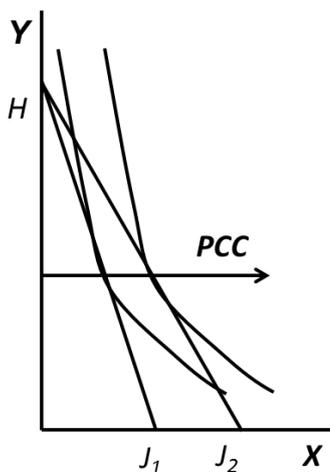
The coefficient of demand price elasticity is calculated by dividing the percentage change in demanded quantity and the percentage of price change:

$$e_{PD} = \frac{X_2 - X_1}{X_2 + X_1} : \frac{P_{X2} - P_{X1}}{P_{X2} + P_{X1}}$$

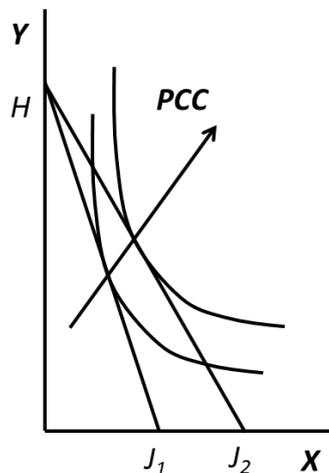
For the price elasticity in the point than applies:

$$e_{PD} = \frac{\delta X / X}{\delta P_X / P_X} = \frac{\delta X / \delta P_X}{X / P_X}$$

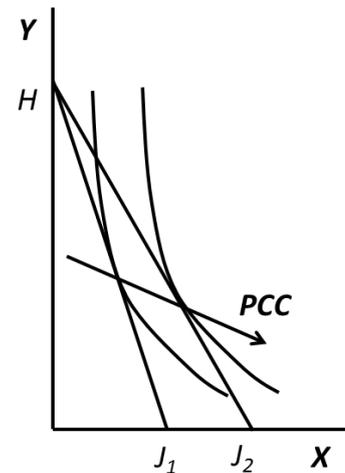
a) jednotková



b) neelastická



c) elastická



## 2.4 Effect of Changes in Other Prices on Demand

We explore how the prices of good Y affect the demand for good X ( $P_X$  and  $I$  are constant).

Just as in the previous case, we can effect of price change divide into substitution and income effects.

**Cross-substitution effect** is analogous to the substitution effect from the previous interpretation.

**Cross-income effect** is somewhat different. It expresses how the change of the price of the good Y will affect the real income and than the demand for good X.

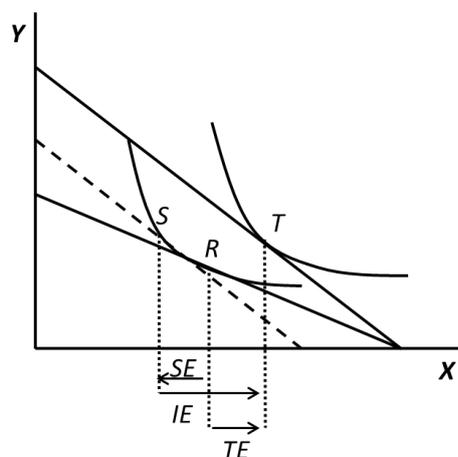
For **substitutes**, the overall effect of price changes is positive:

$$\frac{\delta X}{\delta P_Y} > 0$$

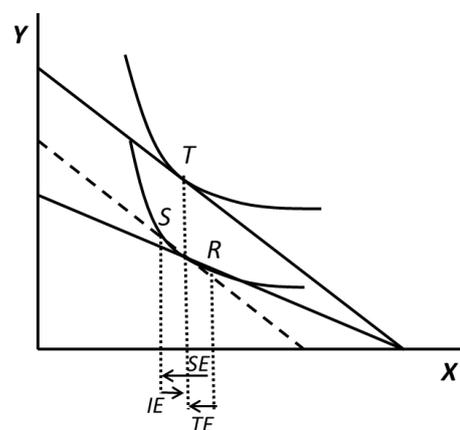
For **Complements** the overall effect of cross price change is negative:

$$\frac{\delta X}{\delta P_Y} < 0$$

a) komplementy



b) substituty



### **Cross elasticity of demand (Ecd)**

This is the ratio of percentage changes in demanded quantity of the good X and the percentage change in price of the good Y.

