



Lesson plan

Course Name: Economics II

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Topic: Factors markets, part I.

Course Objectives:

The aim of the first lecture is to explain specifics of demand and supply formation in the market of production factors. Then we will describe demand in a perfectly competitive labor market. Next we will distinguish the behavior of the company in the short and long term.

FACTOR MARKET SPECIFICS. DEMAND IN A PERFECTLY COMPETITIVE LABOR MARKET.

12. COMPANY CAPITAL AND LABOR DEMAND SPECIFICS

12.1 Profit Maximization Conditions

Necessary conditions for profit maximization are:

$$\frac{\delta \pi}{\delta K} = \frac{\delta TR}{\delta K} - \frac{\delta TC}{\delta K} = 0$$

$$\frac{\delta TR}{\delta K} = \frac{\delta TC}{\delta K} \text{ or } \text{MRP}_K = \text{MFC}_K$$

$$\frac{\delta \pi}{\delta L} = \frac{\delta TR}{\delta L} - \frac{\delta TC}{\delta L} = 0$$

$$\frac{\delta TR}{\delta L} = \frac{\delta TC}{\delta L} \text{ or } \text{MRP}_L = \text{MFC}_L$$

12.2 Revenue Variables of Factor Markets

Marginal Revenue Product (MRP) can be generally defined as the change in total income, due to a change in the volume of production factor per one unit.

Marginal Revenue Product of Capital (MRPK) as a change in the total income caused by changing the volume of the capital per one unit.

$$1. \text{MRP}_K = \delta TR / \delta K$$

$$2. \text{MRP}_K = \text{MR}_A \cdot \text{MP}_K,$$

Marginal Revenue Product of Labor (MRPL) represents the change in total revenue resulting from a change in the volume of work per one unit. Formal expression is similar to the income of the marginal product of capital:

1. $MRP_L = \delta TR / \delta L$
2. $MRP_L = MR_a \cdot MP_L$,

Average Revenue Product (ARP) is generally income per unit of production factor.

Average Revenue Product of Capital (ARPK) is the company's revenue per unit of capital.

$$ARP_K = \frac{TR}{K} = \frac{P_A \cdot Q_A}{K} = P_A \cdot \frac{Q_A}{K} = P_A \cdot AP_K,$$

Average Revenue Product of Labor (ARPL) is the company's income per unit of labor.

$$ARP_L = \frac{TR}{L} = \frac{P_A \cdot Q_A}{L} = P_A \cdot \frac{Q_A}{L} = P_A \cdot AP_L,$$

12.3 Cost Variables of Factor Markets

Marginal Factor Cost (MFC) is the change of the total cost of the company due to the fact that the company has hired an additional unit of a factor of production. For the considered inputs, labor and capital, we get the following values:

Marginal Factor Cost of Capital (MFCK)

$$MFC_K = \partial TC / \partial K$$

Marginal Factor Cost of Labor (MFCL)

$$MFC_L = \partial TC / \partial L$$

Average Factor Cost (AFC) is the cost per unit of factor.

Average Factor Cost of Capital (AFCK)

$$AFC_K = \frac{TC}{K} = \frac{r \cdot K}{K} = r$$

Average Factor Cost of Labor (AFCL)

