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MICROECONOMICS

Lecture notes

for students majoring in 6-05-0311-02 "Economics and Management",
6-05-0412-04 "Marketing" (in English)

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The lecture notes, aligned with the established curriculum, provide a comprehensive introduction to microeconomic theory and methodology. Key concepts include analyzing economic behaviors of consumers and producers, optimizing resource allocation, and enhancing economic efficiency.
    The material is designed for students, educators, and enthusiasts seeking a deeper understanding of microeconomics.

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TOPIC 1. INTRODUCTION TO MICROECONOMICS

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1 Place, boundaries, logic and tools of microeconomics. Subject of microeconomics

Microeconomics is a section of economic science associated with the study of rational behavior of individual economic entities in the conditions of special market structures.

Economic sciences are divided into theoretical (fundamental) and applied. Theoretical sciences, such as microeconomics and macroeconomics, study the general principles of economic phenomena. Applied sciences, such as marketing, management, finance, use theoretical knowledge to solve specific practical problems.

Classification of economic sciences:

1. By levels of study:

Microeconomics studies the behavior of individual economic entities (consumers, firms, industries).

Macroeconomics studies the economy as a whole (economic growth, inflation, unemployment).

International economics studies economic relations between countries.

World economy studies the economy as a whole.

2. By the nature of the problems studied:

Economic theory studies general economic laws and patterns (microeconomics, macroeconomics).

Applied economic sciences use knowledge of economic theory to solve practical problems (marketing, management, finance, accounting).

3. By areas of economic thought they are categorized into Classical economic theory, Marxist economic theory, Neoclassical economic theory, Keynesianism, Institutionalism.

4. Auxiliary disciplines include Econometrics, Mathematical economics, Economic informatics, History of economics.

Microeconomics is a structural element of economic theory – the general methodology of all known economic sciences, therefore, in relation to the four identified blocks of economic sciences, microeconomics is also a methodological basis. Historically, microeconomics emerged as a separate science during the marginal revolution at the end of the 19th century.

The marginal revolution took place in two stages. The first stage covers the 70-80s of the 19th century and is associated with the introduction of marginal (limit) values into economic analysis and the developments of the Austrian, Cambridge and Lausanne schools of neoclassicism; the second stage (since 1890) is associated with the spread of marginal analysis to the area of not only consumption, but also production.

Microeconomics studies:

1) the theory of demand and consumer behavior in the market;

2) the theory of supply and the market behavior of the firm;

3) the market behavior of business entities under conditions of perfect and imperfect competition;

4) features of resource markets and factor distribution of income;

5) features of partial and general economic equilibrium;

6) the theory of external effects;

7) the theory of public goods;

8) markets with asymmetric information;

9) the theory of public choice.

The boundaries of microeconomics can be identified on the basis of the circular flow of economic activity scheme (figure 1.1).
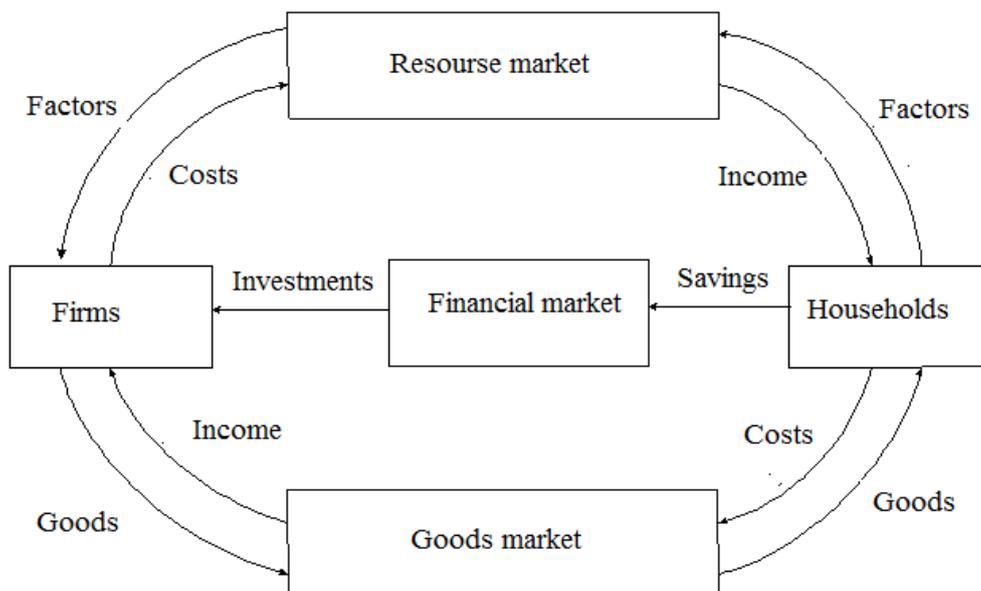
Figure 1.1 – Economic circulation without state participation

Economic circulation is the interconnected movement of resources, goods, services and income between the main subjects of economic activity. The main subjects of economic activity include households, enterprises and the state.

The main subjects of the market economy are households and firms. Households make demand for consumer goods and services, being at the same time suppliers of economic resources. Firms make demand for

resources, offering consumer goods and services. In a market economy, there is a constant interaction of supply and demand: demand creates supply, and supply develops demand.

Thus, microeconomics studies the behavior of individual economic entities in the context of market organizational structures.

The logic of microeconomics corresponds to the logic of scientific knowledge and is carried out at 3 levels:
– empirical;
– theoretical;
– practical.

At the empirical level, collection, observation and primary processing of economic information is carried out.

At the theoretical level, with the help of special tools of microeconomics, economic information is processed, new theories and hypotheses are created, new knowledge is formed.

At the practical level, the reliability of new knowledge, the use of theory in practice, and the development of economic policy are tested.

Microeconomics tools are those means that allow us to study, explain, and forecast the development of microeconomic processes. The main tools of microeconomic analysis include the following:

1. Basic principles and laws.

Principles: scarcity, rationalism, functional relationship.

Laws: supply and demand, diminishing marginal utility, increasing imputed costs, diminishing returns.

2. Triad of economic quantities: total, average, marginal.

3. Economic and mathematical models:
– analytical;
– tabular;
– graphical.

4. Special concepts and categories: market, price, demand, supply, utility, good, etc.

2 Fundamental issues of microeconomics and their solution at the micro level

In any economic system, people, faced with limited resources, must make choices to answer three fundamental questions: What to produce? How to produce? For whom to produce?

A graphical model of economic choice can be shown using a transformation curve (figure 1.2).
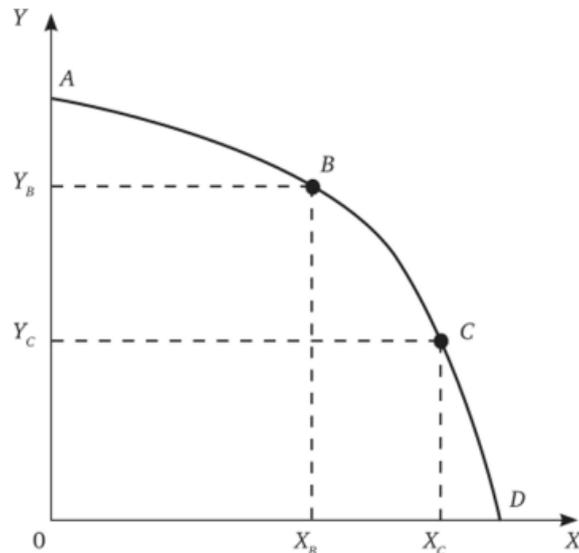
Figure 1.2 – Transformation curve

The model demonstrates two possible modes of production of goods A and B: the mode of full production with full use of resources – points C and D; the mode of production with incomplete use of resources – point E. Point F is the volume of production of goods that is unattainable with a given number of resources and the use of these technologies.

The question "What to produce?" at the micro level is solved with the help of:

1) the transformation curve;
2) the alternative nature of economic choice;
3) minimization of imputed costs. And it assumes:
• production focus on public needs;
• production, first of all, of those goods that are provided in sufficient quantities with resources and technologies;
• production of goods whose imputed costs are minimal.

The question "How to produce?" at the micro level is solved with the help of:

1) the production possibilities curve;
2) efficient production;
3) full employment of resources;
4) rational cooperation of labor.

Efficient production presupposes the full use of limited natural resources and the full volume of production. Rational management requires maximization of results, benefits and minimization of costs, expenses. Optimum in production means a state in which the system is in a state of equilibrium, that is, the subject has no incentive to change his behavior.

The question "For whom to produce?" at the micro level is solved using the concepts:

1) efficient distribution of income;

2) fair distribution of income.

Factor distribution is economically efficient and is described by the Pareto optimum: if the well-being of one subject cannot be improved without worsening the well-being of another, then the system has reached an optimal state. Fair distribution is an area of normative analysis and depends on the value judgments embedded in the concept of "fairness".

In economic literature, four main groups of principles of social justice are distinguished:

1. The egalitarian principle means that there is no inequality in the distribution of income in society.

2. The Rawlsian principle is named after the American modern philosopher J. Rawls, whose views were based on two principles: all members of society should have equal rights to basic freedoms; society should make decisions based on the interests of the least well-off members. Therefore, the approach assumes such a differentiation of incomes, in which relative economic inequality is permissible only when it contributes to the achievement of a higher absolute standard of living by the poorest members of society.

3. The utilitarian principle originates in the works of the English philosopher I. Bentham and is based on the fact that it is necessary to provide the greatest happiness for the greatest number of people. In practice, this means that incomes should be distributed in proportion to the usefulness of their use by different people.

4. The market principle posits that income distribution aligns with the marginal productivity of each factor of production. Essentially, individuals' earnings are determined by the value their resources contribute to the market, reflecting the economic notion that rewards are tied to productivity.

3 Features of the methodology of microeconomics

Microeconomic methodology is grounded in the classical notion of *Homo economicus*, a theoretical construct introduced by Adam Smith in the 17th and 18th centuries. This concept portrays individuals as rational, self-interested actors who make decisions to maximize their economic utility, serving as a foundational assumption in microeconomic analysis. The main characteristics of the economic entity in this model include:

1) the natural, innate property of economic entities is egoism;

2) economic egoism is manifested in the desire to maximize their own economic benefit;

3) the maximum of their own benefit stimulates the receipt of benefits by other economic entities;

4) the receipt of benefits by all economic entities is possible only in the conditions of competitive management.

The methodology of microeconomics is based on this model.

The features of the methodology of microeconomics include:

– *The principle of individualism.* It assumes that the well-being of an economic entity does not depend on its belonging to social groups, classes, parties, etc.

– *The principle of alternative choice.* Assumes decision-making in conditions of unlimited needs with limited resources, taking into account the factors influencing the choice: preference factors and limiting factors.

– *The principle of rational choice.* Means that an individual seeks to maximize his own benefit and minimize his own costs.

– *The principle of full information of an economic entity.* Allows one to evaluate both personal and other people's benefits and optimize one's actions according to the criterion of maximizing this benefit.

– *The principle of quantitative interrelation of economic phenomena.* Assumes that there is a functional relationship between economic phenomena and processes, in which one of the phenomena is considered dependent, and the other is an independent variable. Allows one to formalize economic analysis and use the possibilities of mathematical analysis.

– *The principle of static analysis.* Assumes that any economic system strives for equilibrium and is either in an equilibrium state or in the process of transition from one equilibrium to another.

Three methods of analysis are widely used in microeconomics: marginal, functional and graphical.

Marginal analysis (marginalism) is a method of studying the dynamics of economic indicators: growth, reduction, change. The term "marginal" here should be understood as "additional", "additional". The essence of marginal analysis is that it is the additional, changing part of the economic value that is studied, its characteristics are clarified and thus the trends of change (development) of the entire set as a whole are determined.

Functional analysis consists in establishing and studying the dependencies of some economic values on others. As a rule, the functional dependence is specified mathematically. An independent value (argument) is called an economic factor. For example, a two-factor production function shows the dependence of the volume of output on two factors used - labor and capital.

Graphical analysis is based on modeling economic states and actions using graphs, charts, diagrams and pictures. As a rule, this method is used in combination with other methods of economic analysis.

Key concepts

Microeconomics, economic choice, economic rationalism, marginal analysis, functional analysis, graphical analysis, economic model, equilibrium approach, rational economic behavior, microeconomic tools, transformation curve.

TOPIC 2. THEORY OF CONSUMER BEHAVIOR

1 The Problem of assessing the Utility of goods in Cardinalism and Ordinalism
2 Axioms of Ordinalism. Indifference Curve. Indifference Map
3 Buyer's Budget Line. Consumer Equilibrium in Ordinalism
4 Income-Consumption, Price-Consumption Curves
5 Market Demand and construction of the Market Demand Curve
Key concepts

1 The Problem of assessing the Utility of goods in Cardinalism and Ordinalism

The theory of consumer behavior is based on the premise that the consumer:

1) has sovereignty or freedom of choice in the market;

2) behaves rationally;

3) makes each purchase decision, assessing not only the increase in benefits, but also certain losses, since the money spent always has an alternative use, which we exclude when making a purchase.

There are two main approaches to the analysis of consumer behavior:

1. The 1870s. – an approach developed within the Austrian School (representatives: Menger, Wieser, Böhm-Bawerk) – cardinalism.

2. 1890s – an approach developed within the Lausanne and Cambridge (Edgeworth, Pigou) schools – ordinalism.

According to the cardinal (quantitative) approach, the value of goods is determined not by labor costs, but by the need that is satisfied by the good. Cardinalism provides a quantitative assessment of the behavior of the buyer in the market, introduces quantitative measurements of the utility obtained when purchasing goods. The unit of utility is util.

According to the ordinal (ordinal) approach to utility analysis, the consumer is not required to be able to measure the utility of a particular good in some artificial units of measurement. It is enough for the consumer to be able to rank all possible sets of goods according to their "preference". Cardinalism builds its theory using the following concepts:

1. **A good** is any object of consumer choice that can satisfy a need and improve the subject's well-being.

2. **Total utility** (TU) is a direct connection between the number of units of a good purchased and the level of well-being of the buyer (figure 2.1).
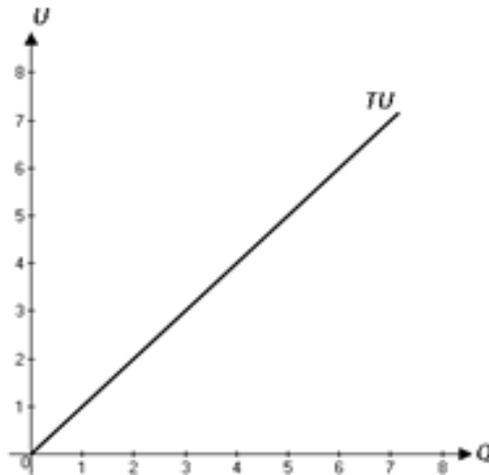
Figure 2.1 – Total Utility Curve

where U is the utility level; TU is the total utility; Q is the purchase volume.

3. **Marginal utility** (MU), which shows how total utility changes when consuming additional units of a good (figure 2.2).
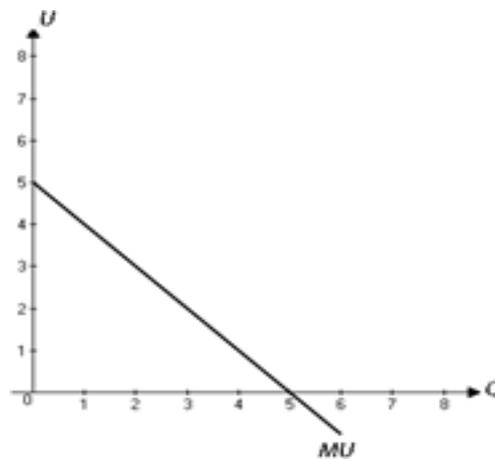
Figure 2.2 – Marginal Utility Curve

$$MU = \frac{\Delta TU}{\Delta Q} \qquad (2.1)$$

where U is the utility level; MU is the marginal utility; TU is the total utility; Δ is the change; Q is the purchase volume.

As the units of a good consumed increase, MU is subject to the law of decreasing.

4. The price-weighted marginal utility of a good, which allows for comparison of any consumer goods in the process of consumer choice.

$$\frac{MU}{P} \qquad\qquad (2.2)$$

where P is the price of the product.

5. The utility maximization rule, which allows one to find the optimal purchase that would maximize the total utility of the buyer, taking into account his budget constraints.

$$\frac{MUx}{Px} = \frac{MUy}{Py} = \frac{MUz}{Pz} \qquad\qquad (2.3)$$

Where MUx/Px, MUy/Py, MUz/Pz, are the price-weighted marginal utilities of goods x, y and z respectively.

The following is common to cardinalists and ordinalists:
– the complete ordering of consumer preferences is taken into account;
– the budget constraints of the consumer are taken into account;
– the behavior of a rational consumer is studied;
– pricing issues are not studied.

Ordinalists operate with the following system of concepts: axioms of consumer behavior, indifference curves, marginal rate of substitution, indifference curve map, consumer budget line, consumer equilibrium, income-consumption curves, price-consumption curves, consumer corner decision and other concepts.

2 Axioms of Ordinalism. Indifference Curve. Indifference Map

The main axioms of ordinalists:

1. The axiom of complete ordering of consumer preferences.

For any pair of sets A and B, either AB (A is preferable to B), or B>A (B is preferable to A), or A (A and B are equivalent). A consumer making a purchase can always name which of the two sets of goods is better than the other or recognize them as equivalent.

2. Axiom of transitivity (consistency, logic) of preferences.

For any three sets A, B and C, if A > B and B > C, then A > C. Or, for example, if AB and BC, then AC.

3. Axiom of reflexivity.

Each set is at least as good as itself AA.

4. Axiom of non-satiation.

Any set containing a larger number of goods is more preferable to a set with a smaller number of goods.

5. Axiom of independence.

The level of consumer satisfaction depends only on the amount of goods consumed by him and does not depend on the amount of goods consumed by others.

An indifference curve is a set of consumer sets, each of which gives the same satisfaction (figure 2.3).

Let the possible sets of goods consist of only two types of goods: X (food) and Y (clothing). By connecting points A, B, and C, we obtain a U curve, each point of which shows the possible combinations of units of clothing and food that bring the same satisfaction. The U curve is called an indifference curve.
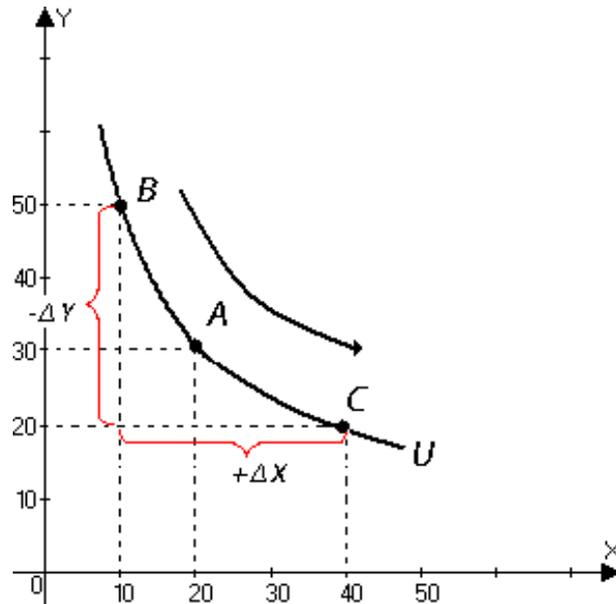
Figure 2.3 – Indifference Curve

The set of indifference curves corresponding to all possible utility levels for a given consumer is called an *indifference curve map* (figure 2.4).
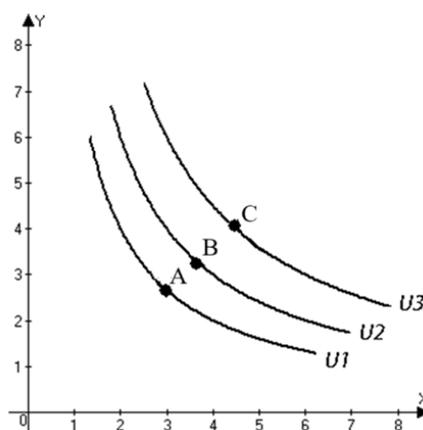
Figure 2.4 – Indifference Curve Map

Properties of indifference curves:

1. An indifference curve located to the right and above another curve is more preferable for the consumer.

2. Indifference curves have a negative slope.

3. Indifference curves have a convex shape relative to the origin.

An important concept of the ordinal theory of utility is **the marginal rate of substitution (MRS)**, which shows how much of good Y should be given up in order to increase purchases of good X so that the buyer's level of satisfaction does not change.

$$MRS = \frac{-\Delta Y}{\Delta X} = \frac{MUx}{MUy}$$ (2.4)

where MRS is the marginal rate of substitution.

3 Buyer's budget line. Consumer Equilibrium in Ordinalism

Indifference curves allow us to identify consumer preferences, but they do not take into account the prices of goods and the consumer's income. They do not determine which set of goods the consumer considers most profitable for himself. This information is given to us by the budget constraint, which shows all combinations of goods that can be purchased by the consumer with a given income and given prices.

In this regard, the consumer's budget constraint (figure 2.5) is expressed by the formula

$$I = Px \cdot x + Py \cdot y$$ (2.5)

where I is the consumer's income; Px, Py are the prices of the goods purchased; x, y are the quantities of the goods purchased.
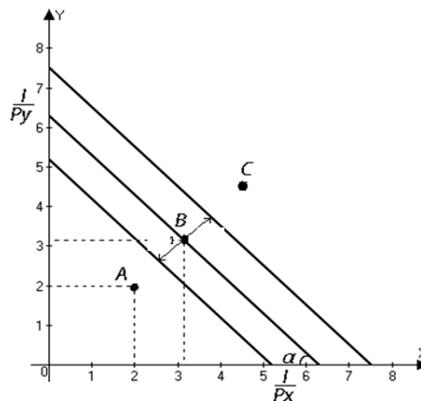
Figure 2.5 – Budget line of the consumer

A – a set of goods, when buying which part of the funds is saved.

B – a set of goods, when buying which the consumer's income is spent completely.