The following applies:

$$e_{CD} = \frac{X_2 - X_1}{X_2 + X_1} ; \frac{P_{Y2} - P_{Y1}}{P_{Y2} + P_{Y1}}$$

Cross-elasticity of demand in point can be calculated by formula:

$$e_{CD} = \frac{\delta X/X}{\delta P_Y/P_Y} = \frac{\delta X/\delta P_Y}{X/P_Y}$$

### **Elasticity of substitution**

Elasticity of substitution is therefore the percentage change ratio in which are consumed goods X and Y, divided by the percentage change in marginal degree of substitution in consumption. substitutes.

$$\sigma = \frac{d(Y/X)}{Y/X} ; \frac{d(MRS_C)}{MRS_C}$$

### 3. CONSUMER CHOICE UNDER THE RISK

The **risk** is situation when the one who **decides knows all the possible consequences of his decisions and is able to determine the probability for each of them**. Consequences must be independent of each other and the sum of their probabilities under the given assumptions, equal to one. Probability expresses the possibility that there will be some result, and in the theory of decision making under risk is used not only objective, but also subjective probability.

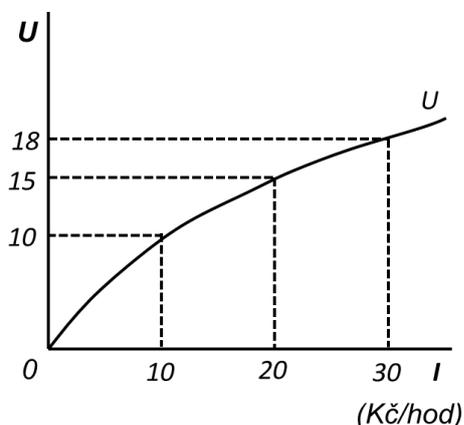
**Objective probability** is based on knowledge of the frequency with which they have certain events tend to occur.

**Subjective probability** is given the impression that the predicted outcome occurs. That may be based on knowledge and experience of man (knowledge of the industry, the economy, etc.). Because different people may have different information or a different ability to use them, they may have a different idea about the probabilities of outcomes, and therefore may decide differently.

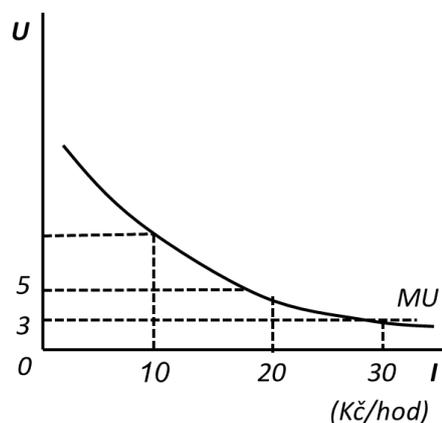
#### Relationship to risk

- Risk aversion

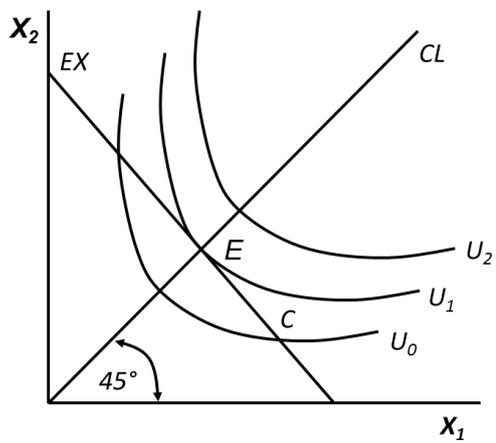
a) celkový užitek



b) mezní užitek

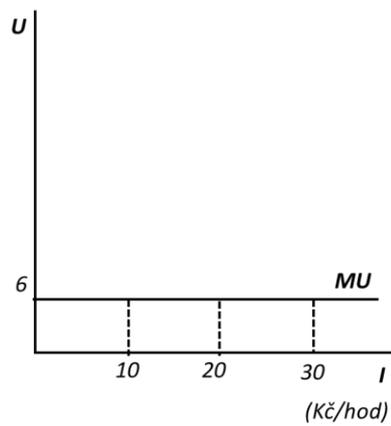
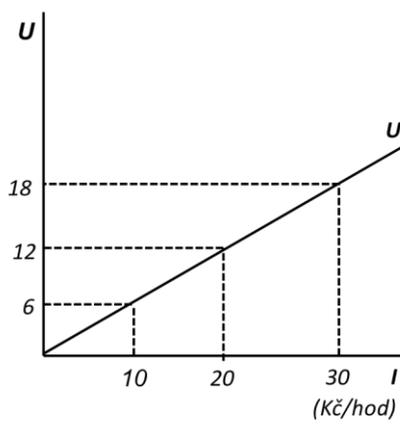