$$AFC_L = \frac{TC}{L} = \frac{w \cdot L}{L} = w$$

13. DEMAND IN A PERFECTLY COMPETITIVE LABOR MARKET

We know the condition of profit maximization: **MRPL = MFCL**

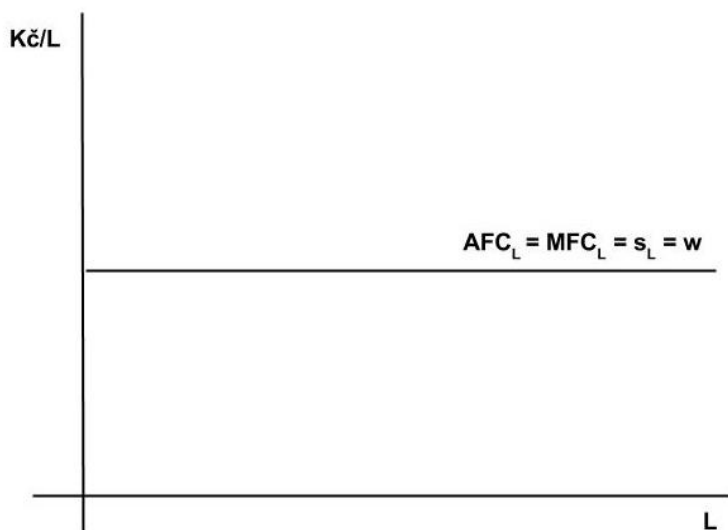
$$MRP_L = MR_A \cdot MP_L$$

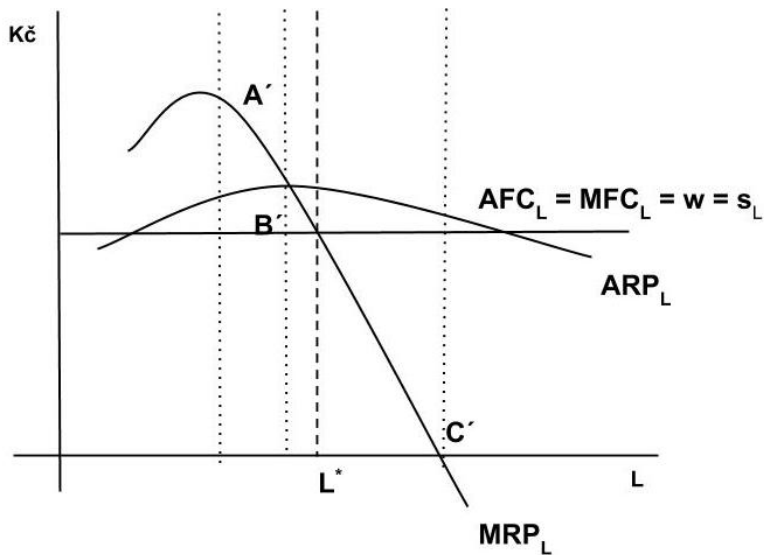
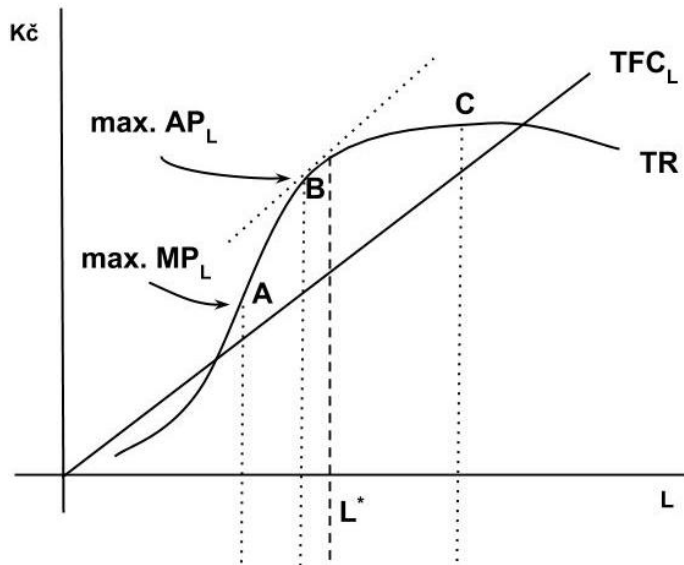
$$MFCL = w$$

13.1 Company Labor Demand in the Short Run

$$P_A \cdot MP_L = w$$

$$TFC_L = w \cdot L$$

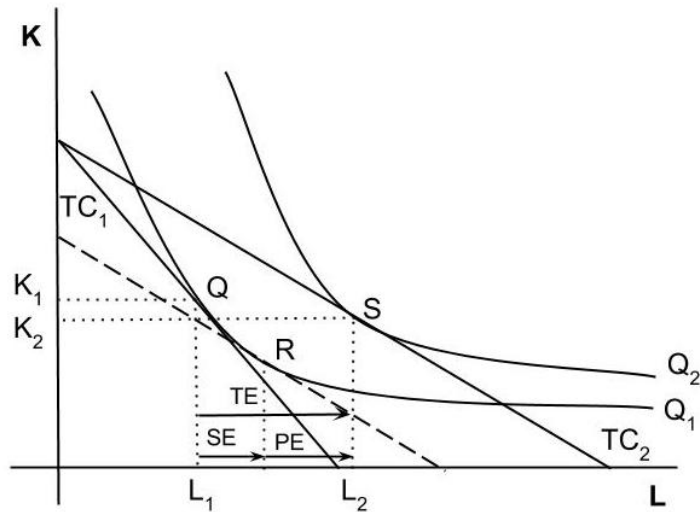




13.2 Company Labor Demand in the Long Run

Production effect shows the change in the optimal combination of inputs, which is associated only with a change in a firm's output.