C – an unattainable consumer set.

The slope of the budget line is expressed by the ratio of the market prices of the purchased goods:

$$tg\alpha = \frac{Px}{Py} \qquad\qquad (2.6)$$

↑ income is a right-hand parallel shift of the graph.
↓ income is a left-hand parallel shift of the graph.
If, with a fixed budget and an unchanged price of good y, the price of good x changes, then the slope of the budget line changes (figure 2.6).
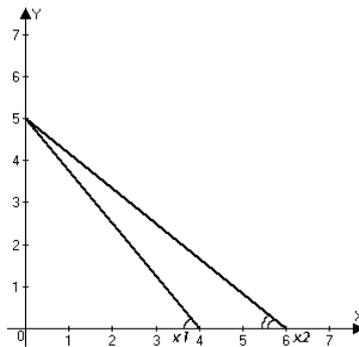
Figure 2.6 – Changing the slope of the buyer's budget line

The ratio of the desired (indifference curve map) and the possible (budget line) allows us to determine the consumer's equilibrium, which means:
1. The buyer extracts maximum utility from the purchase.
2. The buyer minimizes the costs of making the purchase.
3. The buyer has no incentive to change his market behavior.
The consumer's equilibrium is determined by superimposing the indifference curve map on the budget line at the point of contact of one of the indifference curves with the budget line (figure 2.7).
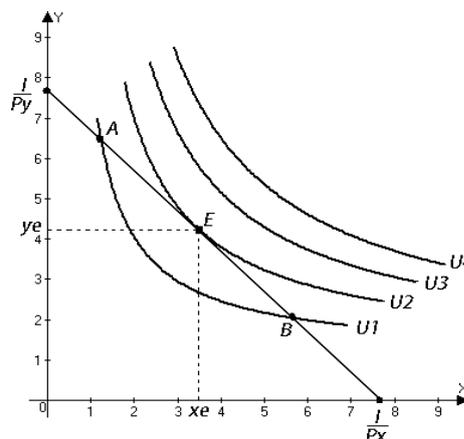
Figure 2.7 – Consumer equilibrium

The equilibrium position of the consumer is achieved at point E. Points A and B of intersection of the budget line and the indifference curve U_1

cannot be equilibrium points, since points on the indifference curve U_1 have lower total utility than points on the indifference curve U_2. Points on the indifference curve U_3, although they have higher total utility, lie outside the budget constraint.

At point E, the slope of the indifference curve is equal to the slope of the budget line.

Cardinalists and ordinalists arrive at identity, despite the fact that they follow their own paths, use their own concepts, etc. This testifies to the precision of the logic of cardinalists and ordinalists.

4 Income-Consumption, Price-Consumption Curves

The *income-consumption curve* (figure 2.8) is a set of equilibrium bundles under the condition that the consumer's income changes and market prices remain unchanged.

Let us assume that the consumer's income increases (I↑), and the prices of goods remain unchanged (Px, Py – const).

An increase in income shifts the budget line up and to the right. The shift in the budget line leads to a new equilibrium point, since at each level of income the consumer chooses the most useful bundle of goods.
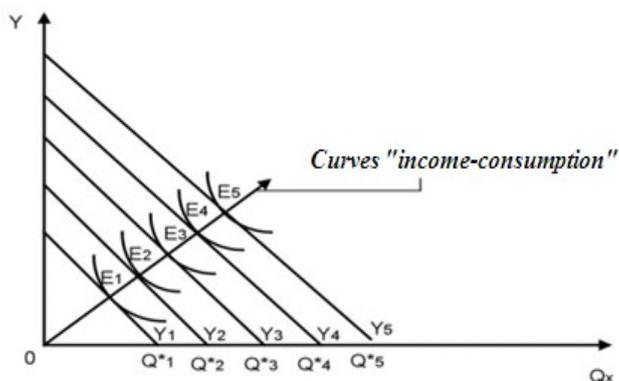
Figure 2.8 – Income-Consumption Curves

The location of the income-consumption curves may be different: EE1, EE2, EE3. Let us analyze each of them.

EE_1: I↑, x↑, y↑

Goods x, y are superior (normal), *E d* > 0.

EE_2: I↑, x↑, y↓

Good x is superior (*E d* > 0), good y is inferior (Ed < 0).

EE_3: I↑, x↓, y↑

Good y is superior (*E d* > 0), good x is inferior (*E d* > 0).

Conclusion: when analyzing the income-consumption curve, it is possible to identify whether goods belong to a higher or lower group and

construct Engel curves on this basis. Engel curves show the relationship between changes in income and the number of goods purchased (figure 2.9).
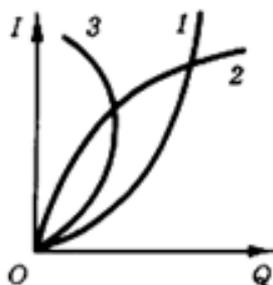
Figure 2.9 – Engel curves for:
1 – essential goods, 2 – luxury goods (higher goods), 3 – lower goods

The price-consumption curve (figure 2.10) is a set of equilibrium bundles given a change in the market price of one of the goods and an invariance in income and prices of other purchased goods.

Let us assume that the price of good x decreases (Px↓), while the price of good y and the consumer's income remain unchanged (I, Py – const).

As the price of good x decreases, the slope of the budget line changes.
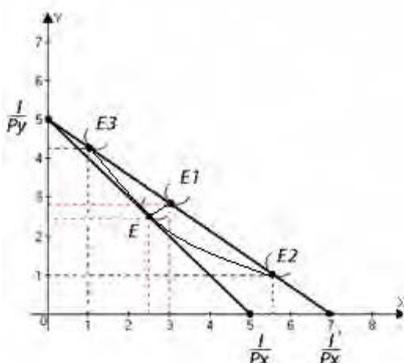
Figure 2.10 – Price-consumption curves

The location of the price-consumption curves can be different. Let us analyze them.

EE_1: Px↓, x↑, y↑

Good y is the complement of good x ($E\,x\,y > 0$).

EE_2: Px↓, x↑, y↓

Goods x, y are close substitutes ($E\,x\,y > 0$).

EE_3: Px↓, x↓, y↑

Good y is a complement of good x ($E\,x\,y > 0$).

Good x is a Veblen or Giffen good – goods for which the law of demand seems to be violated.

Veblen goods (named after the 19th century sociologist and economist Thorstein Veblen). These goods include luxury items such as jewelry,

fashionable perfumes, clothing, and original works of art. If such goods are released for sale at a low price, they lose their appeal and, as a result, demand for them may decrease. On the contrary, with an increase in price, demand may increase.

Giffen goods (named after Robert Giffen, a 19th century economist) are very rare goods for which demand increases with an increase in price and decreases with a decrease in price. This type of demand behavior occurs in underdeveloped countries, where consumers are so poor that they spend most of their income on the cheapest products necessary for subsistence. There are countries, for example, where most of the population eats mainly rice. If the price of rice falls, people have the opportunity to spend some of their money on a more nutritious product, say, meat. Rice consumption decreases.

Conclusion: The price-consumption curve is used to determine whether goods belong to complement or substitute groups, as well as to Veblen or Giffen groups. This curve can be used to construct a market demand curve.

5 Market Demand and construction of the Market Demand Curve

Market demand is determined by summing up the individual demand of buyers in a given market (figure 2.11). The summation occurs horizontally, i.e. the individual volumes of demand are summed up at the corresponding market prices.

$$Qmarket = \sum Qind \qquad (2.7)$$

where Qmarket is the market demand; Qind is the individual demand.
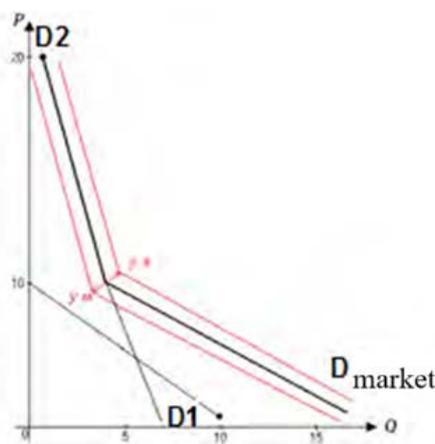
Figure 2.11 – Individual and Market Demand Curves

Market demand is affected by all the same price and non-price factors as individual demand. In addition, there is also such a factor as the number of buyers in the market.

Market demand has a reverse effect on individual demand in the form of special effects:

1. Imitation (accession) effect.

If the total volume of purchases in a market increases, then individual demand also increases.

2. Snob effect.

If the total volume of purchases increases, then individual demand, on the contrary, decreases.

These two effects cancel each other out.

The configuration of market demand can be very different (figure 2.12).
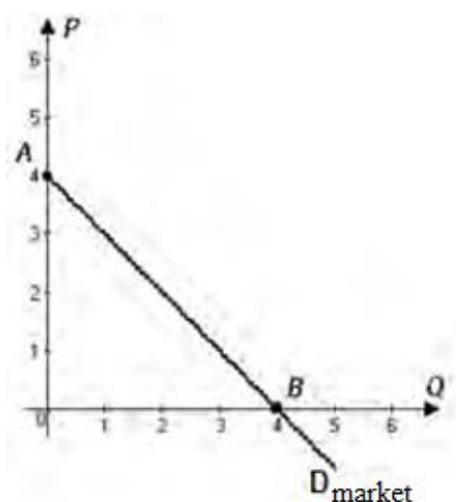
Figure 2.12 – Market Demand Curve

A special case when the graph takes the following configuration:

At point A, demand is 0 and can even take a negative value.

At point B, demand is maximum at a price of 0, and then the region of negative values.

In these cases, the following are taken into account:

1. Inability to make purchases at an inflated price.

2. Resale of a previously purchased product to other buyers.

3. Transformation of a purchased good into an anti-good.

4. Lack of willingness to make purchases even at the lowest price in conditions of complete commodity abundance.

Key concepts

Utility, cardinal approach, ordinal approach, axioms of consumer behavior, indifference curve, marginal rate of substitution, map of indifference curves, buyer's budget line, consumer equilibrium, income-consumption curve, price-consumption curve, individual demand, market demand.

TOPIC 3. MARKET BEHAVIOR OF COMPETITIVE FIRMS

1 Types of Competition and Basic Market Structures. Two methods of analyzing Market Structures
2 Perfect Competition and its main features
3 Short Run equilibrium of a Perfectly Competitive Firm. Supply Curve of a Competitive Firm
4 Long Run equilibrium of a Perfectly Competitive Firm
5 Evaluation of the effectiveness of Perfect Competition
Key concepts

1 Types of Competition and Basic Market Structures. Two methods of analyzing Market Structures

Competition is a form of clash of interests of market participants, their rivalry. The conditions in which the market struggle takes place are called the market structure.

There are two main types of market competition: perfect and imperfect.

Perfect competition is a market condition in which the producer is unable to influence the level of the market price.

Imperfect competition is a market condition in which an individual producer is able to influence the market price.

In addition, in microeconomics, within the framework of these types of competition, it is customary to distinguish special types: price, non-price, intra-industry and inter-industry.

Price competition is the actions of firms aimed at attracting buyers by setting lower prices than their competitors (dumping).

Non-price competition is the actions of firms aimed at attracting buyers by increasing the consumer value of the goods. Intra-industry competition is competition between enterprises in the region for industry prices (intra-industry cost).

Inter-industry competition is competition between producers for common production prices.

Market structure refers to the main characteristics of the market. From the point of view of competition conditions in the market, the following models are distinguished:

1. Perfect competition market.
2. Imperfect competition markets:
• pure monopoly market;
• monopolistic competition market;
• oligopoly market.

Criteria by which market structures are distinguished:

1) the number and size of firms operating in a given market (quantitative);

2) the nature of the products manufactured by the firm, that is, the production of a homogeneous (standardized) or heterogeneous (differentiated) product;

3) the nature of firms' access to the market, that is, the presence or absence of barriers to entry or exit from the market;

4) the firm's ability to influence the level of market price;

5) the presence or absence of non-price competition;

6) the nature of access to market information;

7) the ability or inability of the firm to maintain economic profit in the long term.

The analysis of any market model aims to answer the questions: What is the volume of output of the firm that allows it to maximize profits? What is the volume of output that minimizes losses? It should be noted that only in a perfectly competitive market a company cannot influence the market price, while in other markets it tends to inflate the price as a result of underproduction.

A competent economic analysis of markets and market behavior of companies can be carried out using two methods:

1. The method of comparing total values (TR - TC).

2. The method of comparing marginal values (MR - MC).

The algorithm of the first method requires the calculation of:

$$1.\, TR = P \cdot Q, \tag{3.1}$$

where TR is total revenue; P is the price of the product; Q is the quantity of goods.

$$2.\, TC = ATC \cdot Q, \tag{3.2}$$

where TC is total costs; ATC is average total costs.

$$3.\, Pr = TR - TC, \tag{3.3}$$

where Pr is profit.

The algorithm of the second method also includes the following calculations:

$$1.\, Qopt{:}\, MR = MC, \tag{3.4}$$

$$MR = \frac{\Delta TR}{\Delta Q};\ MC = \frac{\Delta TC}{\Delta Q}, \tag{3.5}$$

where MR is the marginal revenue; MC is the marginal cost.

$$2.\ Pr1\ (Ls1) = P - ATC, \tag{3.6}$$

where Pr1 (Ls1) is the profit (loss) per unit of output.

$$3.\ Pr(Ls) = Pr1(Ls1) \cdot Q, \tag{3.7}$$

During its activity in the market, a company may face various situations:

1. Profit maximization situation:
Aggregate analysis method:

$$TR > TC, \tag{3.8}$$

Marginal analysis method:

$$MR = MC, P > ATC. \tag{3.9}$$

2. Loss minimization situation:
Aggregate analysis method:

$$TVC < TR < TC, \tag{3.10}$$

where TVC is total variable costs.
Marginal analysis method:

$$MR = MC, AVC < P < ATC. \tag{3.11}$$

where AVC is average variable costs.

3. Firm closure situation:
Aggregate analysis method:

$$TR < TVC, \tag{3.12}$$

Marginal analysis method:

$$P < AVC. \tag{3.13}$$

With the help of two methods, it is possible to determine in what specific situation a company finds itself in a given market: profit

maximization, loss minimization, or a situation of company closure. This requires a clear analysis and a well-founded decision from the company. Let us show the possibilities of graphical interpretation of market situations using the example of a perfectly competitive market.

The method of aggregate values:

1. The profit maximization model (figure 3.1)
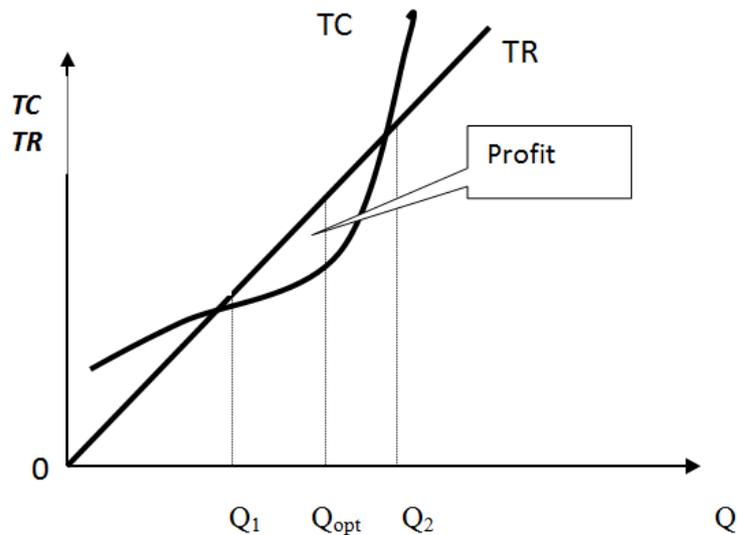
Figure 3.1 – The profit maximization model

The analysis shows that at volumes Q_1 and Q_2, total revenue is equal to total costs, TR = TC, which means that the firm has reached the break-even volume.

The interval $[0 – Q_1]$ shows the inefficient volume of production, at which, due to total fixed costs with zero revenue, the firm is at a loss (TC > TR).

The interval $[> Q_2]$ shows that at large volumes, total costs are greater than total revenue (TC > TR), therefore, the firm is at a loss.

We can find the optimal output volume Qopt in the interval $[Q_1 – Q_2]$.

The maximum distance between TR and TC is the optimal volume Qopt, at which the firm's profit is maximum.

2. Loss minimization model (figure 3.2)
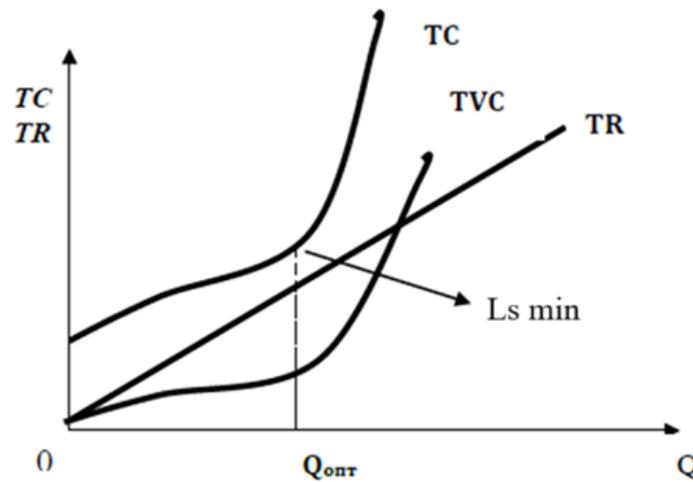
Figure 3.2 – Loss minimization case
(Qopt – loss-minimizing production volume)

This graph shows the case in which the costs of this firm are not covered by revenue.

The minimum distance between TR and TC is the optimal volume Qopt, at which the firm's losses are minimal.

3. Closing the firm (figure 3.3)
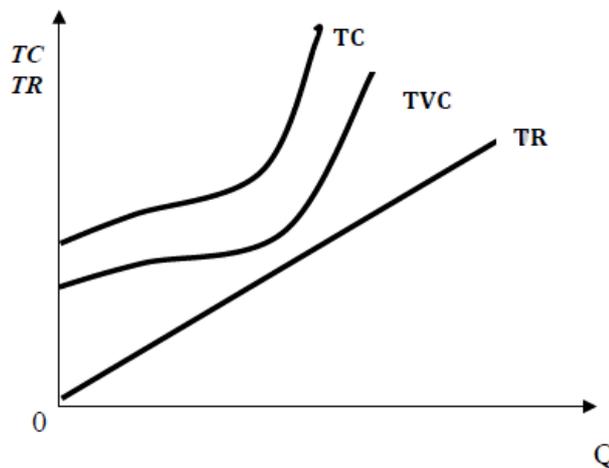
Figure 3.3 – Case of Firm Closure

If revenue does not cover total costs (TC) and total variable costs (TVC), then the firm should close. The marginal analysis method requires knowledge of the characteristics of demand for the firm's product at specific market prices. Therefore, this method should be applied to a specific market model, for example, to a ***perfectly competitive market***.

2 Perfect Competition and its main features

Perfect Competition is a market condition in which a large number of firms sell a standardized product, and none of them has a sufficient share of sales to influence the price.

Characteristics of a perfectly competitive market:

1. The market is populated by many small, sometimes medium-sized firms (small business unit space). The perfect competition model assumes the presence of 1,000 or more producers in the industry.

2. Firms produce a homogeneous (undifferentiated) product (agricultural market, stock market, foreign exchange market).

3. No barriers to entry or exit from the industry.

4. A competitive firm does not exercise control over the market price, acting as a "price taker" in the market, i.e. it accepts the market price that is set independently of it by supply and demand.

5. There is no non-price competition. Since the products are standardized, there are no differences in either design or quality of products, there is no non-price competition. All market participants have full information about market conditions.

6. Both buyers and sellers know the prices of products, profits, and the size of supply and demand.

7. The inability of a competitive firm to maintain economic profit in the long term due to the complete openness of the market.

The model of a perfectly competitive firm (figures 3.4–3.5) assumes that each individual firm making decisions faces certain constraints related to:

• costs;

• demand for the firm's output.

The demand curve faced by an individual competitive firm is perfectly elastic.

Since the firm can sell additional units of output at a constant price, its marginal revenue curve (MR), under perfect competition, coincides with its perfectly elastic demand curve.

Thus, under perfect competition, the marginal revenue and price of an individual firm's output are equal, i.e.

$$P = MR.$$
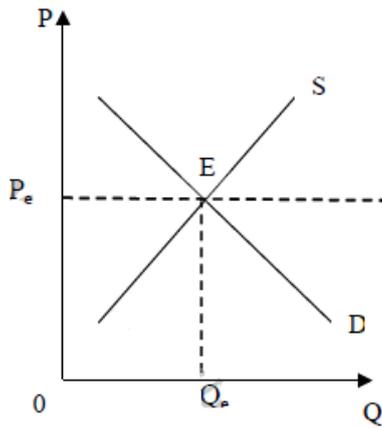
Market   Competitive firm

Figure 3.4 – Pricing in the market   Figure 3.5 – Firm's reaction
to the price formed by the market
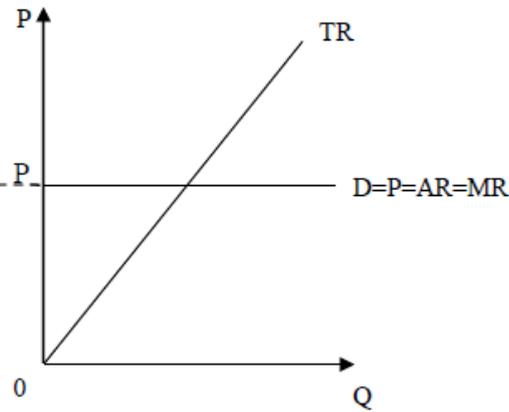
$$TR = P \cdot Q, \tag{3.14}$$

where TR is total revenue; P is price; Q is output volume;

$$AR = \frac{TR}{Q} = P, \tag{3.15}$$

where AR is the average revenue of the firm (the amount of total product per unit of output);

$$MR = \frac{\Delta TR}{\Delta Q} = P, \tag{3.16}$$

where MR is the marginal revenue.