a) averze k riziku

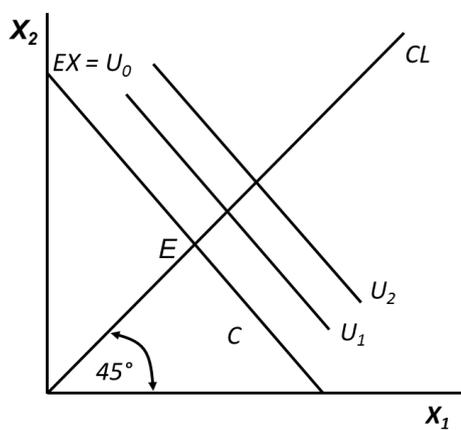


- Risk indifference (neutral attitude to risk)

Alternativní vztah k riziku – lhostejný vztah k riziku

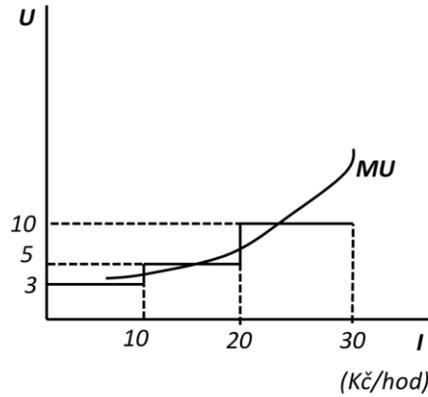
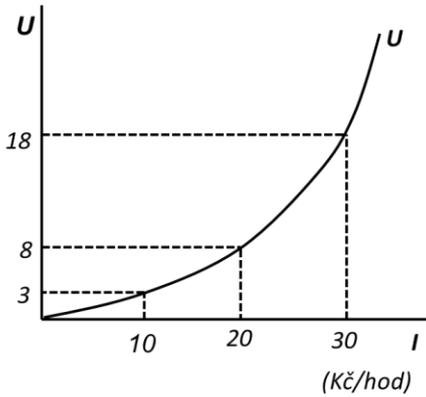


b) Neutrální vztah

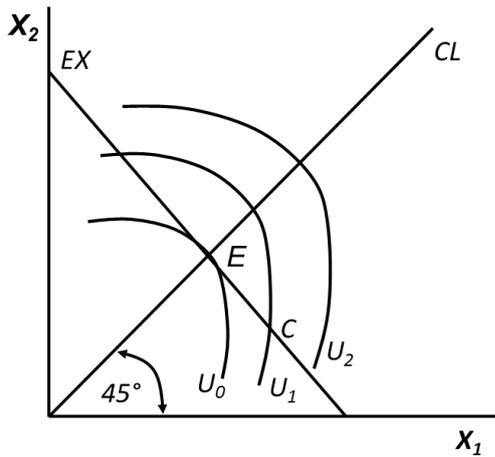


- Risk willingness to accept a fair bet

a) Alternativní vztah k riziku – vyhledávání rizika



b) vyhledávání rizika



### Risk reducing

People generally outweighs **risk aversion**. Therefore, people are trying to reduce risk, which is possible in three ways: by obtaining information about the various alternatives decisions and their results, **insurance** and **diversification** of activities.

### List of tasks for students:

1. Explain how are substitution and income effects of price changes for normal and inferior goods different.
2. How can you calculate the price (pension, cross) elasticity of demand?
3. What is the relationship between income consumer curve (ICC) and Engel curve?
4. Will for the following pairs of goods cross elasticity of demand positive or negative?
  - a) computer and diskette,
  - b) oranges and apples,
  - c) coffee and lemon.
5. Demand for farm X is given by the equation:  $X = 25 + 0.5 I - 0,2P_x + 1,5P_y$ . We know that  $X = 25$ ,  $I = 15$ ,  $P_x=75$ ,  $P_y = 5$ .
  - a) Calculate the price, income and cross-elasticity of demand.
  - b) The farm X is normal or Inferior good?
  - c) Are the goods X and Y substitutes or complements?
6. What does it mean when we say that the consumer has the risk aversion, risk seeking or risk neutral relationship? How would these different approaches to risk be explained using the willingness to accept a fair bet?
7. Why do some people refuse to risk more, while others prefer more?
8. How the diversification reduces risk?