# Lesson plan

**Course Name: Economics II**

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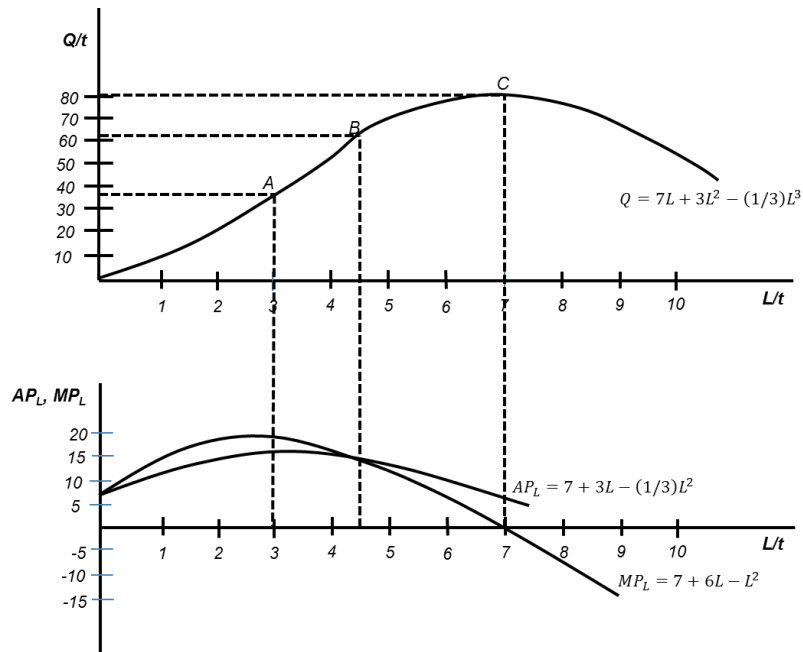
**Topic: Firm behavior and supply shaping**

**Course Objectives:**

The aim of the first lecture is to explain the basic assumptions of the firm analysis, technology choice and to explain the production function in the short and long term, costs in the short and in the long run. Partial goal is also to illustrate the different types of income of the company.
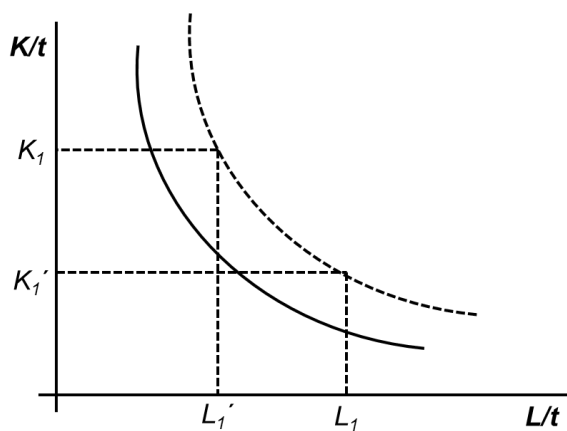
# 4. THEORY OF THE FIRM, COSTS AND REVENUES OF THE FIRM

## 4. TECHNOLOGY CHOICE

- Basis assumptions of the firm analysis

- Technology choice

- Production in the short run (short-term production function)



$$Q = 7L + 3L^2 - (1/3)L^3$$

$$AP_L = 7 + 3L - (1/3)L^2$$

$$MP_L = 7 + 6L - L^2$$

- Production in the long run (long-term production function)

- Technological progress

## 5 COSTS

- Explicit costs

- Implicit costs


- The price of labor is wage rate (w).

- Rent cost of capital (r) means the corresponding cash amount per hour of machine time. The cost of capital a company compares with the interest that could be obtained from the money spent on the purchase of capital assets.


The cost function can be expressed as:

**TC = f (Q, w, r)**


### 5.1 The costs of the company in the short term

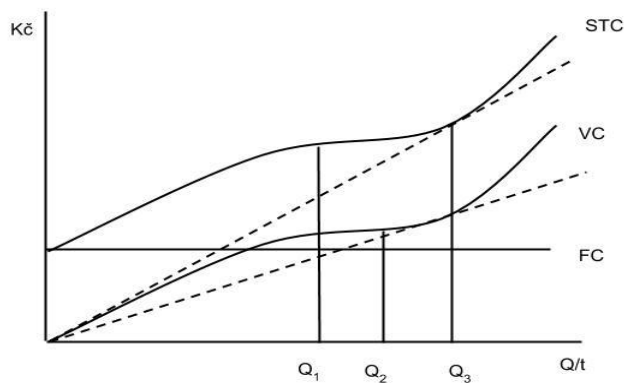The total cost TC, can be defined as the sum of the cost of labor L and capital K.


**TC = w x L + K r x**


Because in a short period, we consider the case of two inputs used generally for a fixed factor of production capital (level K1), the total costs were defined as follows:

**STC = w x L r + x K1**

Total costs in the short term are then the sum of the fixed and variable costs.