Let's consider the possibilities of the marginal analysis method as applied to a perfectly competitive market.

With this approach, a competitive firm should compare the marginal revenue (MR) and marginal costs (MC) of each subsequent unit of output.

Since in a perfectly competitive market the price is set independently of the individual firm and is perceived by it as a given one, the firm can increase production until marginal costs equal the price of the product (MC = P). If MC < P, then production can be increased, but if MC > P, then such production is carried out at a loss and should be stopped. However, as was shown earlier, in a perfectly competitive market, price equals marginal revenue (P = MR), therefore the firm can increase production to the point where marginal costs equal marginal revenue (MC = MR). It is this point, where MC = MR, that determines the optimal volume of production. Thus,

the firm maximizes profits or minimizes losses by producing such a volume of output where marginal revenue equals marginal costs.

1. The Profit Maximization Model (figure 3.6)
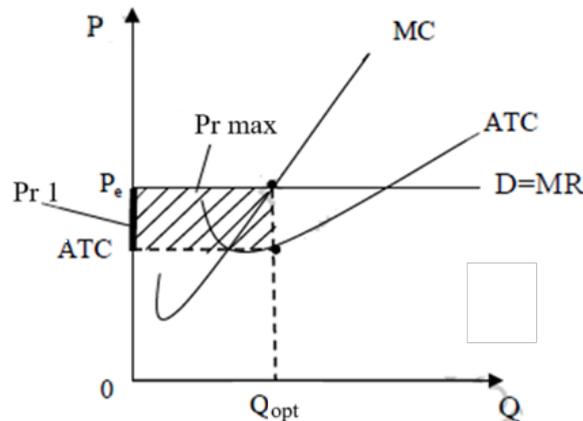
Figure 3.6 – The Profit Maximization Model

We find the intersection point of MC and MR, project it onto the quantity axis Q – this is the optimal output volume. We find the intersection point of ATC and the perpendicular, project it onto the price axis P – this is ATC. The difference between the price and the average total cost is the profit per unit of output (P – ATC = Pr1). The shaded rectangle is the maximum profit.

2. Loss minimization model (figure 3.7)
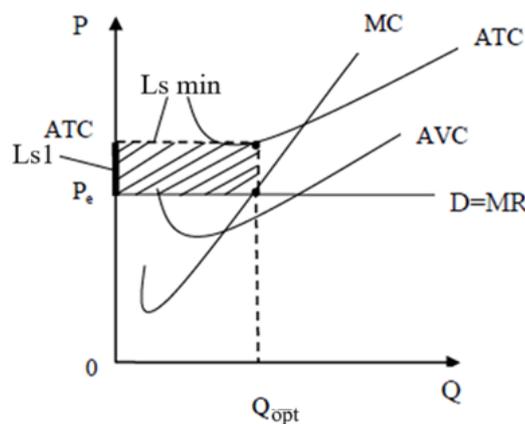
Figure 3.7 – Loss minimization model

We find the intersection point of MC and MR, project it onto the quantity axis Q – this is the optimal output volume. Then we continue the perpendicular upwards to the intersection with the ATC curve, project the intersection point onto the price axis P – this is nothing other than ATC. The difference between the price and the average total costs is the loss per unit of output (P – ATC = Ls1). The shaded rectangle is the minimum loss.

3. Closing of the firm (figure 3.8)
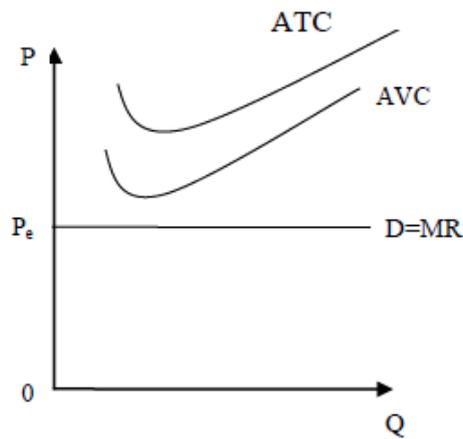
Figure 3.8 – Closing of the firm

If the price does not cover the minimum value of average variable costs $P < AVCmin$, then the firm should close.

3 Short Run equilibrium of a Perfectly Competitive Firm. Supply Curve of a Competitive Firm

In the short term, multiple equilibria in the supply and demand can occur, depending on the market price level. (figure 3.9).

The logic is as follows: when the price level increases, the firm balances the situation by increasing production volumes. Equilibrium is determined by the rule: **MR = MC**.

P1 = AVC, where AVC is average variable cost;

P2 > AVC is the situation of minimizing losses;

P3 = ATC is breakeven and normal profit;

P4 > ATC is economic profit.

The market can set the firm various of the above prices, which should be compared with production costs. Prices P1 and P3 are critical, namely: at any price below P1, supply ceases (the firm closes), and at any price above P3, the firm extracts economic profit, maximizing it. At price P2, the firm minimizes production losses. At price P3 and sales volume Q3, the firm reaches a breakeven situation, when the firm does not receive economic profit, extracting only normal profit.
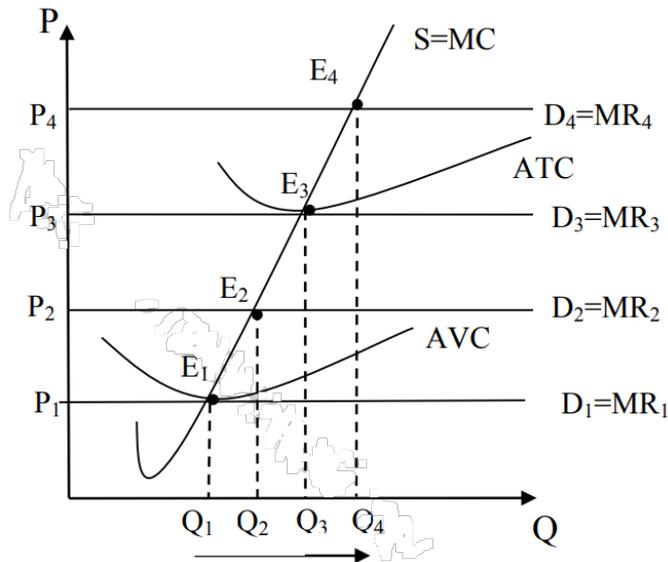
Figure 3.9 – Equilibrium of the firm in the short term

It turns out that starting from price P1 and above, the firm increases output volumes from Q1 to Q4, reaching equilibrium, respectively, at points from E1 to E4. There can be at least four such equilibria in the short term.

The supply curve of a perfectly competitive firm in the short term expresses the functional dependence of the supply volume on the change in market price. Maximizing profits or minimizing losses, a perfectly competitive firm produces up to the equilibrium point, where MC = P. A change in market price will correspondingly cause a change in the equilibrium volume of production. Consequently, this dependence (between a change in price and a change in output volume) is determined by a set of equilibrium points, i.e., the *marginal cost curve*.

Thus, the supply curve of a firm in the short term will have an upward slope and coincide with the segment of the marginal cost curve that lies above the minimum point of average variable costs.

4 Long Run equilibrium of a Perfectly Competitive Firm

In the long run, a competitive firm can make any changes with resources, including exiting the market based on economic indicators, or entering any other market (figure 3.10). A competitive firm exits the market when a low price is set in this market, which puts the firm in a situation of losses. Entry into the market is typical in the case of high prices and the extraction of economic profit. In the case of low prices, the mechanism of perfect competition acts in the direction of their increase, and in the case of high prices - in the direction of their decrease.

The question arises: will a competitive firm be able to retain the economic profit or economic loss that appeared in the short run?

Market   Perfectly competitive firm
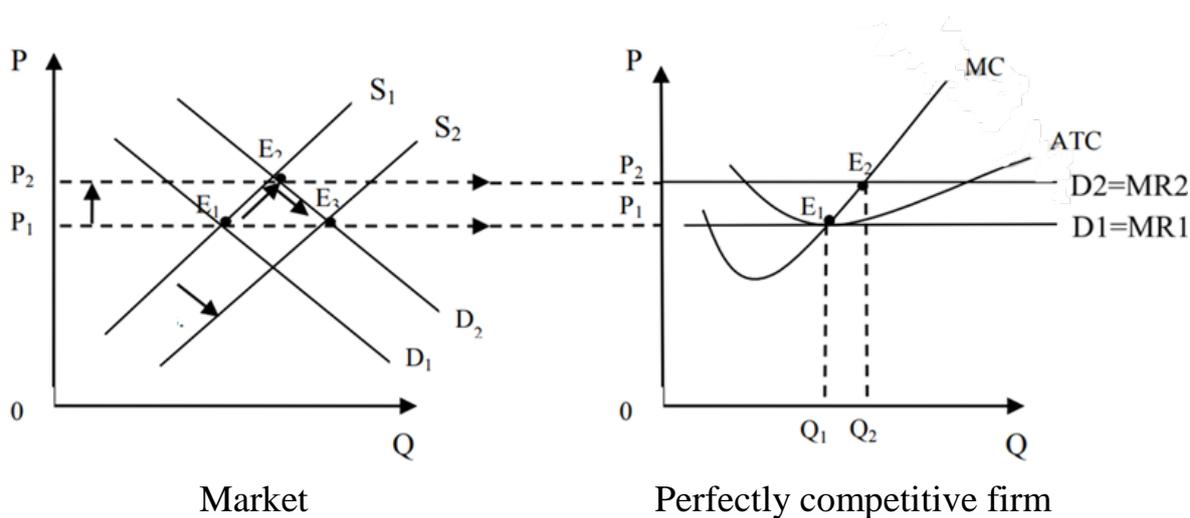
Figure 3.10 – Profit Situation in a Competitive Market

Suppose that at a given price P1 the firm has no economic profit, being content with only normal profit.

P1 = ATC (breakeven and normal profit). Suppose that there is an increase in market demand to

D2 and an increase in price to P2. At price P2 the firm makes economic profit (P2 > ATC). But the economic profit that appeared in the short term due to the increase in market demand will not be retained by the firm in the long term, since:

1) information about the economic profit will reach all interested firms,
2) a massive influx of new firms into this market is possible,
3) there will be an increase in market supply from S1 to S2,
4) the market price will fall to the level of P1,
5) the economic profit that appeared for the firm at the volume of Q2 will disappear, the firm will reduce the volume of output to Q1, reaching breakeven and retaining only normal profit.

Let's consider the situation of losses in a competitive market (figure 3.11).

Let's assume that there has been a decrease in demand in the market from position D_1 to position D_2. The price has become low, and at this price the firm does not cover total costs:

P_1 = ATC – breakeven, the firm receives normal profit; P_2 < ATC – losses.
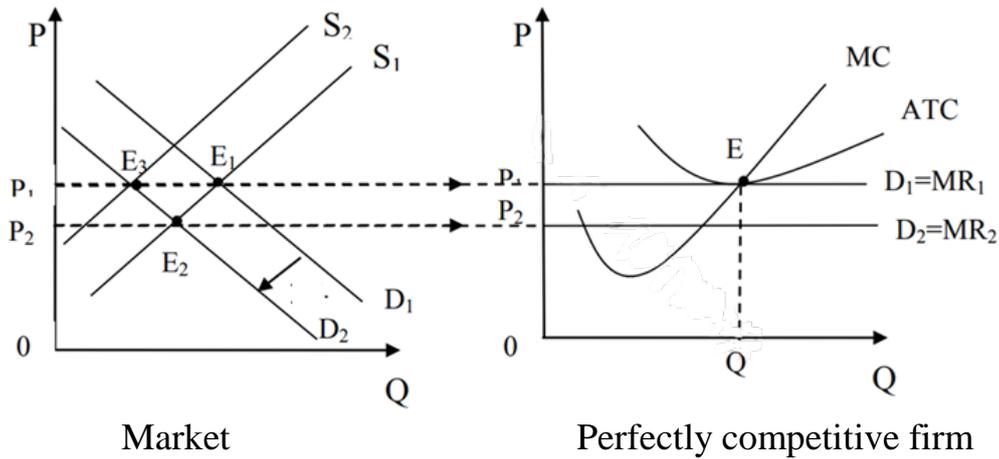
Figure 3.11 – Situation of losses in a competitive market

The losses that appeared at price P_2 cannot be preserved in the long run, because:

1. There will be a massive outflow of firms from the market.
2. The market supply will decrease from S_1 to S_2.
3. New equilibrium at point E_3 at a higher price P_1.
4. The increase in price caused the disappearance of economic losses.

The mass outflow of firms from the market caused the restoration of long-term equilibrium at point E1 at volume Q_1 and price P_1.

Thus, in the long-term period, only one equilibrium position is possible in a perfectly competitive market: *equilibrium at breakeven and normal profit* (figure 3.12).
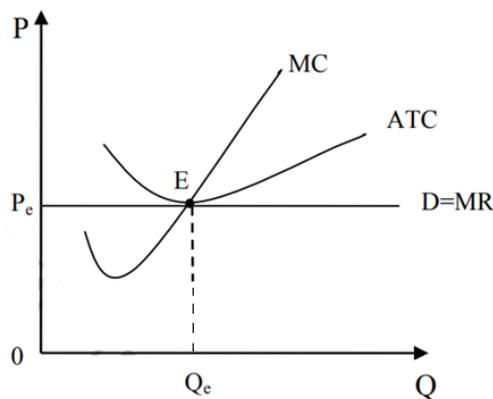
Figure 3.12 – Equilibrium of a competitive firm in the long run

The equation of long-run equilibrium in a perfectly competitive market:

$$Pe(MR) = min\ ATC = MC, \qquad (3.17)$$

From the condition of long-run equilibrium it follows:

33

1. **P = min ATC**: perfect competition promotes the expansion of production efficiency (the firm uses the cheapest production technologies, has low total costs);

2. **P = MC**: means that a competitive firm operates under conditions of socio-economic efficiency, i.e. is placed in conditions of the best distribution of limited resources.

5 Evaluation of the effectiveness of Perfect Competition

The condition of long-term equilibrium of a competitive firm is the equality of price, marginal and minimum average costs. This triple equality determines some conclusions concerning the efficiency of perfect competition.

$$Pe \ (MR) = min \ ATC = MC;$$
$$Pe \ (MR) = min \ ATC;$$
$$Pe \ (MR) = MC.$$

When evaluating, it is necessary to:

1. Identify strengths and positive characteristics: does the long-term equilibrium meet the conditions of production and social efficiency, taking into account the criterion of limited resources.

2. It is necessary to identify the shortcomings of the model being evaluated.

The model of a perfectly competitive market ensures production and social efficiency (the criterion of optimal allocation of limited resources). Equality of price and minimum average costs (Pe (MR) = min ATC) in a perfectly competitive market is a condition for production efficiency. Achieving production efficiency requires that the product be produced at the lowest cost. Production efficiency also assumes:

1 - the company uses the cheapest production technologies;

2 - uses the most productive equipment;

3 - applies the optimal scheme of division of labor and production, including management;

4 - improves the organization of production.

Equality of price and marginal cost *(Pe (MR) = MC)* in a perfectly competitive market is a condition of social efficiency. With this equality, no firm gains an advantage in obtaining resources. Efficiency of resource allocation assumes that limited economic resources are distributed between firms and industries in such a way as to obtain a certain range of products that are most needed by consumers.

In the long run, under conditions of perfect competition, a situation of "no profit, no loss" ("profit paradox") arises, which is called *Pareto optimality*. Pareto optimum exists when there is such a distribution of

resources and goods that there is no option for their redistribution that improves the situation of at least one individual, but does not worsen the situation of others.

A perfectly competitive market also has its drawbacks:

1. A perfect competitor is not able to effectively distribute income, and brings income differentiation to the extreme (social injustice).

2. Lack of control over externalities in the market.

3. Inability of the market to produce and offer a public good.

4. Inability to finance expensive research and development (R&D).

5. The market is unable to provide buyers with a wide range of purchasing choices, since it offers a homogeneous product.

Key concepts

Perfect competition, pure monopoly, monopolistic competition, oligopoly, optimal output, social efficiency, production efficiency, Pareto optimum.

TOPIC 4. PURE MONOPOLY

1 Main features of a Pure Monopoly. Types of monopoly
2 Price and Output Determination under Pure Monopoly
3 Economic consequences of Monopoly
4 Price discrimination: conditions, forms, consequences
5 Regulated Monopoly
6 Evaluation of the effectiveness of Pure Monopoly
Key concepts

1 Main features of a Pure Monopoly. Types of monopoly

Monopoly (originates from Greek words: *"monos"* meaning *"alone"* or *"single,"* and *"polein"* meaning *"to sell."*) – a market of one seller.

Pure Monopoly – a market model represented by a single producer of a unique product.

Main characteristics:

1. There is a single producer whose size is not of fundamental importance.

2. The company produces a unique product that has no analogues, that is, close full-fledged substitutes.

3. The market is protected by barriers, that is, entry into the market is blocked for many reasons: patent protection of the market, protection of the manufacturer's copyright, the company's ownership of unique raw materials, etc.

4. The monopolist is able to influence the market price.

5. Non-price competition is not typical for the market, with the exception of the costs of maintaining image (status).

6. Limited access to market information.

7. The ability of the monopolist to maintain economic profit in the long term.

As a historical phenomenon, monopoly arose in the last third of the 19th century. There are two known ways of emergence:

– on a voluntary basis (unification, cooperation of firms);

– the "absorption" path, when a stronger competitor displaces a weaker one and adds its assets to its own.

The main goal of a monopolist is to impose its conditions on the market and ensure maximum profit.

There are 5 main types of monopoly:

1. Natural.
2. Closed.
3. Open.
4. Simple.
5. Organizational.

Natural – public utility enterprises (water, gas, electricity supply companies, minimizing costs under the condition of the existence of one producer in this industry.

Closed – a monopoly protected by legislative barriers in the form of patents, licenses, copyrights.

Open – a short-term monopoly of a producer who has not protected its position in the market with special barriers. In such a situation, companies that first appeared on the market with new products often find themselves.

Simple – companies that sell their product or service at one price, not engaging in price discrimination.

Organizational – a monopoly that arises as a result of the concentration or centralization of capital. For example: a trust, syndicate, concern, etc.

2 Price and Output Determination under Pure Monopoly

For a monopolist, as well as for a perfectly competitive firm, the main goal of activity is to maximize profits. However, a monopolist always faces a specific task that does not arise for a perfect competitor – choosing a price level that must not only be set, but also maintained for as long as possible. Therefore, it is so important, firstly, to determine the volume of production, as well as its conscious limitation, since as sales increase, the price decreases; secondly, to develop and implement a pricing strategy (figure 4.1).

Figure 4.1 shows a pure monopoly model, which shows that the firm's equilibrium position is determined by point K (the intersection of MC and MR). By drawing a vertical line from point K to the demand curve D, we determine the price (P_1), which will be established at level A. The shaded rectangle shows the magnitude of monopoly profit.
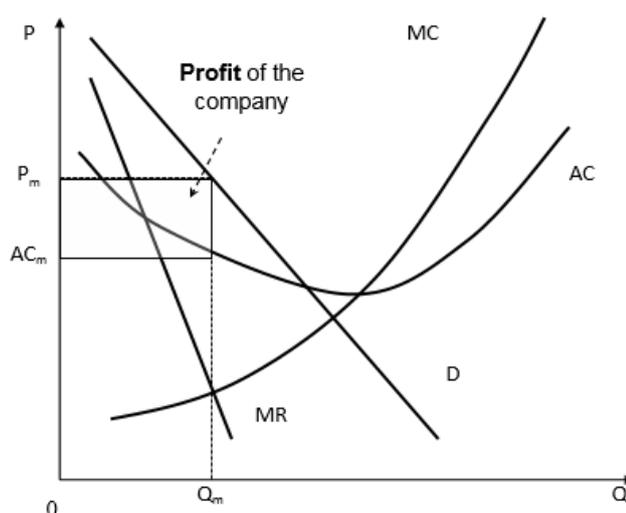
Figure 4.1 – Profit maximization by a monopolistic firm

The graphical model was constructed using the marginal method according to the following algorithm.

$$1. \, Qopt: MR = MC, \qquad (4.1)$$

$$2. \, P1 = P - ATC, \qquad (4.2)$$

$$3. \, Pr \, max = Pr \, 1 \cdot Qm, \qquad (4.3)$$

The downward-sloping demand schedule for a monopolist's product is due to the law of diminishing marginal utility in the consumption of the monopoly product. Specifically, with each additional unit consumed, the consumer's utility level decreases, forcing the producer to lower the price to increase sales of the product.

According to the calculation algorithm, the marginal revenue schedule for a downward-sloping demand schedule is always lower.

The monopolist's price Pm (figure 4.2):

1. Not the highest of all possible prices. There are much higher prices that provide higher Profit1.

However, the monopolist's primary goal in setting prices is to maximize Profit, not Pr 1.
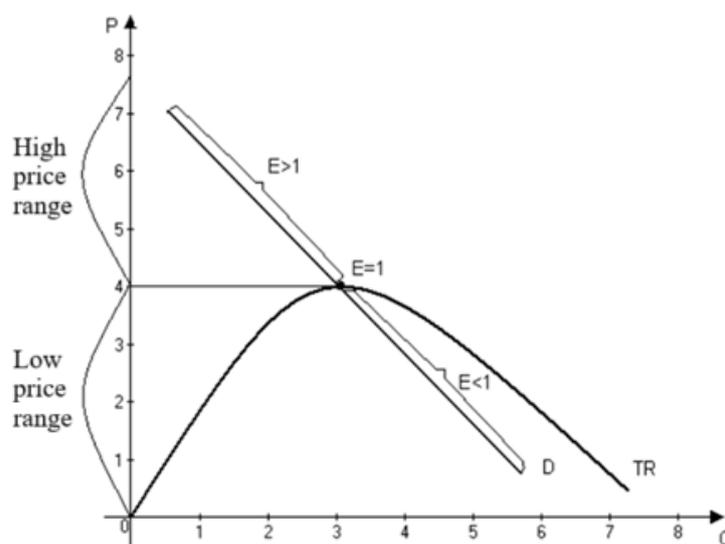
Figure 4.2 – The nature of monopolist price changes depending on the elasticity of demand

2. The monopolist's price depends on the price elasticity of demand.

P↓ E > 1→ TR ↑ – that is, the monopolist's interest is tied to the elastic segment of the downward demand curve.