Cost effect is directly connected with the production effect.



13.3 Factors Affecting Labor Demand

The demand for any commodity or service is primarily influenced by two groups of factors:

1. price of the goods or services,
2. other factors (cause shifts of the entire demand curve).

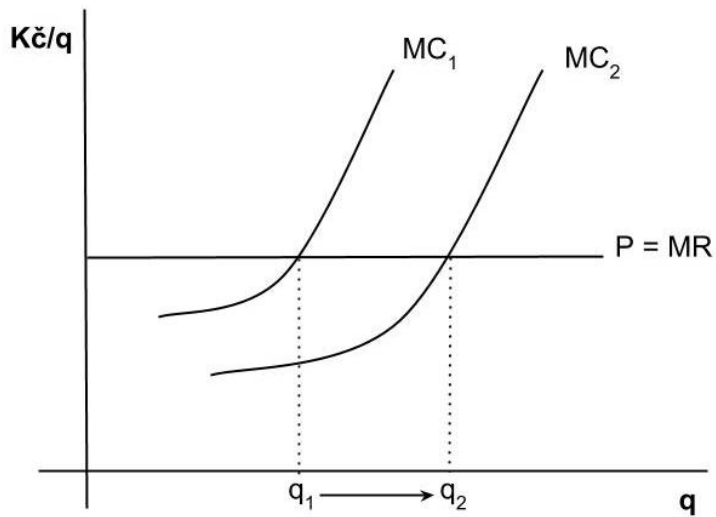
Change in the price of labor (wage rate)

If we examine the relationship between the percentage change in demanded quantity of work and the percentage change in its price, we get the **coefficient of price elasticity of demand for labor EDL**:

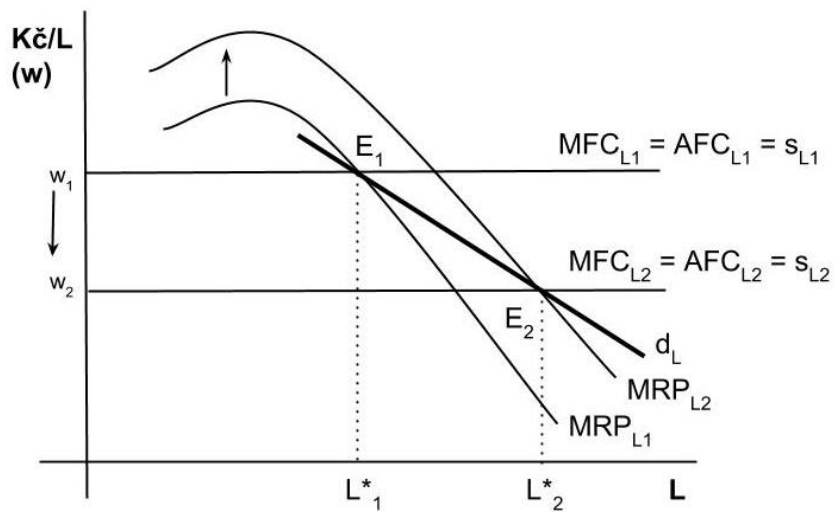
$$e_{DL} = \frac{\delta L/L}{\delta w/w} = \frac{\delta L}{\delta w} \cdot \frac{w}{L} \quad \text{at constant output } q$$

Assuming that the company uses in the production of two inputs (labor and capital), we can formulate the **cross-elasticity of demand for labor** as follows:

$$e_{CDL} = \frac{\delta L/L}{\delta r/r} = \frac{\delta L}{\delta r} \cdot \frac{r}{L} \quad \text{at constant output } q$$



Perfect competitive firm demand for labor:



List of tasks for students:

- 1. Explain why there is a modified golden rule of profit maximization in the inputs market.**
- 2. Identify differences between the terms "marginal revenue" and "marginal revenue product".**
- 3. Define terms "marginal cost" and "marginal factor cost".**
- 4. Define individual job supply from the company's perspective.**
- 5. why is the company's demand for labor derived from the function of the marginal revenue product of labor.**
- 6. Plot market demand for labor.**
- 7. Define the substitution and production effect of the wage rate and explain its effect on the marginal product of labor.**