**STC = FC + VC**

Average fixed cost **AFC** are fixed costs per unit of output. The average variable cost AVC, are variable costs per unit of output.

Vertical sum of the AFC and AVC curves for each size of the output curve SAC get by paying:

$$SAC = AFC + AVC$$

**Costs and revenues from variable input**

Production function is defined as:
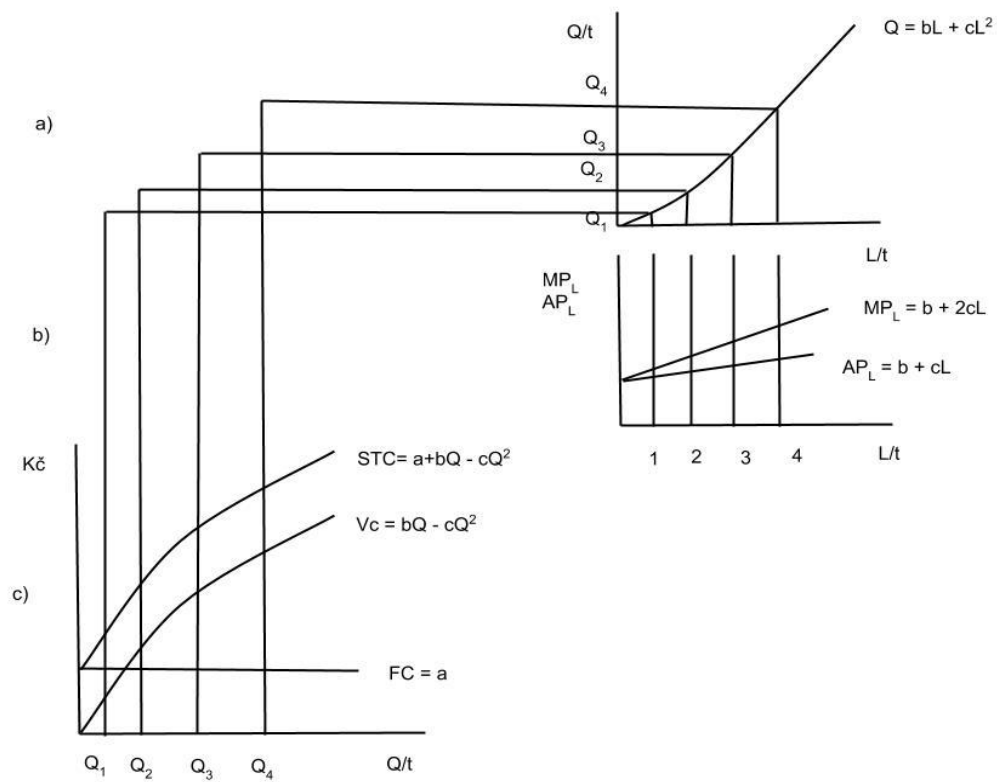
$$Q = a + b x + c x L L2$$

1. **Fixed costs** are due to the constant level of the fixed inputs also constant - assuming their size as constant ,,**a**". Then the equation of fixed costs as follows:

$$FC = a$$

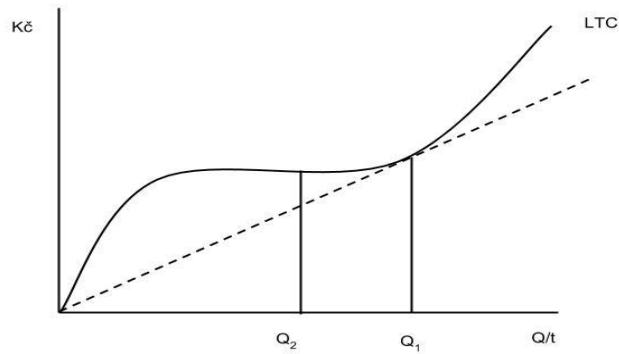2. The shape of the curve of variable costs is derived directly from the production function.
3. **Total costs**

4. **Average fixed costs**

5. **Average variable cost**

6. **Average costs**

7. **Marginal cost**



Graph a) $Q/t$ axis, $Q_4$, $Q_3$, $Q_2$, $Q_1$, $L/t$ axis, $Q = bL + cL^2$

Graph b) $MP_L$, $AP_L$, $L/t$ axis, $MP_L = b + 2cL$, $AP_L = b + cL$, markers 1 2 3 4, $L/t$

Graph c) Kč axis, $STC = a + bQ - cQ^2$, $V_c = bQ - cQ^2$, $FC = a$, $Q_1$ $Q_2$ $Q_3$ $Q_4$, $Q/t$
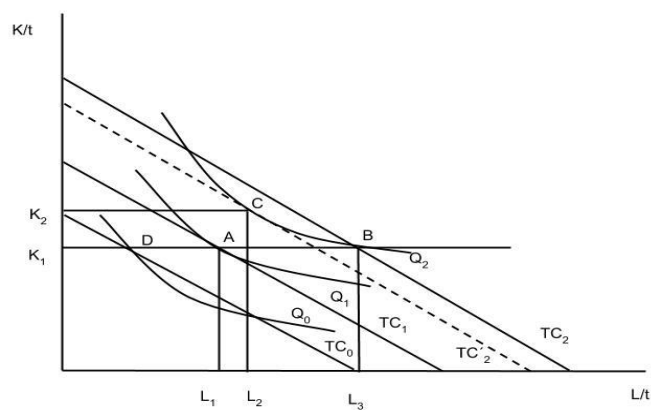
## 5.2 The costs of the company in the long run

Total cost curve in the long term **LTC** is derived the same way as the curve of total costs in the short term STC. The shape of the curve is determined by the LTC returns to scale.