3. The monopolist's price always lies in the high price range.

4. The monopolist often uses the monopolist's price as an additional barrier, protecting the market from potential competitors.

The concept of supply is meaningless for a pure monopoly market.

3 Economic consequences of Monopoly

The economic consequences of monopoly can be identified by comparing a perfectly competitive market and a pure monopoly market with different ratios of production costs in these markets.

1. ATCm = ATCc.
2. ATCm < ATCc.
3. ATCm > ATCc.

1. ATCm = ATCc (figure 4.3).
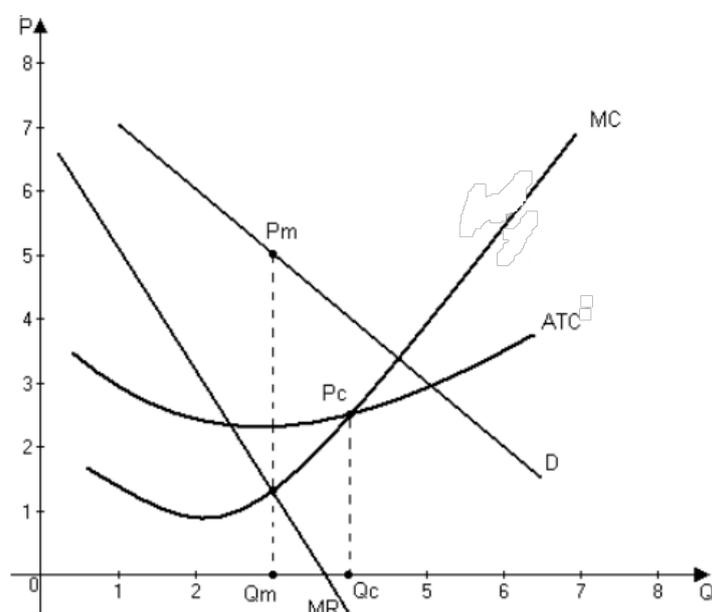
Figure 4.3 – Output and Price under Pure Monopoly and Perfect Competition

$$Pm > Pc, \qquad\qquad (4.4)$$

$$Qm < Qc, \qquad\qquad (4.5)$$

Thus, a pure monopoly market differs from a perfectly competitive market by underproduction (Qm < Qc) and inflated prices (Pm > Pc). Underproduction and inflated prices are the strategy of any monopolist in any market.

2. ATCm < ATCc (figure 4.4).

This comparison requires taking into account the analysis of production scale effects during long-run output expansion. Production scale

effects is the different nature of the relationship between the increase in output and the change in the dynamics of long-run average costs.

There are three types of returns to scale in production:

1. Positive returns to scale ($\uparrow$Q, $\downarrow$ATCL);

2. Diseconomies of scale ($\uparrow$Q, $\uparrow$ATCL);

3. Neutral returns to scale ($\uparrow$Q, ATCL = const).

Figure 4.4 – Economies of Scale in Production under Pure Monopoly and Perfect Competition

Qm > Qc;
ATCm < ATCc.

The monopolist fully realizes positive economies of scale, demonstrating the advantages of large-scale production.

3. ATCm > ATCc.

In this case, the reasons for the monopolist's higher costs may be:

1) "X-inefficiency";

2) advertising expenses.

"X-inefficiency" is a market situation in which actual costs are higher than the maximum allowable for a given output volume. The main reason is the absence or insignificant competition in the market.

"X-inefficiency" is more characteristic of a monopoly market than a perfectly competitive market.

Advertising expenses are incurred by a monopolist seeking to promote its presence in order to renew its licensed activity. These are advertising expenses not for the product itself, but for the reputation, image, and good intentions of the monopolist itself. Advertising costs are a factor in inflated costs and prices.

4 Price discrimination: conditions, forms, consequences

Price discrimination is the practice of selling the same product to different buyers at different prices, whereby the difference in prices offered to buyers is independent of differences in production costs.

Conditions for price discrimination:

1. The producer must have market power, setting different price levels.

2. The producer must control the market, preventing resale of products.

3. The producer must be able to differentiate buyers based on the price elasticity of demand, charging higher prices to buyers with inelastic demand and lower prices to buyers with elastic demand.

Three _types of price discrimination_ are commonly distinguished:

1. First-degree price discrimination, or perfect price discrimination (figure 4.5).

Each buyer is charged a price that corresponds to their purchasing power (income). The monopolist sells each unit of a good to each buyer at their reservation price, that is, the maximum price the consumer is willing to pay for the good. This means that all consumer surplus is appropriated by the monopoly, and the marginal revenue curve coincides with the demand curve.

2. Second-degree price discrimination, which involves setting different prices depending on sales volume (figure 4.6).

3. Third-degree (segmented) price discrimination is a situation where a monopolist sells goods to different groups of buyers with different price elasticities of demand (figure 4.7). This situation requires market segmentation, that is, the formation of groups of buyers based on their ability to pay. Thus, the monopolist creates "high-end" and "low-end" markets.
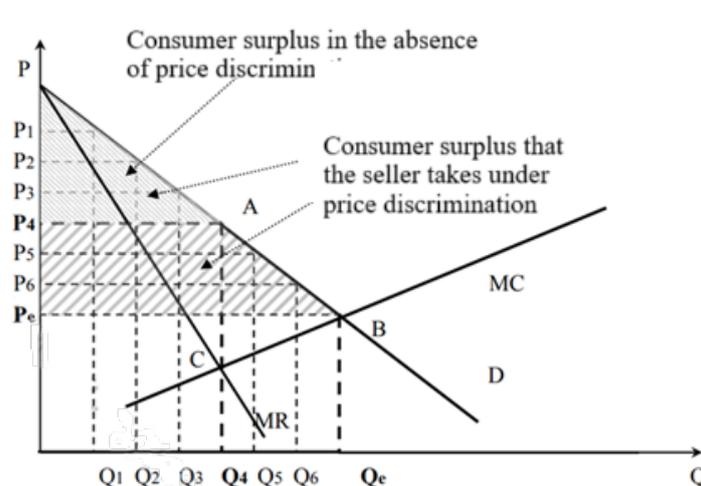
Figure 4.5 – Output and Price of a Pure Monopoly with First-Degree Price Discrimination

Figure 4.5 shows the distribution of consumer and producer surplus under perfect (first-degree) price discrimination. Prices P_1, P_2, ..., P_6 are reservation prices, reflecting the maximum willingness of buyers to pay for quantities Q_1, Q_2, ..., Q_6. In the absence of price discrimination, the monopolist will sell a quantity of Q_4 at a price of P_4. All buyers pay the equilibrium market price of P_4, resulting in consumer surplus proportional to the area of the shaded triangle. Under perfect price discrimination, the firm will sell the first portion of Q_1 for P_1, the second portion of Q_2 for P_2, and so on. As a result, each consumer will pay the maximum price they are willing to pay for the product. All consumer surplus accrues to the selling firm.

Under perfect price discrimination, the monopolist's marginal revenue function coincides with the demand function for its product. As a result, the equilibrium sales volume, which maximizes the firm's profit, will increase from Q_4 to Qe. New buyers, for whom the price of P_4 was too high, will enter the market. This will create additional consumer surplus (proportional to the area of the shaded trapezoid), which will also accrue to the seller.

Thus, the efficiency consequences of price discrimination are twofold. On the one hand, consumers are worse off, as they are deprived of the opportunity to extract their surplus. On the other hand, the consumer surplus accrues to the seller, improving their welfare. Furthermore, sales increase and reach the optimal volume (at a price equal to marginal cost).

If social welfare is represented as the sum of consumer and producer surplus, it will increase as a result of price discrimination by an amount equivalent to the area of triangle ABC.
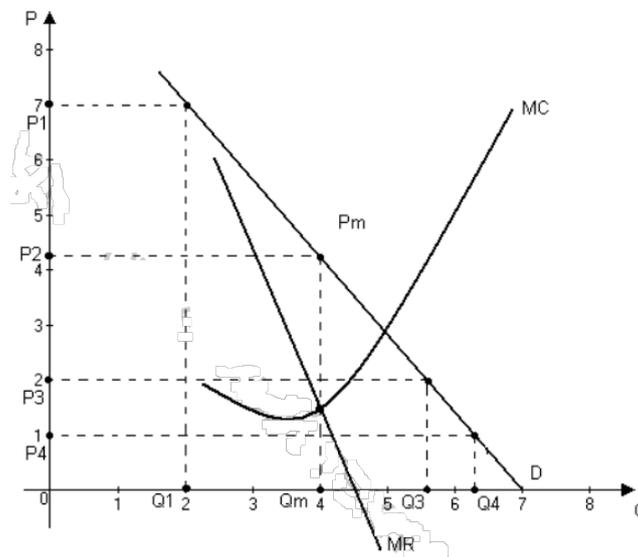
Figure 4.6 – Output Volume and Price of a Pure Monopoly with Second-Degree Price Discrimination

Second-degree price discrimination is most effective when there are positive returns to scale, when ATC↓, and it is this type of price

discrimination that is actively supported by the government. The monopolist lowers prices for customers who increase their purchase volumes.

The economic consequences are the same as with first-degree price discrimination.

Third-degree price discrimination (price discrimination in segmented markets) involves dividing consumers into groups and setting different prices for each group. Examples include: selling similar products at different prices under different brands; selling airline tickets of different classes at different prices, etc. Figure 4.7 illustrates an example of third-degree price discrimination.
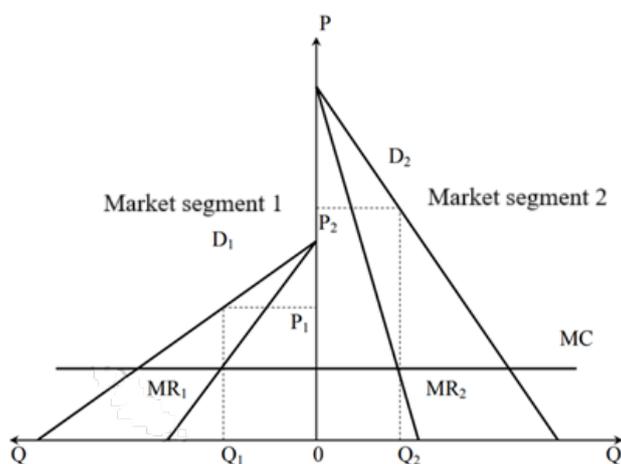
Figure 4.7 – Price Discrimination in Segmented Markets

For example, there is a category of consumers with relatively low purchasing power (market segment 1) and a category of consumers with relatively high purchasing power (market segment 2). Each market segment has its own demand and marginal revenue function for the seller. The product sold in both market segments is virtually identical. Some differentiation is possible, for example, varying the quality of service for passengers in different classes on an airplane, but such differentiation usually has little impact on costs.

Thus, production costs are similar in both market segments. The sales volume of a product in segments 1 and 2 is determined by the intersection of the graphs of the marginal revenue functions MR_1 and MR_2 and the graph of the marginal cost function MC, respectively. By projecting sales volumes Q_1 and Q_2 onto the demand functions D_1 and D_2, we can determine the optimal prices P_1 and P_2 for the first and second categories of consumers.

It is profitable for the firm to sell its product in the second market segment at higher prices than in the first. Setting the same high prices for buyers in the first segment as for buyers in the second segment is ineffective – they won't be able or willing to pay that much, or the number of buyers will be very small. Targeting only consumers willing to pay high prices is

unprofitable for a company, as demand will be too small. Setting low prices for everyone will increase demand, but to a lesser extent than the price reduction, and the company's revenue will be lower than with price discrimination.

Thus, segmented price discrimination clearly demonstrates a positive effect for the manufacturer due to:

1. A large increase in sales volume in the second segment, where buyers with elastic demand are offered lower prices.

2. An increase in profits due to a price increase in the first segment for buyers with inelastic demand.

3. A slight decrease in sales volume in the first segment.

4. A slight decrease in profits due to a price reduction in the second segment. It turns out that the monopolist overall benefits from price discrimination against buyers with inelastic demand.

5 Regulated Monopoly

Manifestations of monopoly are classified as so-called market imperfections and serve as a justification for government intervention in the activities of monopolies. The government can pursue antitrust policy in two main ways: by stimulating competition where possible and by regulating monopolies in industries where competition is problematic.

A natural monopoly is subject to regulation using the following instruments:

1. Fixing prices for the monopolist's product, namely: establishing "price scissors" (fixing upper and lower price levels); pricing rules; legislatively defining the price structure; using increasing or decreasing price coefficients, etc.

2. Setting production quotas – legislatively defining output volume or sales volume.

3. Defining the geographic boundaries of sales markets.

4. Government control over mergers, acquisitions in the industry, and the purchase and sale of securities.

Price fixing is the most active regulatory tool. The question arises: at what level should the monopoly set its price?

The monopolist itself would prefer to set the price Pm and the sales volume Qm. The optimal price, from the standpoint of resource allocation efficiency, is to set prices at the marginal cost level (price level P1 in figure 4.8). This would result in a sales volume of Q1. However, at this level, the average cost ATC1 would exceed the price level, meaning the firm would become unprofitable (in figure 4.8, the loss is represented by the area of the shaded rectangle). To prevent the firm from going bankrupt, the government would have to subsidize it.
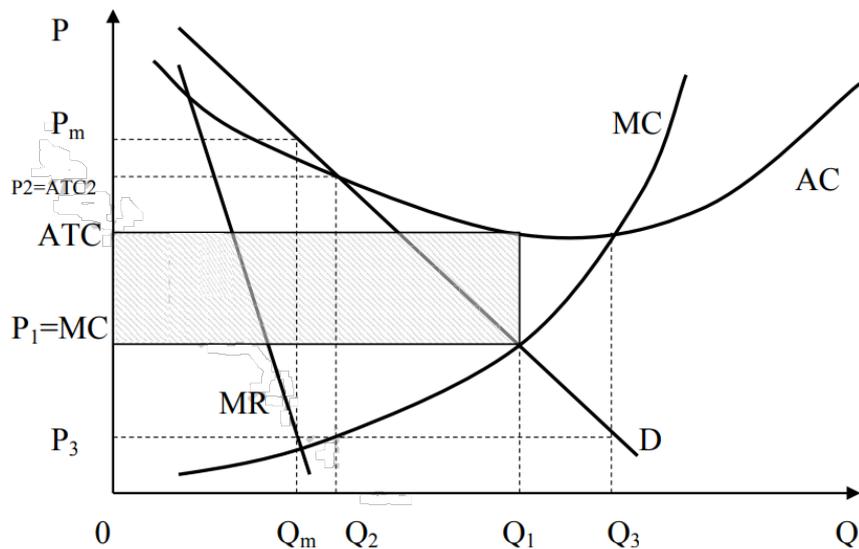
Figure 4.8 – Regulated Monopoly

If the government is unwilling to subsidize the monopolist, it can set prices at a level that covers average costs ($P_2 = ATC_2$ in figure 4.8). This will result in sales volume Q_2, which is less than the optimal volume in terms of resource allocation efficiency, but greater than the monopoly volume Q_m. With average-cost pricing, firms may be tempted to increase their costs in order to extract higher prices from the government. Firms begin to operate inefficiently, fail to utilize available cost-cutting opportunities, and are reluctant to implement new technologies.

This creates a situation of X-inefficiency – inflated costs regardless of output volume. X-inefficiency is not unique to monopolies, but it is most pronounced in the absence of competition – the less firms fear competitors, the less they "try" to operate efficiently.

The example in figure 4.8 shows that, no matter what price the government sets for a monopolist's product, it is impossible to simultaneously achieve all efficiency conditions. From the standpoint of production efficiency, a quantity of a product should be produced to minimize average costs, and the product should be sold at a price equal to average costs. In figure 4.8, this quantity is Q_3. However, this quantity can only be sold at a price of P_3, which is much lower than average costs and very unprofitable for the firm. Setting the price at average costs, however, will prevent the firm from selling a volume sufficient to minimize average costs.

Thus, when regulating a monopoly, there are three "suboptimal" price levels: P3, which minimizes production costs; P_2, at which the firm breaks even (earns only normal profit); and P_1, at which resources are efficiently allocated within the industry. Unlike in perfect competition, these three price levels do not coincide, so even with government regulation of a monopoly, the economic optimum cannot be achieved. The government's choice

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between prices is called the regulatory dilemma. This choice depends on many factors:

1. The characteristics of the market in which the monopolist operates.
2. The level of development of the national economy.
3. The state of the government budget (deficit or surplus).
4. The level of government debt and debt payments.

6 Evaluation of the effectiveness of Pure Monopoly

The efficiency of a pure monopoly is assessed by comparing the pure monopoly market with a perfectly competitive market, based on the condition of long-run equilibrium in a perfectly competitive market (figure 4.9).

$$Pe = min\ ATC.$$

Pm > Pc
1. Pe = min ATC → PE (production efficiency).
2. Pe = MC → CE (social efficiency).

The efficiency of a given market structure from a social welfare perspective is considered in two aspects: as production efficiency and as resource allocation efficiency (allocative efficiency). Based on this approach, one can identify the negative and positive aspects of the market.
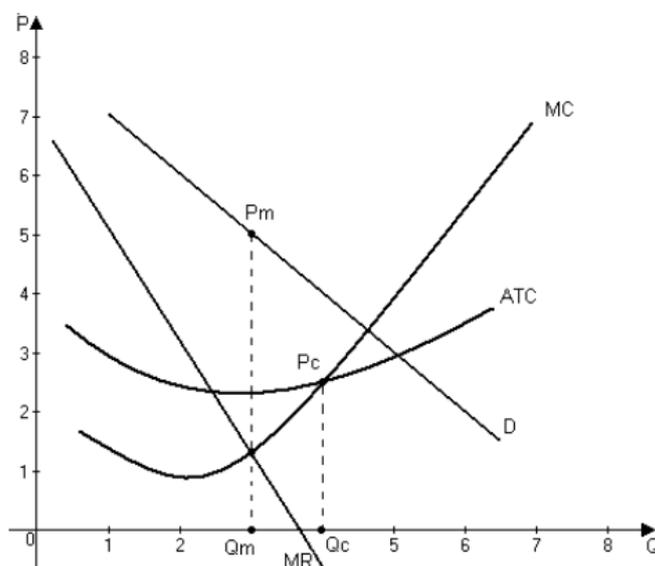
Figure 4.9 – Output Volume and Price under Pure Monopoly and Perfect Competition

Disadvantages of a pure monopoly:
1. Optimal utilization of scarce resources is not ensured, i.e., Pe is not achieved (Pm > min ATC). Production efficiency is associated with firms in the industry achieving equality between price and minimum average cost. Efficiency is achieved if:

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- first, production is carried out using technologies that allow for the lowest production costs, i.e., the product is produced in the most efficient manner;

- second, the product is sold at the lowest possible prices, i.e., prices that merely cover the sellers' average costs but do not allow for any economic profit above normal.

Typically, competition between sellers leads to such price levels. This may not be the most profitable option for sellers seeking to maximize profits, but it is the most favorable option for society, allowing for the lowest possible prices for the product.

2. Optimal allocation of scarce resources is not achieved (Pm > MC). Allocative efficiency is associated with the equality of a product's price and its marginal production costs. It assumes that:

- the resource costs required to produce an additional unit of output should not exceed the price of that unit;

- production should not be carried out by firms with marginal production costs that exceed the price;

- a firm should increase production volumes until the last (marginal) unit of output generates revenue equal to its production costs.

In a competitive industry, marginal costs characterize firm supply, while price characterizes consumer demand. Equality of price and marginal costs corresponds to equality of supply and demand in the market. In other words, the market will sell the quantity of a product at the price that optimally balances the capabilities of producers and the desires of consumers.

Firms always choose the volume of production that maximizes profits, and mathematically, maximum profits are observed when marginal costs and marginal revenues are equal. However, in a perfectly competitive market situation, the price of a product and the marginal revenues of firms are equal, resulting from the perfectly elastic demand for each individual firm's product.

In the absence of perfect competition in an industry, the above efficiency conditions will not necessarily be met. If demand for an individual firm is not perfectly elastic (which is typical of a monopoly), then the price of the product will not coincide with marginal revenue, and a firm maximizing its profits will equate marginal costs with marginal revenue, but not with the price of the product. Production volumes will not necessarily be optimal for society.

3. The presence of some manifestation of "X-inefficiency" in the market.

4. Lack of incentives for scientific and technological progress.

Positive aspects of a pure monopoly:

1. The presence of economic profit allows for the financing of expensive R&D (research and development).

2. The monopolist is able to extract economies of scale from large-scale production, i.e., is able to realize positive economies of scale.

3. Savings on information costs associated with the producer's monopoly position in the market; i.e., the producer's name itself provides comprehensive information about its product.

Key concepts

Pure monopoly, natural monopoly, closed monopoly, open monopoly, regulated monopoly, price discrimination, "X-inefficiency," resource allocation efficiency (allocative efficiency), production efficiency.

TOPIC 5. MONOPOLISTIC COMPETITION

1 Main Features of Monopolistic Competition
2 Short Run equilibrium of a firm under Monopolistic Competition
3 Long Run equilibrium of a firm under Monopolistic Competition
4 Non-Price Competition and Its Costs
5 Evaluation of the effectiveness of Monopolistic Competition
Key concepts

1 Main features of Monopolistic Competition

Monopolistic Competition is a market structure consisting of many small firms producing heterogeneous products and enjoying free entry and exit. Monopolistic competition is characterized by the production of differentiated products and the presence of non-price competition. The market is similar to perfect competition due to the large number of producers, and to a monopoly due to the ability to influence market prices within its price segment.

The theory of "monopolistic competition" was discussed by the American philosopher Chamberlain in his book "The Theory of Monopolistic Competition" and the Englishwoman Joan Robinson in her book "The Economics of Imperfect Competition."

Characteristics that distinguish monopolistic competition from other types of competition include product differentiation, the presence of multiple sellers, and competition based on non-price factors. Monopoly in this model is based on product differentiation but is limited by a large number of competitors.

The characteristics of a monopolistic competition are:

1. A large number of small, medium, and large producers (more than 20) operate in the market, which:

• On the one hand, eliminates the possibility of collusion and concerted actions between firms to limit output and raise prices;

• On the other hand, prevents firms from significantly influencing market prices.

2. Firms produce a heterogeneous, differentiated product, that is, a variety of substitute goods. Product differentiation is the diversity of consumer conditions and marketing qualities, including style, packaging, sales conditions, services, cross-selling, retailer location, and advertising promotion. Differentiation allows for a certain degree of market isolation for individual firms through price differences between substitutes, thereby creating the preconditions for price control (shoe, clothing, detergent, hotel, and other markets).

Product differentiation can be based on:
• physical characteristics of the product;

• services and terms associated with product sales (service, delivery, warranty);

• product placement and availability (supermarkets with lower prices and small shops on busy streets with high prices);

• "imaginary" differences related to packaging, branding, company image, and advertising.

Differentiation is sometimes divided into horizontal and vertical:

• vertical differentiation is based on dividing products by quality or some other similar criterion, conventionally into "bad" and "good";

• horizontal differentiation assumes that, at approximately equal prices, the buyer categorizes products not as good or bad, but as appropriate or inappropriate to their taste (e.g., choosing a car – Volvo or Alfa Romeo).

3. The market is not protected by specific barriers; however, entry barriers may be created by well-known trade names, factory trademarks, trademarks, well-known brands, and familiar logos.

4. A company can influence market prices to the extent that it has managed to clearly differentiate its product, that is, imbue it with unique quality and properties.

5. Non-price competition is becoming a typical market phenomenon, which can be implemented in the following main areas:

• tangible improvements in product quality and consumer properties;

• offering more attractive terms to buyers during sales, such as installment plans, credit, or free access;

• providing customer services: warranty and post-warranty support;

• extensive advertising campaign: branding;

• a more advantageous location of the company relative to sales markets, etc.

6. Access to information is free. Due to the openness of the market, long-term equilibrium is achieved at breakeven, but the possibility of achieving economic profit through non-price competition remains.

2 Short Run equilibrium of a firm under Monopolistic Competition

Product differentiation allows a monopolistically competitive firm to control its price within certain limits. In other words, the demand curve for its product is downward-sloping. Possessing a certain amount of monopoly power, the extent of which depends on its success in differentiating its product from those of other firms, a monopolistic competitor is a price-seeker and seeks to set a profit-maximizing price.

Demand for the products of firms operating under monopolistic competition is fairly elastic, but still declining (since market power is low). The demand curve is flatter than that of a pure monopoly because consumers can more easily switch to substitute products when prices rise. The greater

the number of competitors and the weaker the product differentiation, the more elastic the demand curve for each seller, meaning the closer the situation will approach perfect competition and the less market power will each firm have.

The first step in analyzing the monopolistic competition model is to examine the decision-making process of an individual firm. Every firm in a monopolistic competition market is in many ways a monopoly. Because its product differs from those produced by other firms, it faces a downward-sloping demand curve. A monopolistically competitive firm follows the profit-maximizing rule and chooses the output volume at which marginal revenue equals marginal cost (MR = MC), then uses the demand curve to set a price corresponding to this volume.

Firms in monopolistic competition can either make a profit or incur a loss in the *short run*.

a) Profit Maximization Model (figure 5.1)

We find the optimal output in a monopolistic competition market using the rule MR = MC. We find the intersection of ATC and the perpendicular and project it onto the price axis P – this is ATC. The difference between price and average total cost is the profit per unit of output (P_1 = Pmc – ATC). The shaded rectangle is the maximum profit (Pr max = P1 * Q).
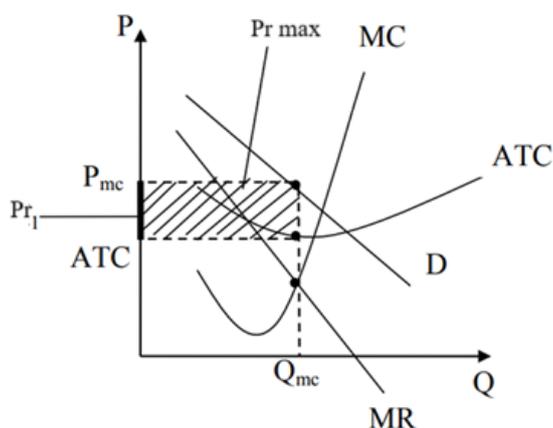
Figure 5.1 – Profit Maximization Model for Monopolistic Competition

If firms earn economic profit in the short run, this encourages new competitors to enter the market, leading to an increase in the number of products offered and a decrease in demand for all rival firms. As demand for the products of existing firms falls, the price decreases and, consequently, the level of economic profit.

b) Loss Minimization Model (figure 5.2)

We find the intersection of MC and MR and project it onto the quantity axis Qmc – this is the optimal output. Next, we extend the perpendicular upward until it intersects with the ATC curve, projecting the intersection point onto the price axis P – this is ATC. The difference between price and

average total cost is the loss per unit of output (Ls1 = ATC – Pmc). The shaded rectangle represents the minimum loss (Ls = Ls1 * Q).
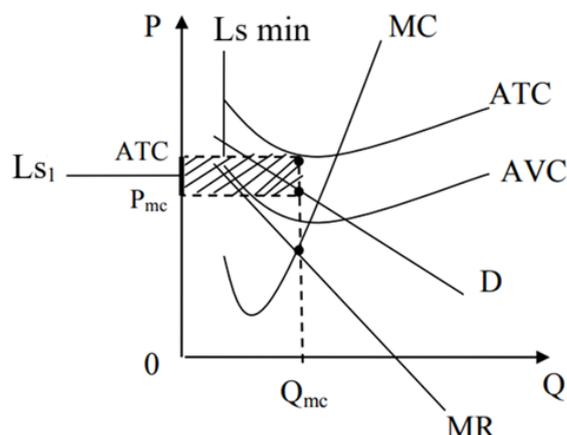
Figure 5.2 – Loss Minimization Model for Monopolistic Competition

Short-term losses incurred by firms prompt them to exit the market. As some firms exit the market, the number of product types available decreases; the reduction in the number of firms leads to increased demand for the products of the remaining firms. As demand for the products of the remaining firms increases, losses decrease.

3 Long Run equilibrium of a firm under Monopolistic Competition

In the long run, a firm in a monopolistic competition market faces the problem of excess capacity, which means that firms offer slightly less than the optimal output and set slightly higher prices than they should for a given volume. In this market, buyers do not benefit from the highest production volumes and lowest prices; in fact, buyers suffer from underutilized capacity, as this significantly increases average production costs and, consequently, market prices.

In the long run, there is a tendency toward normal profits, or, in other words, breakeven. The long-run equilibrium of a firm in a monopolistic competition market is represented graphically (figure 5.3):

P   MC

P_{mc}

min

ATC

D

0

Q_{mc} Q

MR
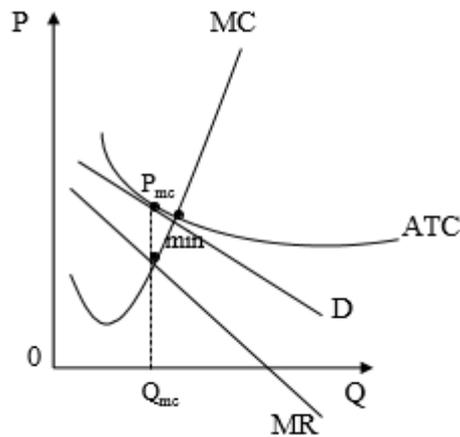
Figure 5.3 – Long-run equilibrium in a monopolistic competition market

The conditions of monopolistic competition, when establishing equilibrium in the long run, differ from those of perfect competition.

First, some firms can create and patent a product with unique properties, thereby gaining an advantage over their competitors for a considerable period of time.

Second, individual firms can locate in geographically advantageous locations for their business, allowing them to consistently generate economic profits (motels, service stations, restaurants, shopping malls, etc.).

Third, innovation and the use of advanced technologies can allow a firm to gain a long-term competitive advantage.

Finally, the barrier to entry for new firms can be raised by additional financial investments associated with product differentiation and sales promotion. On the other hand, conditions under which a firm earns below-normal profits can persist for a long time. Therefore, under monopolistic competition, market forces are not strong enough to consistently maintain prices in line with short- and long-run average costs. However, these forces can determine the limiting tendency and, in the long run, curb losses for monopolistically competitive firms.

Thus, monopolistic competition is distinguished from perfect competition by two key factors:

1) the presence of significant capacity;

2) markup.

Firms will strive to improve their position and achieve economic profit in the long run through non-price competition.

Non-price competition methods include:

– product differentiation and improvement;

– advertising.

4 Non-Price competition and its costs

Under monopolistic competition, the pursuit of long-term profitability is more of a tendency. In reality, firms can generate economic profits over a relatively long period. This is achieved through the use of non-price competition methods (product differentiation and improvement, advertising, trademarks, etc.).

One of the most common tools of non-price competition is advertising.

Advertising is a means of communicating information to a target audience with the aim of motivating them to take certain actions and forming certain attitudes.

According to its object, advertising is divided into:

- commercial, aimed at stimulating the sale of goods and services;

- social, aimed at achieving charitable and other socially beneficial goals, as well as ensuring the interests of the state;

- political, carried out by political parties and candidates as part of the electoral process.

By method, advertising has many varieties: television and radio advertising; print (in the press and as leaflets); outdoor (in the form of billboards, signs, etc.); Online advertising; direct mail advertising; public transportation advertising, etc.

Hidden advertising is information that is not labeled as advertising, disguised as non-advertising information, but functions as advertising.

The concepts of counter-advertising (as a refutation of false advertising) and anti-advertising (as a means of discrediting competitors' products and services) are also distinguished.

Non-price competition has two advantages over price competition:

1. In a diverse product landscape, product quality, in the eyes of the buyer, is more important than price appeal.

2. In today's marketplace, non-price competition is often less expensive than price competition.

In this context, the product's image, ingrained in the consumer's mind, is of great importance. The product becomes a brand, meaning an emotional and intuitive image of the product exists in the buyer's imagination. If a positive image is created, the buyer is willing to pay more.

The process of brand formation is quite complex, as it is influenced by many factors: the nature of needs, traditions, culture, prejudices, information from other sources, PR efforts by manufacturers, and advertising.

The role of non-price competition and advertising in society is assessed in two ways in economic literature. Two approaches to this assessment are distinguished.

1. *The pro-competitive approach* is one that gives a positive assessment of non-price competition and advertising:

- advertising provides information that facilitates reasonable, rational choices;
- advertising contributes to the financing and support of national communications media (radio, television, magazines, etc.);
- advertising stimulates product change;
- effective advertising contributes to the expansion of production;
- advertising is a force for maintaining competition, as it provides information about substitutes that help weaken a firm's monopoly power;
- advertising promotes greater employment, including by promoting the development of advertising agencies, design centers, etc.

2. **The anti-competitive approach** is one that focuses primarily on the negative role of advertising in society:
- advertising can be misleading when it provides false information;
- advertising expenditures are unproductive for society, and therefore constitute a form of diversion of scarce resources from the real sector of the economy;
- advertising contributes to numerous negative externalities: roadside landscapes deteriorate, and rural areas are damaged;
- advertising triggers a self-neutralizing effect, meaning that as a result of excessive advertising, consumers stop paying attention to it, and each firm maintains the same market share as before advertising, but with higher costs and prices (detergents, pharmaceuticals);
- advertising contributes to the strengthening of monopoly power in the market by fostering consumer loyalty to the firm's product.

5 Evaluation of the effectiveness of Monopolistic Competition

We assess the effectiveness of monopolistic competition based on the model of long-term equilibrium in the monopolistic competition market (figure 5.4).
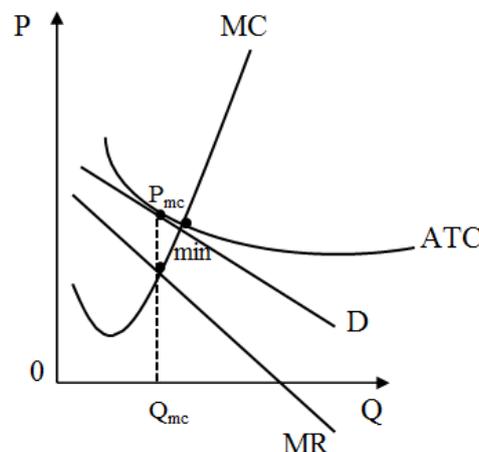
Figure 5.4 – Long-Run Equilibrium in a Monopolistic Competition Market

For the economic analysis to be accurate, the price level of a monopolistic competition market (Pmc) must be compared with the price level of a perfectly competitive market (Pc).
- condition of production efficiency:

$$Pc = min\ ATC,\qquad(5.1)$$

$$Pmc \neq min\ ATC,\qquad(5.2)$$

where min ATC is average total cost;
- condition of social efficiency:

$$Pc = MC.\qquad(5.3)$$

Based on the analysis, the following conclusions can be drawn about the ***negative characteristics of a monopolistic competition market***:

1. Production efficiency is not achieved in the market, since **Pmc ≠ min ATC**, indicating inefficient resource utilization in the industry.

2. Pmc ≠ MC, meaning social efficiency is not achieved. This implies that resources are inefficiently allocated in the industry, due to the monopolistic competitor's market power.

3. Efficiency losses occur in the market due to excess capacity, which indicates that there are more firms operating in the industry than necessary; fewer firms in the industry could offer output Qmc at much lower prices.

Positive aspects of monopolistic competition:

1. Providing consumers with a wide range of differentiated product choices.

2. Positive assessments of non-price competition advertising by proponents of the pro-competitive approach.

Key concepts

Monopolistic competition, excess capacity, non-price competition, advertising, product differentiation, brand.

TOPIC 6. OLIGOPOLY

1 Main features of Oligopoly
2 Typology of Oligopoly Models
3 Kinked Demand Curve model of Oligopoly
4 Indicators of monopoly power and Antitrust Legislation
5 Evaluation of the effectiveness of Oligopoly
Key concepts

1 Main features of Oligopoly

Oligopoly (from ancient Greek, combining *oligos* (ὀλίγος), meaning "few," and *pōlein* (πωλέω), meaning "to sell,") is a market model in which several producers engage in strategic interactions, demonstrating cooperative or non-cooperative behavior, especially in pricing.

Key characteristics:

1. The market is comprised of several (2 to 20) large and very large producers.

Since there are few firms, then:

• Strategic interactions between firms are inevitable in the market—a tendency to cooperate, especially in pricing. When pursuing its competitive strategy, a monopolist must consider the behavior and reactions of competitors.

• The propensity of monopolists to cooperate makes oligopolistic prices relatively stable.

• Depending on the degree of interdependence, oligopolists can pursue either a cooperative strategy (colluding) or a non-cooperative strategy (not colluding).

2. Oligopolists can offer both homogeneous (nickel, oil, and gas production) and differentiated products (televisions, computers, refrigerators, automobiles, etc.).

3. The market is protected by barriers, the most important of which are: significant economies of scale, various legislative barriers (patent and others), monopolies in resource markets, as well as collusion between firms, mergers, and acquisitions.

4. Oligopolists are able to influence prices. Moreover, the propensity for joint action in the pricing process makes oligopolistic prices more stable and unchangeable than in any other market.

5. Oligopolists, producers of differentiated products, actively engage in non-price competition, typically related to genuine improvements in products, technologies, etc.

6. Access to market information is restricted and limited.

7. Oligopolists are capable of extracting economic profits in the long term.

Of all the characteristics of an oligopoly, the following key features deserve special mention:

1. Strategic interaction between firms.
2. Relative stability of oligopolistic prices.
3. Lack of a single (generally accepted) oligopoly model.

2 Typology of Oligopoly models

1. 1838 – Cournot's theory of oligopoly.

This is the first attempt to analyze oligopoly and duopoly markets (two producers in a market) under the assumption that competitors do not respond to price changes by the leading oligopolist. Cournot assumed:

• Each oligopolist seeks to sell the volume of output that maximizes its profit.

• For any market, there is a specific and stable equilibrium between sales volume and product price.

• The sales price level is determined by the number of sellers in the market; that is, the more sellers there are, the lower the price will be, and vice versa.

Advantage of the model: the very formulation of the question of oligopolistic relationships between firms.

Disadvantage of the model: the assumption that competitors do not respond to price changes made by one of the firms in the industry.

2. The Kneeling Demand Curve Theory (Hall, Hitch, Sweezy) – 1939.

The authors studied the oligopoly market, assuming that competitors necessarily respond to price changes in the industry. As a rule, any price reduction was supported and any price increase was not supported.

Strength of the model: it assumes that oligopolists respond to price changes.

Weakness of the model: it does not explain how prices are initially set in the market.

3. 1944 – Game Theory (Neumann, Morgenstern).

Game theory is a theory that models, in the form of a game, the choices made by interdependent actors with different interests from a given set of behavioral strategies, taking into account the reactions of their rivals.

4. Theory (model) of collusion.

Collusion between firms in the market can be overt or covert.

Overt collusion (cartel) occurs when its participants agree on price, production volumes, market division, structure and use of production capacity, resource procurement, etc.

Cartels arise when a number of conditions are met:

1. A small number of firms in the market (up to 10).
2. Approximately equal cost levels across all industries.
3. Lack of product differentiation.

4. Inelastic demand for the oligopolist's product.

5. Lack of excess production capacity among firms.

6. High barriers to entry.

7. Industry stability or economic depression.

The main obstacle to overt collusion is antitrust laws, which is why covert collusion has become common in many countries. Secret collusions are informal agreements between oligopolists regarding prices, quotas, and markets, concluded in the form of "gentlemen's agreements."

In the case of collusion, an oligopoly operates like a pure monopoly.

5. *The price leadership model* is a market situation in which a leading firm with the largest market share independently sets the market price that maximizes its profit. The remaining oligopolists determine the output volumes at which they maximize their profits.

There are three types of price leadership:

• leadership by a dominant firm,

• collective leadership, when there is no single leader, but several firms with approximately equal market shares coordinate their pricing policies,

• barometric leadership occurs when there is no clear market leader or when a leader is changing. In this case, any firm can assume leadership functions, that is, set fair prices and inform its competitors of this.

When implementing price leadership, leading firms:

1. They resort to mass revisions of base prices when industry production conditions change.

2. The upcoming price revision is announced in advance in the media or in industry publications.

3. When revising prices, the leader pursues two goals: maximizing their own profits and turning the new price into an additional barrier to entry.

6. *Cost-Plus Pricing Model*

This model assumes the establishment of a uniform pricing methodology in the industry.

Step 1: Determine the ATC at 75-80% capacity utilization.

Step 2: Add a 15-17% markup on after-tax capital.

Advantages of the model:

1. Simplicity, transparency, and low labor intensity of pricing using this algorithm.

2. The methodology does not conflict with any other pricing methodology; rather, it complements others.

3. The methodology is most convenient for multi-product production.

Cost-plus pricing is quite common. For companies producing a wide range of products, determining demand and costs for each type of product is expensive, so cost-plus pricing is preferable for them. On the other hand, this pricing method is compatible with the firm behavioral strategies described in the price leadership and cooperative game models. Standardized pricing principles make the behavior of entities more predictable, allowing for more

accurate consideration of competitors' reactions, thereby bringing greater organization to the market.

3 Kinked Demand Curve model of Oligopoly

The authors of this work are the British economists R. Hall and S. Hitch, and the American P. Sweezy, who set out to explain price stability in oligopoly conditions.

The assumptions of this model are:

1. There are only a few firms in an oligopolistic market.

2. The firms are producing close-substitute products.

3. The quality of the products remains constant and the firms do not spend on advertising.

4. A set of prices of the product has already been determined and these prices prevail in the market at present.

5. Each firm believes that if it reduces the price of its product, the rival firms would follow suit, but if it increases the price, then the rivals would not follow it, they would simply keep their prices unchanged. We shall see presently that, because of this asymmetric reaction pattern of the rivals, the demand curve of each firm would have a kink at the prevailing price of its product.

In figure 6.1 we have drawn two negatively sloped straight line demand curves, viz., dd' and DD'. Of these two curves, dd' is flatter than DD'. Now, when one particular firm in the industry changes the price of its product, all other firms keeping their prices constant, the firm's demand curve will be rela-tively flatter like dd', i.e., the magnitude of the change in the demand for its product as its price changes would be relatively larger.

Production efficiency is not achieved in the market, since **Pmc ≠ min ATC**, indicating inefficient resource utilization in the industry.
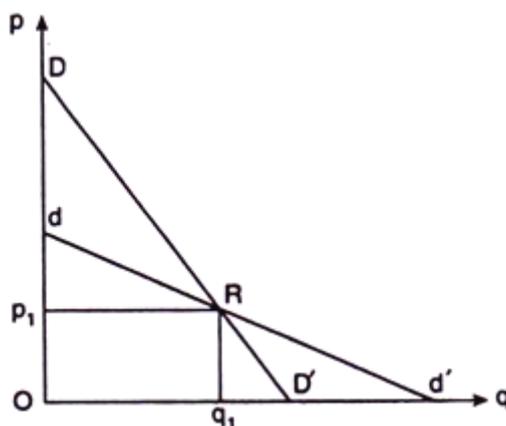
Figure 6.1 – Oligopoly with a Kinked Demand Curve

This is because, as the firm reduces or increases the price of its product, the prices of the products of other firms remaining constant, the product of the firm becomes relatively cheaper or dearer, respec-tively, than those of the other firms.

On the other hand, if a particular firm in the industry changes the price of its product, and following this, all other firms also change their prices in the same direction, and, say by the same proportion, for the sake of simplicity, then the firm's demand curve would be relatively more steep like DD'.

This is because, in this case, as the firm decreases or increases the price, its product does not become neither relatively cheaper nor dearer. Therefore, now its demand curve would be less elastic, or steeper, than dd'— now the demand curve would be like DD'.

Let us suppose that initially the price of the product of the firm is p1 or Op1 and the demand for the product is q1 or Oq1 If the firm now increases its price from P_1, the rival firms would keep their prices unchanged according to assumption (v) of this model.