## 5.3 The relationship between short run and long run costs

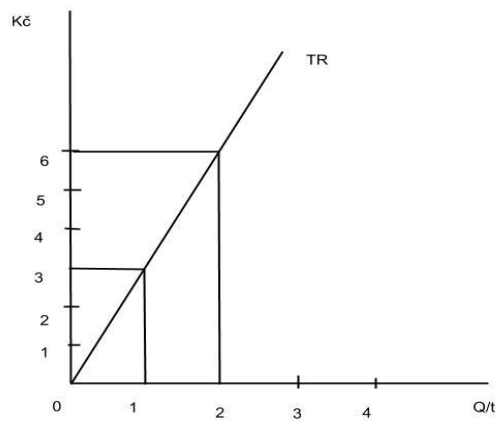In contrast, during the long period are all inputs variable.

# 6 REVENUES

**Total revenue (TR)** is the total amount of money that the company gains by selling their products. Its size by multiplying the unit price and quantity sold.
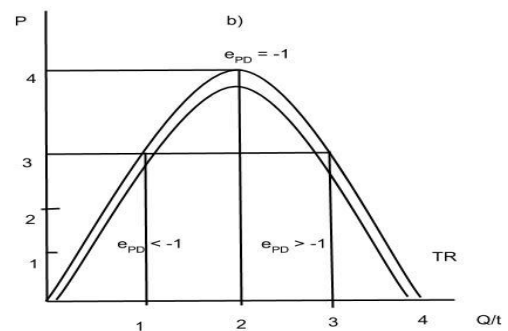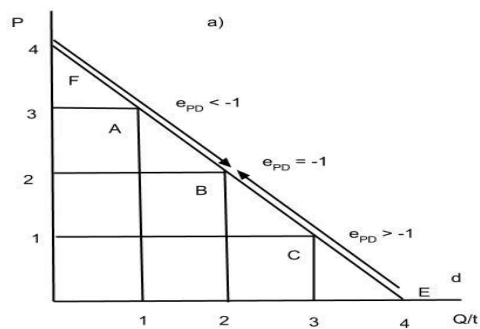
**TR = P x Q**

From this relation it follows that the graphical representation of the total revenue will depend on the type of competition.´
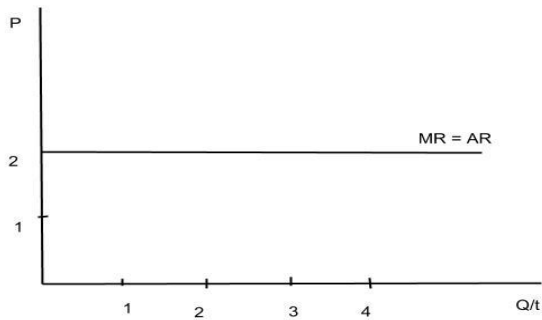
a) In perfect competition



b) In the conditions of imperfect competition - the situation is more complex
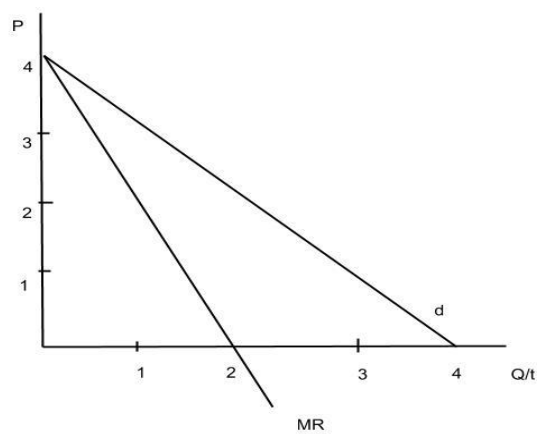
Another type of income is the **average revenue (AR)**.

**Marginal revenue (MR)** is defined as the change in total revenue due to changes in output (sales) by unit.

a) Perfect competition



b) Imperfect competition

**List of tasks for students:**

1. Compare the isoquant with indifference curve. What are the isoquant characteristics?

2. Explain to the specific example of cross marginal productivity of inputs.

3. Explain the concepts of marginal rate of technical substitution and substitution elasticity coefficient.

4. Explainthe difference between implicit and explicit costs. Provide specific examples.

5. How is possible to calculate total, average and marginal costs?