In this case, the firm's demand would decrease along the segment Rd of the relatively more elastic demand curve dd'. On the other hand, if it goes on decreasing its price from p1, its rivals also would be decreasing their prices according to assumption (v). In this case, the quantity demanded of the firm's product will increase along the segment RD' of the relatively steeper demand curve DD'.

Therefore, at the price p1, the firm's demand curve would be dRD'. Obviously, because of assumption (v), the segment dR of this demand curve would be more flat or more elastic than the segment RD' (and the segment RD' would be more steep or less elastic than the segment dR). As a result, there would be a kink at the prevailing price p1, or, at the point R on the firm's demand curve d RD', i.e., the demand curve in this model would be a kinked demand curve.

The problem with the broken demand curve model is that it lacks an explanation of where the current price level comes from and how it is set.

4 Indicators of monopoly power and Antitrust Legislation

Market monopoly power is a firm's ability to influence the price of a product by changing the quantity sold to its own advantage.

The causes of monopoly power are varied:
• the presence of natural monopolies in some industries;
• monopoly rights in resource markets;
• natural monopolies;
• legal restrictions related to patents and licenses;
• unfair competition.

The main indicators of market power include:

• Bain's coefficient (economic profit rate);
• Lerner's coefficient;
• Tobin's coefficient;
• Papandreou's coefficient;
• Herfindahl-Hirschman index;
• concentration ratio.

The degree of monopoly power of firms in a given industry can be judged based on several indicators:

1. Bain's coefficient (economic profit rate).

$$r = \frac{economic\ profit}{investment\ capital},$$ (6.1)

Essence: under perfect competition, the economic profit rate is 0, and if EB > 0, the market is not competitive.

2. Lerner's coefficient.

$$r = \frac{P - MC}{P},$$ (6.2)

where P is the price of the product; MC is marginal cost.

The coefficient ranges from 0 to 1. A coefficient of zero is characteristic of perfect competition, while a coefficient closer to 1 is characteristic of imperfectly competitive markets.

Where $E\ d$ is the price elasticity of demand; P is economic profit; TR is total revenue.

The extent of economic profit in the market is the most important manifestation of monopoly power.

3. Tobin's coefficient.

$$q = \frac{P}{C},$$ (6.3)

where P is the market value of the firm, measured by the market price of its shares; C is the replacement cost of the firm's assets, equal to the sum of the expenses required to acquire the firm's assets at current prices.

The closer CT is to 1, the greater the economic profit and the more pronounced the firm's market power.

4. Papandreou's coefficient allows one to take into account:

1. The presence of substitute goods in the market, taking into account the cross-elasticity of demand. The lower the cross-elasticity coefficient, the greater the firm's monopoly power.

2. Competitors' capacity constraints, and whether they have the ability to enter the industry.

The lower the ability to enter, the more pronounced the monopoly power in the market.

5. *Herfindahl-Hirschman Index.*

Calculated as the sum of the squares of the market shares of all firms in the industry, it indicates the degree of industry concentration:

$$HHI = S_1^2 + S_2^2 + \cdots + S_n^2, \qquad (6.4)$$

where HHI is the value of this index; Si is the firm's share of total industry output as a percentage; and n is the number of firms in the industry.

6. *Concentration coefficient.*

Calculated as a percentage of the sales volume of a certain number of the largest firms (3, 4, 6, 8, 20, 50) to the total sales volume of the industry, it indicates the degree of industry concentration, i.e., the dominance of one or a few firms. A similar indicator can be calculated based on the share of large firms in the industry's workforce, added value, value of fixed assets, and output volume. The higher the coefficient for the largest firms, the greater their monopoly power. A minimum value of 0% indicates pure competition, while a maximum of 100% indicates a monopoly.

$$Cc = \frac{Firm'sales}{Idustry\ sales}, \qquad (6.5)$$

The calculation methodology differs only in one respect. For example, in the United States and France, the coefficient is calculated for the top 4, 8, 20, 50, and 100 firms in the market; in Germany, England, and Canada, it is calculated for 3, 6, and 10 firms; and in Russia and Belarus, it is calculated for 3, 4, 6, and 8 firms. The main drawback of this ratio is its insensitivity to the distribution of market share among competitors.

Antitrust regulation refers to the targeted activities of government agencies to weaken market power, limit it, prevent its acquisition and abuse by economic entities, and implement this activity through a system of appropriate economic, administrative, and legislative measures. The foundation of antitrust regulation is antitrust legislation – a set of laws and legal norms establishing the rights, obligations, and responsibilities of economic entities arising from their activities to weaken competition and abuse market power.

In the Republic of Belarus, the antitrust laws define the organizational and legal framework for combating monopolistic activity and unfair competition and aims to ensure conditions for the development of fair competition and the creation and effective functioning of commodity

markets. Antimonopoly Committee of the Republic of Belarus – MART (Ministry of Antimonopoly Regulation and Trade).

According to Belarusian law, the activities of a business entity are considered illegal if:

1. Barriers are created to the entry of other firms into the market.
2. Production is restricted, leading to shortages.
3. Prices are unreasonably inflated (or deflated).
4. Transaction terms are imposed on partners.
5. Unlawful discrimination against partners occurs.

5 Evaluation of the effectiveness of Oligopoly

When studying the efficiency of market structures, the primary focus is on maximizing social welfare, not the profitability of the firm itself. Obviously, with significant market power, monopolistic firms can achieve high profitability, and from the firms' perspective, this is efficient. However, for society, monopoly is associated with high prices, low production volumes, and often poor quality.

From an economic perspective, the problem should be considered in terms of maximizing the efficiency of resource allocation and use. The ideal of efficiency for society is considered to be a situation of perfect competition, where firms' selling prices coincide with their marginal costs, and in the long run, production is carried out at the lowest possible average cost.

Production efficiency is not achieved in the market, since **Pmc ≠ min ATC**, indicating inefficient resource utilization in the industry (figure 6.2).
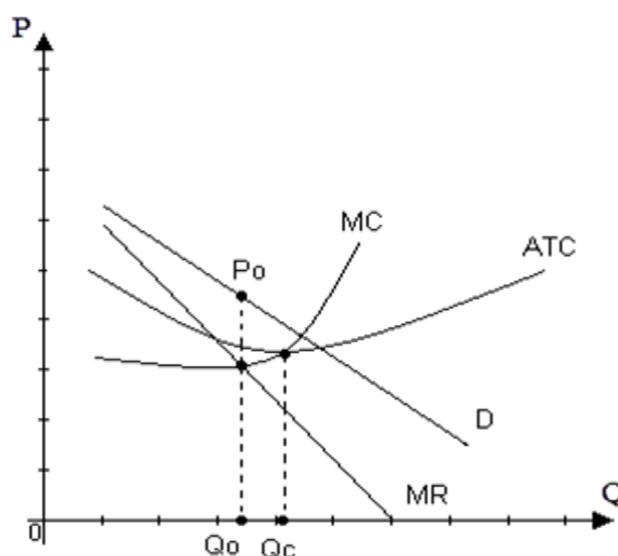
Figure 6.2 – Production volume and price under oligopoly and perfect competition

When comparing oligopoly and perfect competition, we can identify the positive and negative aspects of oligopoly.

Disadvantages:

1. There is a lack of production efficiency in the market, since Po ≠ min ATC, indicating inefficient resource utilization in the industry.

2. Po ≠ MC, meaning social efficiency is not achieved, implying that resources are allocated inefficiently within the industry.

3. The presence of collusion, usually secret, hinders the application of antitrust laws to oligopoly markets.

Advantages of oligopoly:

1. Economic power allows oligopolists to finance expensive R&D and promotes scientific and technological progress.

2. A wide range of consumer choice in the production of differentiated products.

3. Relative stability of oligopolistic prices.

Key concepts

Oligopoly, Cournot oligopoly theory, kinked demand curve theory, game theory, collusion theory, price leadership model, cost-plus model, antitrust policy, antitrust legislation, Bain's coefficient, Lerner's coefficient, Tobin's coefficient, Papandreou coefficient, Herfindahl-Hirschman index, concentration coefficient.

TOPIC 7. RESOURCE MARKETS. LABOR MARKET

1 Resource Demand: a general approach. Marginal Resource Revenue, Marginal Resource Cost
2 Competitive Labor Market Model
3 Imperfectly Competitive labor market
4 Nominal and real wages. Forms and systems of wages
5 Human Capital Theory
6 Features of the labor market in the Republic of Belarus
Key concepts

1 Resource Demand: a general approach. Marginal Resource Revenue, Marginal Resource Cost

Previously, our attention was focused on studying the economic processes that developed between consumers and producers in finished goods markets—markets for consumer goods. It should be noted that resource markets in microeconomics are studied separately, after analyzing product markets.

Resource markets have a number of characteristics:

1. The owners and primary suppliers of economic resources are households, and in some cases, the government; the buyers are firms and the government.

2. The price of resources is an important socioeconomic benchmark: for a company, it is the value of production costs; for a household, it is the value of their factor income.

3. Resource markets are oversaturated with institutional factors in the form of labor legislation, occupational safety laws, natural resource laws, etc.

4. Demand for any economic resource is derived, secondary, and depends on:

• the productivity of the resource itself, which is expressed by the marginal product of the resource.

$$MP_{res} = \frac{\Delta TP}{\Delta Q_{res}} \qquad (7.1)$$

where ΔQ res is the additional unit of resource

• from the price of finished goods (Pgood) produced using these resources.

Consequently, the demand for resources is derived and is expressed by the MRP, which shows how the firm's total revenue changes when using an additional unit of resource.

$$MRP = \frac{\Delta TP}{\Delta Q_{res}} = MP \cdot P_{good} \qquad (7.2)$$

Resources satisfy needs indirectly, rather than directly, through finished products. Consequently, changes in demand for resources are also dependent on changes in demand for finished products and are derived from (dependent on) the demand for products manufactured using these resources. That is, they depend on the revenue the producer receives after selling each additional unit of output.

When a firm is a price-taker in the resource market, its marginal revenue curve coincides with the demand curve for resources (regardless of whether it is a price-taker in the market for its own products). The demand curve should reflect the quantity of output in demand at the corresponding price. The quantity of a resource required by a given firm will be such that the price of the resource (and consequently its marginal cost) equals the marginal revenue of the resource (figure 7.1).
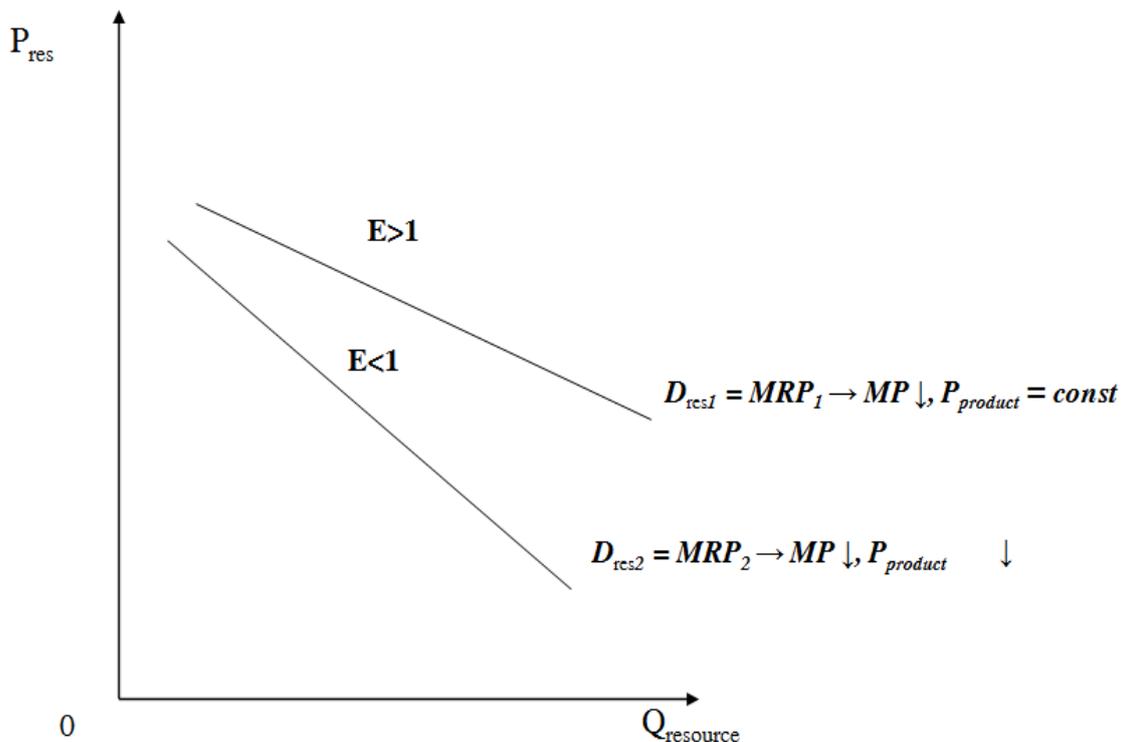
Figure 7.1 – Resource demand curve

The demand schedule for resources is always downward sloping and can differ only in the nature of their elasticity. Elastic demand for resources will be from the "price-taker," that is, perfectly competitive firms whose marginal product declines as their purchases increase, while the price of the finished good remains constant.

The more resources a firm purchases, the lower the resource's productivity, which is due to the law of diminishing returns.

In imperfectly competitive markets, firms have an inelastic demand for resources, which is due to the simultaneous change of two indicators:

1. The marginal product of a resource decreases as its quantity of use increases.

2. A downward-sloping demand schedule shows that price also decreases as sales volume increases.

The marginal revenue of a resource (MRP) is not the only factor determining resource demand. An equally important factor is the marginal cost of a resource (MRC), which shows how total costs change when additional units of a resource are used.

$$MRC = \frac{\Delta TC}{\Delta Q_{res}} \tag{7.3}$$

Thus, resource buyers always compare two indicators: the resource's marginal revenue (MRP) and the resource's marginal cost (MRC).

The following options are possible when comparing:

1. MRP > MRC.

This means that the firm will purchase this unit of the resource because it will increase total revenue (TR) to a greater extent and total costs (TC) to a lesser extent.

2. MRP < MRC.

This expression indicates that purchasing this unit of the resource is inadvisable for the firm because this resource will increase total costs (TC) to a greater extent and total revenue (TR) to a lesser extent.

3. MRP = MRC.

This expression shows the optimal amount of resources that will provide the firm with maximum profit or minimum loss. In resource markets, the well-known profit-maximization rule MR = MC is transformed into the resource utilization rule MRP = MRC.

2 Competitive labor market model

Labor is fundamentally different from all other production resources, which is why a special market – the labor market – has emerged in a market economy.

The labor market, in the everyday sense, is a place where an employee seeking employment and an employer seeking an employee meet to conclude an employment contract.

From an economics perspective, the labor market is a market for a commodity whose price is determined by the interaction of labor supply and demand.

The main difference between the labor market and other resource markets is that its commodity (labor) is a form of human activity and

therefore inseparable from it. In other words, the commodity in this market is not represented independently, but by those living people whose labor abilities it reflects.

There are four labor market models:

1) the competitive labor market model (figure 7.2);

2) labor markets with imperfect competition;

• the monopsony model;

• the labor market model with trade unions;

• the labor market with a bilateral monopoly.

Key characteristics of the competitive labor market model:

–   A large number of buyers and sellers in the market, meaning that no one has an individual impact on the price of labor (wage rate);

$$P_L = W,$$

where W is the wage rate;

– Job seekers and trade unions are homogeneous;

– Workers are mobile, meaning they can move freely from one location to another.
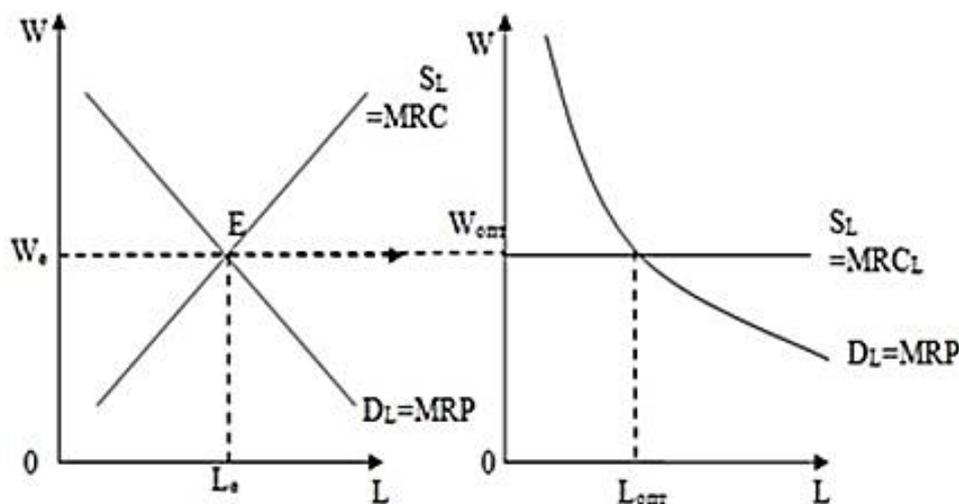
Figure 7.2 – Labor Market under Perfect Competition

Equilibrium in perfectly competitive labor markets is characterized by the equilibrium wage rate being equal to the marginal cost of the resource, $W = MRC_L$, and being the same for all firms in the industry. Regardless of the number of workers employed, the wage rate remains constant. Since labor supply is perfectly elastic, a profit-maximizing firm will hire workers until the marginal revenue from the resource equals its marginal cost:

$$MRP_L = MRC_L. \tag{7.4}$$

3 Imperfectly Competitive labor market

Monopsony in the labor market is a situation where there is only one buyer of a given type of labor, that is, one employer (figure 7.3).

Characteristics of a monopsony market:

- The monopsonist employer has an absolute monopoly on the demand side of labor;
- The number of people employed at a given enterprise (city-forming enterprise) constitutes the majority of all those employed in a particular type of labor;
- The labor force is immobile;
- The monopsonist dictates wages.

When hiring workers, a monopsonist firm is forced to face an increase in labor costs relative to the price of labor, since if the monopsonist increases wage rates to attract additional workers, it must also pay these increased rates to all previously hired workers.

$$P_L = W$$
$$P_L \rightarrow MRC_L = MRP_L$$
$$W_C > W_M$$
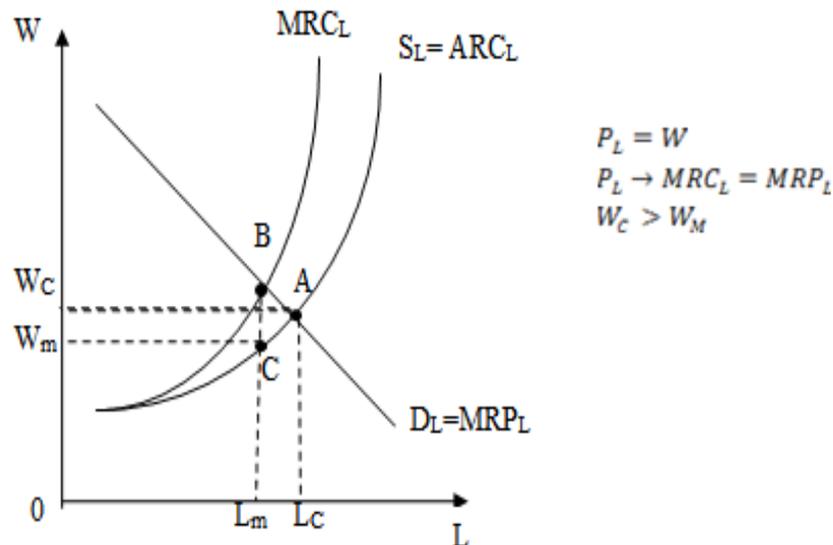
Figure 7.3 – Employment Level in a Monopsony Market

The amount of labor required to maximize a firm's profit is located at the intersection of the marginal resource revenue curve (MRP_L) and the marginal resource cost curve (MRC_L). The employer's marginal resource cost curve (MRC_L) is located above the labor supply curve (S_L) and is characterized by lower elasticity. The equilibrium wage rate is not determined by the intersection of the marginal resource cost and marginal resource revenue curves. The equilibrium wage rate (W_m) is located on the supply curve directly below the intersection of these curves at point C.

Under monopsony, the wage rate and marginal labor cost depend on the amount of labor employed. By equating MRC_L with the labor demand MRP_L at point B, the monopsonist will hire L_m workers (compared to L_C

under perfect competition) and pay a wage rate of W_m (in contrast to the competitive rate W_C).

All other things being equal, in a monopsonistic market, a monopsonist maximizes profits by hiring fewer workers and paying wages lower than in a competitive labor market. This is achieved by reducing the number of employed workers. Increased competition among workers leads to wages falling below the equilibrium level.

Trade unions play an important role in the labor market under imperfect competition. A trade union is an association of workers with the right to negotiate with the employer on behalf of its members.

The goal of a trade union is to maximize the wages of its members, improve their working conditions, and obtain additional payments and benefits. Trade union activity is determined by their desire, on the one hand, to increase the demand for labor and, on the other, to restrict the supply of labor.

There are two types of trade unions in the labor market:
– Closed (shop);
– Open (factory).

Closed trade unions unite workers in narrow professions and specialties and achieve an increase in wage rates by restricting the supply of labor on the market (figure 7.4).

To reduce labor supply, closed trade unions restrict the use of immigrant labor, limit child labor, support age-retirement laws, support shorter workweeks, establish occupational licensing, and restrict union membership.

The closed trade unions' tactic of restricting labor supply leads to higher wages and a reduction in the number of employed workers: S' ↓ to S" => W' ↑ to W" and L' ↓ to L".
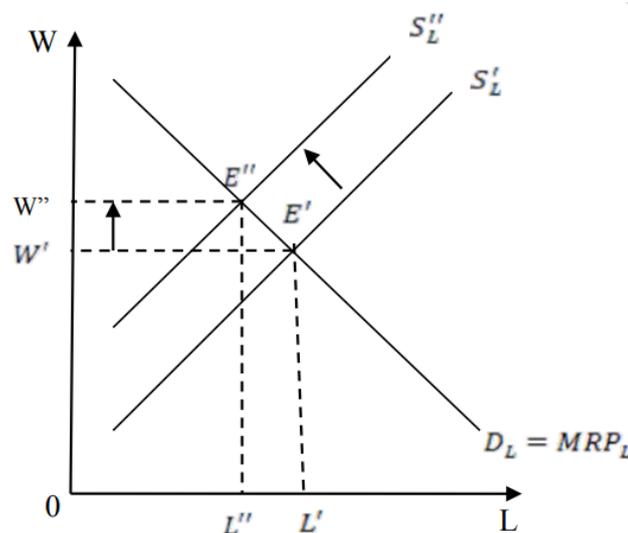
Figure 7.4 – Closed Trade Union in the Labor Market

Open trade unions are associations of workers in common professions and specialties, striving for 100% union membership for these workers (figure 7.5).
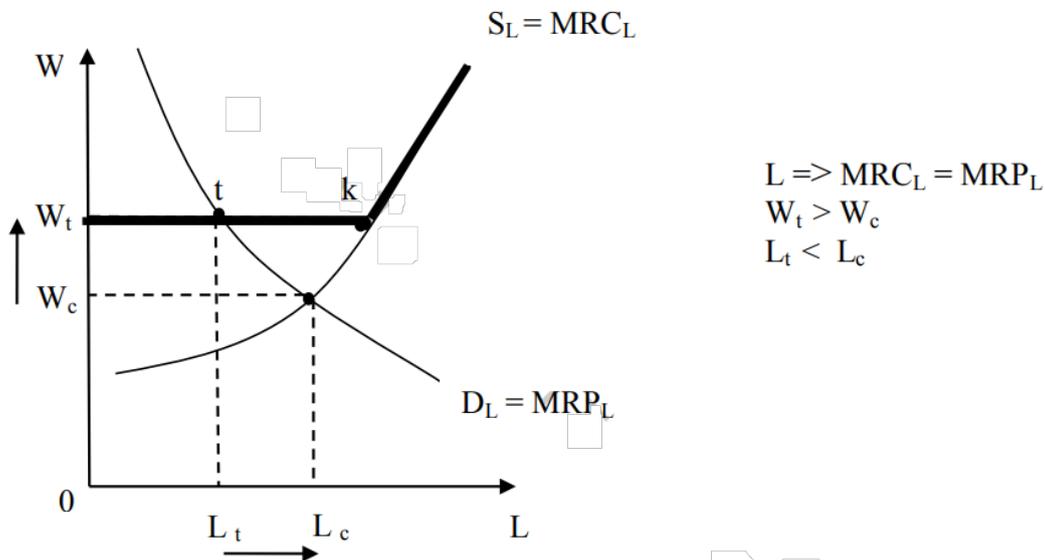
Figure 7.5 – Open Trade Union in the Labor Market

The main tool for open trade unions to influence the labor market is collective bargaining agreements or tripartite agreements involving representatives of state employment services, trade unions, and employer representatives. Increased demand for a product results in both wage growth and employment growth.

One area of trade union activity is the fight for expanded state labor standards and regulation. The goal of this fight is to legislate wage increases and establish a minimum wage level above the equilibrium level. As a result, the average wage rises and employment declines.

In addition to monopsony, an imperfectly competitive labor market can also be represented by a bilateral monopoly structure.

A **bilateral monopoly** is a market structure in which a single seller and a single buyer trade factors of production and both control prices (figure 7.6). A monopsonist acts on the demand side of labor, while an open trade union acts on the supply side.

The wage rate in such a market is determined by the relative power of these two monopolists.
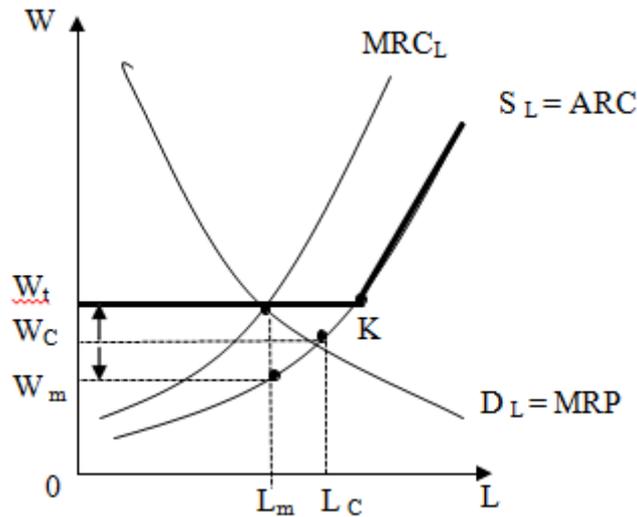
Figure 7.6 − Bilateral Monopoly in the Labor Market

If a monopolistic firm seeks to set the wage rate (W_m) below the equilibrium level by reducing employment, then the industry trade union will seek to set it above the equilibrium level (W_t). Ultimately, the wage rate will approach the equilibrium level (W_c), and the firm will lose its incentive to limit employment to L_m, settling at L_C. However, in such a market, the price of labor is typically determined through negotiations within the specified limits.

Bilateral monopoly or negotiations between firm management and trade unions theoretically have no definitive solution.

4 Nominal and real wages. Forms and systems of wages

Wages are the reward for labor or the price of labor recognized by the market.

A distinction is usually made between nominal and real wages.

Nominal wages are wages in monetary terms paid for the use of labor.

Real wages are the purchasing power of nominal wages adjusted for inflation, that is, the price level of goods and services. Real wages reflect how much economic goods you can actually purchase.

The higher the inflation rate in a country, the greater the difference between real and nominal wages.

In economics, it is common to distinguish between wage forms and systems.

These forms establish a relationship between wages and the resulting output of labor: if the output of labor is expressed in hours worked, then we speak of time-based wages; if the output of labor is measured by the volume of output or work performed, then piecework wages are used.

A wage system is a specific method of paying for labor results.

Differentiate between simple and complex, individual and collective, incentive, and mandatory wage systems.

Time-based wages can be either simple or time-based with a bonus.

With a simple time-based wage system, the wage amount depends on the wage rate or salary and the hours worked. Under the time-bonus system, employees receive a bonus in addition to their wages (tariff, salary) for the time actually worked. This bonus is linked to the superior performance of a particular department or the enterprise as a whole, as well as the employee's contribution to overall labor results.

Based on the method of calculating wages, this system is divided into three types: hourly, daily, and monthly.

The piecework system is further specified by the following payment systems:

– Direct piecework (fixed rate for the work);

– Piecework with bonus (piecework rate + bonus);

– Progressive piecework, where exceeding the standard is incentivized by setting a higher rate;

– Regressive piecework, where work in excess of the standard is paid at a lower rate;

– Piecework, where payment is made for the entire volume of work performed.

In the Republic of Belarus, an important tool for differentiating wages based on the complexity, content, and conditions of work is used: the **tariff system**.

The wage scale, as an element of the wage system, has the following characteristics: wage scale range; number of grades; and absolute and relative increase in wage coefficient. The absolute increase in wage coefficients is the difference between the wage coefficients of adjacent grades. The relative increase in wage coefficients is the ratio of the higher coefficient to the lower coefficient minus one, expressed as a percentage.

The current scale consists of 27 grades, and its wage coefficient ranges from 1 to 7.84.

The increase in wage coefficients is as follows:

1) from grades 1 to 4 – by 16%;

2) from grades 4 to 6 – by 10%;

3) from grades 6 to 27 – by 7%.

New global trends in wages include:

• Abandonment of equalizing tendencies, a shift toward individualization of wage systems. First, wages are linked to the individual qualities of the employee; second, wages are linked to the final results of the specific company's activities.

• Abandoning traditional forms and systems of payment and embracing non-traditional ones, primarily the participation system.

A participation system is the employee's participation in the capital of their own company, the profits, and the accumulation of accounts of the company where they work.

Under the participation system, the employee receives a base salary based on their qualifications and additional bonuses or dividends.

5 Human Capital Theory

Capital is any asset whose return in the form of income is only possible in the future.

In this sense, the following are used:

• physical capital (capital asset);

• financial capital – capital in the form of cash, securities, and credit resources;

• human capital;

• information capital, etc.

In the 1960s, the theory of "human capital" emerged in response to the growing role of the human factor in the context of scientific and technological progress. It was developed by neoclassical economists G. Becker, J. Mintzer, and T. Schultz. According to them, two factors interact in production: "physical capital," which includes the means of production, and "human capital," which includes acquired knowledge, skills, and energy. The value of "human capital" is measured by the potential income it can generate.

Human capital is a stock of knowledge, skills, abilities, motivation, and abilities, as well as health, accumulated through investment and contributing to increased productivity and income.

Investments in human capital consist of:

1) education expenditures,

2) healthcare investments,

3) expenditures on developing the necessary value and ethical standards in employees.

Thus, human capital is typically divided into three components:

• education capital;

• health capital;

• cultural capital.

– Human capital differs fundamentally from classical physical capital:

– Unlike physical capital, human capital has zero liquidity;

– Human capital has a long investment period (20–30 years), while physical capital has a lifespan of 1.5–2 years;

– Investments in human capital are best made early in a person's life, as the return depends on the expected lifespan of the capital;

– Since human capital is associated with a free individual, institutional factors that protect individual rights are important in investment.

6 Features of the labor market in the Republic of Belarus

The labor market in the Republic of Belarus is in a state of formation.

The Belarusian labor market is influenced by many factors, primarily the cyclical nature of the Belarusian economy. In this regard, the following stages of the Belarusian labor market's development can be distinguished:

1991–1995 – the beginning of the labor market's formation and the intensification of its tension due to rising unemployment;

1996–2002 – a stage of employment growth in the market for the first time since 1991; 2003–2009 – economic recovery, changes in the employment structure;

2010–2025 – the impact of global crises on the labor market.

Currently, it is characterized by the following features:

– a decrease in the labor force, exacerbated by an unfavorable demographic situation;

– high labor force mobility in the 16–24 age group, associated with wage differentiation both within and between industries; - low labor costs; - redistribution of labor between the production and non-production sectors in favor of the latter; - labor mobility, reproducing the previous employment structure, due to the preservation of the existing reproduction structure; - reduction in the scale of involuntary underemployment; - low official unemployment rate of 0.5-2.5%; - the presence of hidden unemployment; - an imbalance between the need for highly skilled personnel and the surplus of low-skilled personnel, i.e., structural unemployment; - relatively long unemployment duration.

The labor force is increasing in all regions and in Minsk; the capital accounts for one-fifth of the labor force of the Republic of Belarus.

For several decades, Belarus has been experiencing a decline in the rural labor force. In all intra-republican flows, a positive migration balance remains for the urban population, while a negative one remains for the rural population. A characteristic feature of the Belarusian labor market is the low official unemployment rate of 0.5–2.5%. The labor market primarily requires skilled workers and specialists.

The number of vacancies is growing, reaching almost 35,000 by the end of the second quarter of 2025. This growth amounted to more than 7%, and in the first half of the year, compared to the beginning of 2025, the increase in vacancies was almost 38%. Experts note that job seeker activity, compared to January, remained at approximately the same level as a year ago.

Despite the overall balance between supply and demand in the Belarusian labor market, labor shortages persist in certain sectors. These include retail, HoReCa (hotels, restaurants, and catering), manufacturing, construction, and blue-collar workers.

Moreover, the share of sectors experiencing staff shortages accounts for 72% of all active vacancies. The highest competition for jobs is observed

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in office and creative industries, meaning it's the most difficult to find a job here: administrative staff, marketing, advertising, PR, and information technology.

All of the above processes characterizing the current state of the labor market in the Republic of Belarus are driven by the country's transition to a market economy with a socially oriented development vector.

Key concepts

Marginal resource revenue, marginal resource cost, labor market, labor demand, labor supply, monopsony, open trade union, closed trade union, nominal and real wages, tariff system, human capital theory.

TOPIC 8. CAPITAL MARKET.
ENTREPRENEURIAL ABILITY AND ECONOMIC PROFIT

1 Capital Market and its structure. Capital goods market
2 Loan capital market and loan interest. Nominal and real interest rates
3 Discounting future income. Net Present Value
4 Securities Market. Prices and incomes in the securities market
5 Entrepreneurship. Functions and sources of profit
Key concepts

1 The Capital Market and Its Structure. The Capital Goods Market

Capital is any asset that may generate income in the future. In this sense, capital includes fixed and working capital, land, bank deposits, and human labor.

When analyzing capital, a distinction is made between stock and flow.

Capital as a stock is accumulated assets intended for a specific period of time.

Capital as a flow is investments (capital expenditures) that increase the stock of capital assets over a specific period of time.

Due to the ambiguity of the interpretation of the category "capital," there is also the problem of defining the concept of "capital market." Depending on what is the object of the relationship between sellers and buyers in the market, and what concept is used to interpret the concept of capital, two possible options for interpreting this concept are distinguished: a material interpretation or a monetary interpretation.

A material interpretation of capital. In the factor market, capital refers to physical capital: machines, equipment, structures, inventories, etc., in their monetary terms. Therefore, in this case, the capital market is a component of the factor market, along with the labor market and the land market. That is, the factor market = labor market + land market + capital market.

A monetary interpretation of capital. In the financial market, capital refers to monetary capital. Therefore, the capital market is a component of the loan capital market. That is, the loan capital market = money market + capital market.

Investments in the factor market:

1. Investments in fixed capital (machine tools, equipment, vehicles).

2. Investments in construction (housing, buildings).

3. Inventories – finished goods and services produced in a given year but not sold.

A distinction should be made between capital and capital services. Capital is a stock, while its services are a flow. Therefore, a distinction is made between the price of capital goods and the price of capital services –

the amount of income from the exploitation of capital. This income is called *the rental rate* or *rent*.

In the modern economy, three segments of the capital market are distinguished:

• Capital goods market – the market where fixed capital is bought and sold (figures 8.1–8.2);

• Capital services market – the leasing or rental of capital goods;

• Borrowed funds market (loan capital market) – the market for funds used to acquire capital goods (figure 8.3).

The income of the owner of loan capital is **interest**.

According to accounting traditions, the following structure of capital goods is commonly distinguished:

1. Fixed capital.
2. Working capital.

Fixed capital is embodied in machines, tools, equipment, and buildings. It is characterized by its long useful life and the gradual transfer of its value to the manufactured product as it wears out over several production cycles.

Working capital is embodied in raw materials and fuel and transfers its value to the manufactured product over the course of a single production cycle.

In the capital goods market, demand is generated by firms, and supply is generated by households. In the capital services market, supply and demand are generated by firms leasing their property at a certain rate – **rent**.

Households are suppliers of capital goods, but, as a rule, they do not provide capital in kind, but rather provide savings, which are converted into investments through financial markets. These investments are then used to acquire capital goods. The capital goods market should be considered in the short run, where capital is fixed, and in the long run, where capital fluctuates.
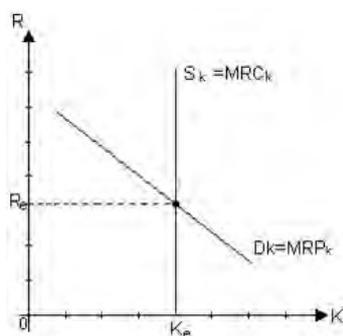
Figure 8.1 – Capital Goods Market in the Short Run

In the short run, the amount of capital supplied in the market is a vertical line on the graph. An individual firm will demand capital services until the marginal return on capital equals the marginal cost of capital – MRCk.
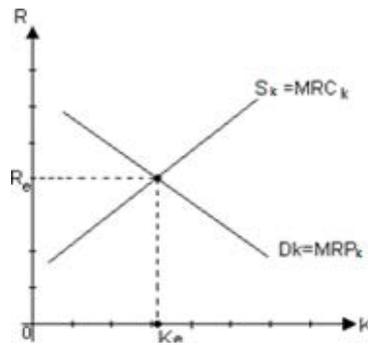
Figure 8.2 – Capital Goods Market in the Long Run

In the long run, the supply curve for capital is upward-sloping. This is because rents change over the long run in response to changes in the market price of capital. The higher the cost of capital, or rental rate, the greater its supply.

Rent is the price paid for the use of capital per unit of time.

When acquiring capital goods, either through purchase or rental, the income received is compared with the cost.

In the process of using a capital asset, the owner (holder) constantly evaluates the efficiency of using the capital asset using the efficiency indicator:

$$Efficiency\ of\ capital\ asset\ use = \frac{Income\ from\ capital}{Cost\ of\ capital} \cdot 100\%. \qquad (8.1)$$

2 The Loan Capital Market and Interest Rates. Nominal and Real Interest Rates

The demand for real capital manifests itself in the demand for money (money capital), and money capital is bought (sold) in the loan capital market.

Loan capital is money lent. The price paid by the buyer of money (borrower) to the owner of capital (lender) for the use of their money for a certain period of time is called interest.

The source of interest is the income received from the use of loan capital.

A borrower using loan capital is forced to divide their profit into two parts:

1. Interest, repaid to the lender at a certain rate.
2. The entrepreneurial income of the borrower.

The amount of **interest** is its rate, determined by the formula:

$$i = \frac{Income\ from\ capital}{Amount\ of\ loan\ capital} \cdot 100\%. \qquad (8.2)$$

A distinction is made between the upper and lower bounds of the interest rate.

The lower bound of the interest rate is greater than zero, because at a rate less than zero, lending becomes meaningless.

The upper bound of the interest rate is equal to normal profit.

A distinction is also made between nominal and real interest rates.
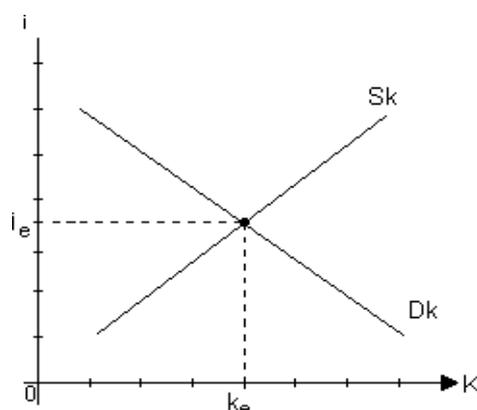
Figure 8.3 – Equilibrium in the loan capital market

The demand side for capital is represented by:

1. Firms (businesses) borrowing for investment purposes.

2. Households, which increase their demand for capital when interest rates decline.

3. The government, which borrows to cover the budget deficit.

The supply of loanable capital is carried out by the following entities:

1. Households, which save by reducing current consumption.

Motivation: the higher the interest rate, the greater the amount of household savings.

2. Firms and the government.

Equilibrium in the loan capital market allows for the formation of an equilibrium market rate and an equilibrium volume of loanable capital.

In practice, a wide range of interest rates is used, influenced by the following factors:

1. Risk of default.

2. Loan term.

3. Loan amount. The rate is higher for smaller loan amounts.

4. Level of competition in the credit market. The higher it is, the lower the rate.

5. Tax level. The higher the tax rates, the higher the interest rate.

6. Level of economic development of the country (the amount of accumulated wealth). The richer the country, the higher the savings rate and the lower the interest rates.

7. Expected inflation. The higher it is, the higher the interest rates.

3 Discounting future income. Net Present Value

Discounting is the process of bringing future income to the present. It allows cash flows received at different times to be recalculated and brought to a single period.

Thus, discounting is intended to reduce the magnitude of future income flows from a present-day perspective. The discount factor is multiplied by the future income, bringing it to the present, which can be expressed by the following formula (for a one-time income):

$$PV = \frac{R_n}{(1 + i)^n}, \tag{8.3}$$

where Rn is the amount of cash to be received in the future; n is the number of years over which the cash flow is expected to be received; and i is the interest rate or discount.

The discount is usually the refinancing rate.

PV is the present value (today's value of money).

Most often, investments are expected to generate multiple income streams in the future, so the present value is calculated as follows:

$$PV = \sum_{j=1}^{n} \frac{R_j}{(1 + i)^j}, \tag{8.4}$$

where Rj is the net income that long-term investments will generate in year j.

The present value is influenced by:

1. The interest rate (discount rate). The higher it is, the lower the present value.

2. The service life of the fixed capital. The relationship is direct.

3. The amount of future net income. The relationship is direct.

To determine the feasibility of an investment, an investor must compare the present value of future income with the amount of current investment. To do this, the net present value is estimated:

$$NPV = -I + \sum_{j=1}^{n} \frac{R_j}{(1 + i)^j}, \tag{8.5}$$

where NPV is the net present value; I is the investment cost.

If NPV > 0, the investment is feasible; if NPV < 0, the investment is infeasible and the project is not profitable.

4 Securities market. Prices and incomes in the securities market

In the economic system, households save, and firms invest. Financial markets, including securities markets, are the mechanisms that transform savings into investments.

The *securities market* is the buying and selling of securities with the goal of attracting investment funds into the economy. This market establishes relationships between issuers, legal entities that issue securities (JSCs, investment funds, banks, and enterprises), and investors, entities that have available cash in the form of savings and are willing to spend it on the acquisition of securities.

These can be individuals or legal entities—corporations, funds, banks, and the state through its agencies. Market functions:

1. Transformation of monetary capital into loan capital, and then into physical capital.

2. Redistribution of cash flows between economic entities, industries, and regions.

3. Redistribution of property rights.

4. Effective management of the financial condition of enterprises through the diversity of their financial portfolios. Financial portfolios are financial assets, financial savings. The more diverse they are, the lower the risk.

5. Regulation of money circulation and credit relations.

6. The market reflects the state of the economy through funds, which act as a barometer of market conditions.

A **security** is a monetary document certifying property rights or loan relationships between issuers and investors.

There are three classes of securities:

1. Basic (stocks, bonds).

2. Derivative (futures, options, warrants).

3. Other (checks, bills).

A *share* grants the right to own property, manage a business, and receive money for the share.

A *future* is a security that allows the purchase of securities by a certain date.

An *option* is a form of reserving the purchase of securities at a certain price for a certain period.

A *warrant* is a certificate of the right to additional benefits for the owner of the securities after a certain period.

Third parties in the securities market are brokers and dealers.

A *broker* is a pure intermediary who brings together buyers and sellers for a commission. A *dealer* is an intermediary who can also act on their own behalf, buying and selling securities.

Two types of markets are commonly distinguished: primary and secondary.

Primary markets involve the issuance and placement of securities (the initial purchase of securities).

Secondary markets are where issued and previously sold securities are redistributed. These markets take the form of stock exchanges, over-the-counter trading, and so on. The secondary securities market is subdivided into exchange-traded and over-the-counter (OTC) markets. The OTC market is used to buy and sell securities not listed on the exchange. OTC trading is associated with the activities of investment funds and commercial banks. The core element of the exchange market is the stock exchange.

A *stock exchange* is a non-profit organization created to provide conditions for professional participants in the securities trading market, as well as to determine their prices, publish them, and regulate the market. The stock exchange performs a number of important functions:

1. It facilitates inter-industry and interregional capital flows;

2. It organizes the investment process;

3. It raises quality standards, as only high-quality securities are admitted to the exchange;

4. The exchange reflects the state of the entire national economy.

5 Entrepreneurship. Functions and sources of profit

Entrepreneurship (entrepreneurial ability) is an important factor of production, along with labor, capital, and land. Entrepreneurship is a specific labor activity involving the organization of production and the management of its results. The following conditions are considered for the existence of entrepreneurship as a factor of production: First, the autonomy and independence of economic entities, their certain freedoms and rights to choose their type of activity, sources of financing, access to resources, the management of profits, etc. Second, responsibility for decisions made, their consequences, and the resulting risks. Third, a focus on achieving commercial success and maximizing profits.

Functions of an entrepreneur are pooling resources, business management, creating innovations and bearing risks.

Taking the above into account, it can be noted that entrepreneurship is a proactive, independent activity of individuals (individuals or legal entities) aimed at generating profit or income, carried out in their own name, at their own risk, and under their own financial liability.

The entrepreneur's form of remuneration is income (revenue). **Profit** is the entrepreneur's final factor income.

Concepts and sources of profit:

1. Profit is **the payment for risk** associated with changes in market conditions, resource prices, and consumer tastes and preferences. The

concept of risk and uncertainty as a source of profit is associated with the American economist F. Knight. He characterized profit as compensation to the entrepreneur for bearing the burden of risk. F. Knight identified two types of risk:

1) risk whose probability can be statistically calculated and against which one can insure.

Risks of the first type are less frightening to the entrepreneur—by insuring against them, they include insurance premiums in their production costs;

2) risk (uncertainty), which is fundamentally uninsurable (risk associated with a lack of demand for a new product, into the development and production of which significant funds have been invested).

However, the entrepreneur assumes all risks of the second type when making decisions about the release of a particular product, setting a particular price for it, and choosing a particular competitive strategy when promoting the product to the market. Profit (loss) for F. Knight thus appears as a win (loss) in a game with an unpredictable outcome.

2. Pioneering innovation, expressed in the creation of a new product, the use of new technologies, etc. The eminent economist Joseph Schumpeter developed a theory of profit as the result of innovation. The role of the entrepreneur is to find and implement new combinations of various factors of production. These combinations are innovations, which enable profits above the average income for a given industry.

A distinction should be made between inventions—the discovery of new technologies or methods – and innovations – the practical implementation of inventions. Entrepreneurs' pursuit of profit entails constant innovation in production and, consequently, is the driver of economic and technological progress.

3. An entrepreneur's profit is **the result of their monopoly power** in the market. A firm earns profit due to its market dominance. A monopoly can earn profits in both the short and long term. This occurs because it sets prices above marginal costs, limiting the supply of a product. The existence of monopoly profit does not act as an incentive for other firms to enter the industry, as there are significant barriers to entry.

The essence of profit is most fully revealed in its functions: accounting, incentive, and distribution. The essence of *the accounting function* of profit is that profit is the most important criterion for the effectiveness of a firm's entrepreneurial activity. The key indicators that reveal this function are the volume and rate of profit (profitability).

The incentive function of profit is that it (profit) is a powerful generator of the economy. The desire to increase profits underlies most innovations. The amount of profit is influenced by the quantity of output, the rate of capital turnover, production costs, labor productivity, prices, and several other factors.

The essence of ***the distribution function*** of profit is that it serves as a source of accumulation and development of production, as well as material incentives for employees. In a market economy, profit is the foundation for the development of an entrepreneurial firm.

Key concepts

Physical capital, money capital, fixed capital, working capital, capital demand, loan capital, nominal and real interest rate, market interest rate, investment, discounting, net present value, stock, economic profit.

TOPIC 9. LAND MARKET

1 Land as a factor of production. Limited Land
2 Land rent and its determination. Lease vs. Rent. Land Price
3 Differential land rent based on fertility and location
4 Development of the Land Market in the Republic of Belarus
Key concepts

1 Land as a factor of production. Limited Land

Land as a factor of production refers, firstly, to all natural factors that can be utilized, and secondly, to land itself as the primary factor of production (figures 9.1–9.2).

Land as a factor of production differs from other factors:
• land has an unlimited lifespan, unlike labor and capital;
• land is a natural factor by origin, a gift of nature;
• labor and capital are required to maintain land in working condition;
• land is a product of past labor, just like capital, meaning the labor of many generations of people has been invested in it;
• land is an immobile factor of production, meaning it is tied to a specific location;
• a distinction is usually made between natural fertility as the result of long-term soil-forming processes; artificial fertility as the result of human influence, improving agricultural standards; and economic fertility of the soil, which is the sum of natural and artificial fertility.

The similarities between land, labor, and capital are revealed in the following ways:

1. Land, like other factors of production, is a limited resource. The scarcity of land in the land market can be represented as a perfectly inelastic supply.

2. Not only is the quantity of land limited, but also the quantity of land of varying quality. Land is strictly differentiated into poor, average, and best plots based on fertility and location.

3. Demand for land is divided into agricultural (for agricultural production) and non-agricultural (for housing, mining, etc.). As a rule, non-agricultural demand for land is more elastic and particularly sensitive to the location of land plots. Demand for agricultural land is inelastic and particularly sensitive to fertility factors.

Households are suppliers of capital goods, but, as a rule, they do not provide capital in kind.
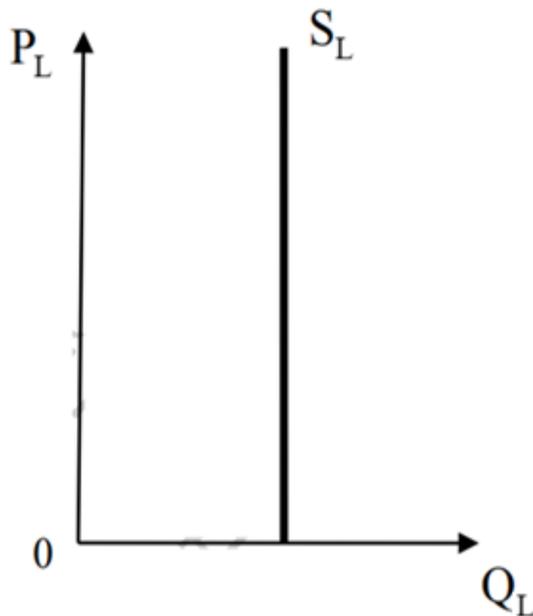
Figure 9.1 – Land Supply   Figure 9.2 – Land Demand
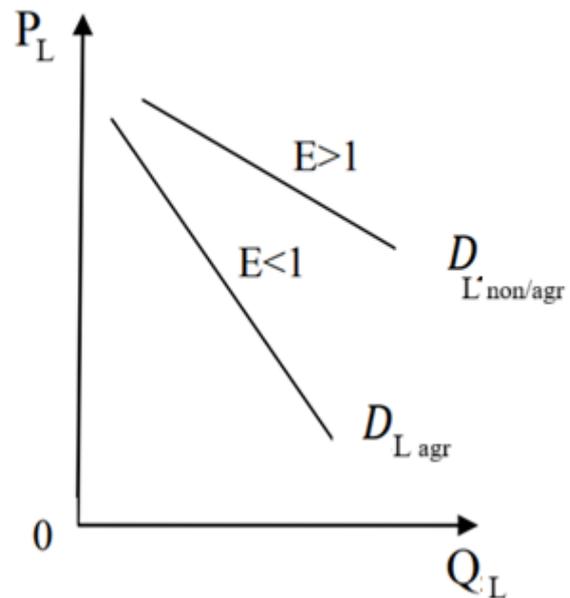
Agricultural demand for land:

• is derived, meaning that this demand is determined by MRP_L and depends on MP_L and the price of the commodity P_{good} produced using the land.

• food products obtained from land satisfy primary human needs, therefore agricultural demand for land is inelastic;

• under inflation, fluctuations in food purchases have a smaller amplitude compared to non-food goods or durable goods;

• demand for agricultural products is also inelastic with respect to income. This leads to a gradual reduction in the share of food consumption in consumer income, and in the long run, leads to a reduction in the share of agriculture in the country's national income;

• due to the inelastic demand for agricultural products in terms of price and income, economics identifies a special agricultural (farmer) problem, the essence of which is the declining and unstable income of agricultural producers and the need for their support from budgetary funds.

Demand for non-agricultural land:

• This demand is elastic, as a slight drop in the price of such land increases demand for the construction of buildings and structures;

• The determining factor in non-agricultural land demand is the location of the land;

• Non-agricultural land demand is demand for housing construction and infrastructure.

2 Land rent and its determination. Lease vs. Rent. Land price

Land rent is the price for the use of land and other mineral resources whose supply is limited due to their non-renewability (figure 9.3).

Non-renewability means that these natural resources have no full-fledged substitutes and, therefore, no alternative value.

Rent is present to some extent in the income of any factor of production. It is a unique economic form of realizing ownership of this factor of production. In this sense, rent includes payments to the owner of economic resources in excess of the amount required to maintain these resources for a given purpose. This rent is called economic rent.
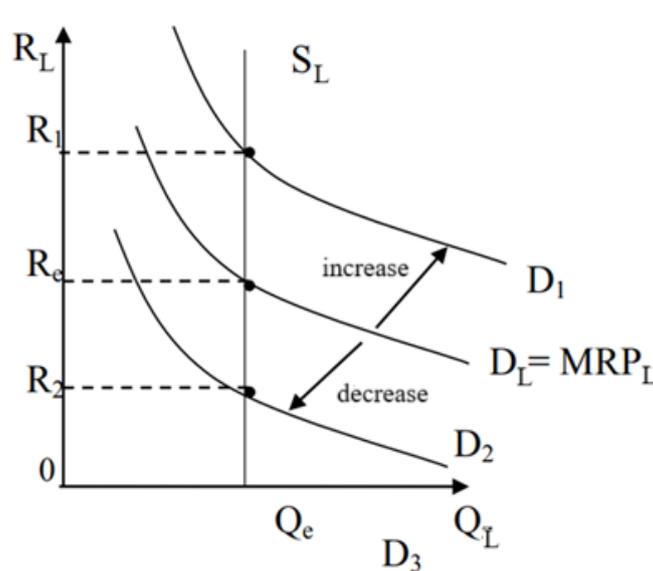
Figure 9.3 – Formation of Land Rent

With a perfectly inelastic supply of land, the only factor influencing the size of land rent is the demand for land.

Since rent does not serve an incentive function, meaning its increase or decrease does not affect the supply of land, rent does not affect economic potential. Therefore, land rent is commonly considered a surplus, that is, a payment that does not ensure the availability of land in the economy.

Land rent has its own varieties in the form of differential rent.

Differential land rent is associated with differences in the fertility or location of land plots, and, consequently, the higher income obtained from better plots with the same investment.

There are two types of land markets:

1. The purchase and sale of land as an asset in full ownership, with its alienation from owners.

In the purchase and sale of land with a change in ownership, the price of the land is its discounted value, calculated over an infinite period of time. In this case, the price of the land is determined by the following formula:

$$P_L = \frac{R}{i},\tag{9.1}$$

where R is the annual rent; i is the annual interest rate.

For the landowner, the price of the land acts as capitalized rent; that is, it must generate a monetary income such that, if deposited in a bank, it would generate income no less than the annual rent.

2. The purchase and sale of land for temporary use, or the lease of land services, whereby ownership of the land is not alienated from the owner. In this case, a lease agreement is concluded between the lessor and lessee, which defines the payment for the land in the form of rent.

In this case, rent includes several elements:
• rent;
• land depreciation;
• interest on capital invested in the land;

For the landowner, rent is the excess of the actual payment received for the use of the land owned above the asking price, i.e., MRC_L, while for the lessee, rent is an element of production costs.

If the best land plots are leased, the differential land rent is also appropriated by the landowner.

3 Differential land rent based on fertility and location

As noted above, there are plots of land of varying quality. They can be roughly divided into inferior, average, and superior.

There are two types of differential rent:
1. Differential rent of the first type based on fertility and location.
2. Differential rent of the second type, based on additional capital investment.

The mechanism for the formation of differential rent is as follows:
Given:
three plots of land: A – the best, B – average, C – the worst.

The price of agricultural produce is determined by the average total costs of the worst plot:

$$P_{good} = ATC_C,\tag{9.2}$$

where ATC_C is the average total costs on the worst plot, C.

What is the amount of differential rent on each of the three plots of land (figure 9.4)?

A   **B**   **C**
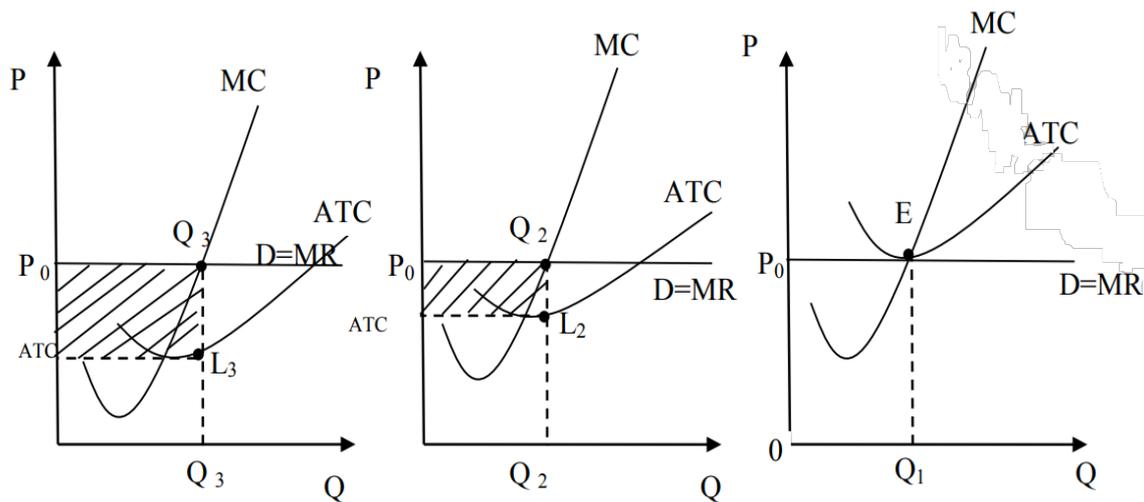
Figure 9.4 – Formation of Differential Rent

Price is determined by the costs of the worst plot, as human needs increase. For land to be used profitably, the price must cover the average total costs of the worst plot.

The graph shows three plots of land: A – the worst; B – average; C – the best. P_0 is the current market price, formed based on supply and demand in a perfectly competitive agricultural market. The resulting differential land rent on plot B is equal to the quadrilateral $P_0ATCL_2Q_2$, and on plot A, it is equal to the quadrilateral $P_0ATCL_3Q_3$.

The reasons for the existence of differential rent are the monopoly on land as an economic asset and the need to include not only the best but also the worst plots in agricultural production. Since the costs on the best plot A are the lowest, the differential rent from this plot will be maximum. On plot B, differential rent is lower and absent on the worst plot C.

The amount of differential rent from plots A and B is stipulated in the lease agreement and is fully collected in the form of rent paid to the landowner.

Thus, all tenants are placed in equal economic conditions with respect to the management conditions of the differentiated land plots.

Consequently, the full rent will include depreciation, interest on capital invested in the land, simple ground rent, and any forms of differential rent.

The mechanism for the formation of absolute rent is logically described in classical and proletarian political economy.

Absolute rent is a portion of the surplus value created by agricultural wage laborers and appropriated by landowners due to the monopoly of private land ownership. Unlike differential rent, absolute rent is independent of differences in the fertility and location of individual plots and the productivity of additional capital investments in the same plot. Private landowners, having legal title to the land, allow their land to be used only for compensation, which they receive in the form of rent.

A landowner collects rent from any plot of land, even the worst, if there is a need for its use. The tenant, the entrepreneur who leases land, must ensure not only the average profit but also a surplus profit, which is transferred to the landowner as absolute rent and constitutes part of the rent. Such surplus profit is possible in agriculture because the organic composition of capital in agriculture is lower than in industry, and consequently, the share of living labor creating surplus value and the mass of surplus value in agriculture are greater than in industry.

Therefore, the rate of surplus value is higher in agriculture than in industry. The value of agricultural produce is higher than the social price of production (including production costs plus average profit).

Different rates of profit also arise in different sectors of industry depending on differences in the organic composition of capital. Competition between sectors leads to profit equalization and the formation of an average rate of profit. The surplus profit created in agriculture does not participate in the free process of profit equalization. Private land ownership prevents this. The excess surplus value over average profit in agriculture remains within that sector.

Thus, part of the surplus value created in agriculture goes to the tenant farmer in the form of average profit, determined by industrial profits. The excess over average profit is given to the landowner as ground rent. Absolute rent is the difference between the social value of agricultural produce, which is determined by production conditions on the worst land, and the social price of production.

Since absolute rent is collected from every plot of land, even the worst one, and the market price is determined by the value established on the worst plot of land, it causes higher prices for agricultural goods consumed by society as a whole.

Absolute rent is the payment society as a whole makes to private landownership.

4 Development of the Land Market in the Republic of Belarus

Market relations in Belarus began to develop in 1992. According to Article 13 of the Constitution of the Republic of Belarus, property may be state-owned or private. The state grants everyone equal rights to engage in economic and other activities, except for activities prohibited by law, and guarantees equal protection and equal conditions for the development of all forms of ownership.

The Constitution specifically states that subsoil, water, and forests are the exclusive property of the state. Agricultural land is owned by the state.

The land market in the republic is in the process of formation and improvement. Currently, land relations are regulated by the Land Code of the Republic of Belarus (adopted on January 4, 1999).

In accordance with Article 5 of this Code, state governance in the area of land use and protection is exercised by the President of the Republic of Belarus, the Council of Ministers of the Republic of Belarus, local executive and administrative bodies, and the specially authorized state body for land resources and land management. Article 8 of this Code regulates land use (permanent and temporary). Permanent use of land plots is defined as use without a predetermined term.

Temporary use of land plots may be short-term (up to three years) or long-term (from three to ten years). If necessary, these terms may be extended for a period not exceeding the terms of short-term and long-term temporary use, respectively. Extensions of land use terms are granted by the authorities that provided the land plots.

The President of the Republic of Belarus may establish a longer term of long-term use for certain types of land use. Land plots may also be granted for lifelong inheritable possession.

The maximum lease term in Belarus is 99 years. Rent varies depending on the cadastral valuation of the land plot.

Private land ownership is also permitted in the Republic of Belarus. In accordance with Article 11 of the Code, land plots acquired by citizens of the Republic permanently residing in the territory of the Republic of Belarus or equivalent to permanent residents are in the private ownership of citizens of the Republic of Belarus.

In the Republic of Belarus, private ownership of land by legal entities, as well as foreign state ownership of land, is permitted. Land plots may be transferred to Belarusian legal entities, including enterprises with foreign investment, during the privatization of state-owned properties. The list of state-owned properties for which land plots may be transferred along with the privatized properties is approved by the President of the Republic of Belarus.

Land plots may also be transferred to the ownership of Belarusian legal entities during investment projects. The decision to transfer land plots to Belarusian legal entities is made by the President of the Republic of Belarus.

Land plots may be transferred to foreign states under a special procedure and certain conditions.

Land plots owned by the state may be leased. These relations are regulated by the Law of the Republic of Belarus "On Lease."

Specific provisions concerning the leasing of land plots are contained in the Law of the Republic of Belarus "On Payments for Land" (dated December 18, 1991).

The transfer of subsoil plots, water bodies, and forests for use (including leases) is regulated by relevant legislation: the Subsoil Code, the Forest Code, and the Water Code.

Key concepts

Land, agricultural land demand, non-agricultural land demand, natural soil fertility, economic soil fertility, land rent, land price, differential rent based on fertility, differential rent based on location, differential rent from additional capital investment, absolute rent.

TOPIC 10. GENERAL EQUILIBRIUM AND SOCIAL WELFARE

1 Partial and general equilibrium. The relationship between product and resource markets
2 Exchange efficiency. Indifference Curve
3 Production Efficiency. Production Possibilities Curve
4 General economic equilibrium and Social Welfare
5 Market failure and the need for microeconomic equilibrium
Key concepts

1 Partial and general equilibrium. The relationship between product and resource markets

A distinction is usually made between partial and general equilibria.

Partial equilibrium is an equilibrium that arises in individual markets while ignoring interrelations with other markets. Partial equilibrium has many negative characteristics.

The main one is ignoring both direct and inverse relationships with other markets.

General economic equilibrium takes into account interrelations with other product and resource markets, including both direct and inverse relationships.

Economic analysis often assumes that all variables other than those under consideration are constant. This analytical technique allows one to study a single market while ignoring its relationships with other markets. Market equilibrium analysis, when the study of price changes is limited to a single market or a single group of closely interconnected markets, is called partial economic equilibrium analysis. However, this approach doesn't take into account the impact of changes in one market on all other markets, so it's imperfect. Let's illustrate this problem with an example.

Let's analyze four types of product markets: A, B, C, and D (figure 10.1).

A: Product A is a substitute for Product B, a complement to Product C, and its production requires the same resources as the production of Product D.

B: Product B is a substitute for Product A.

C: Product C is a complement to Product A.

D: The production of good D requires the same resources as the production of good A.
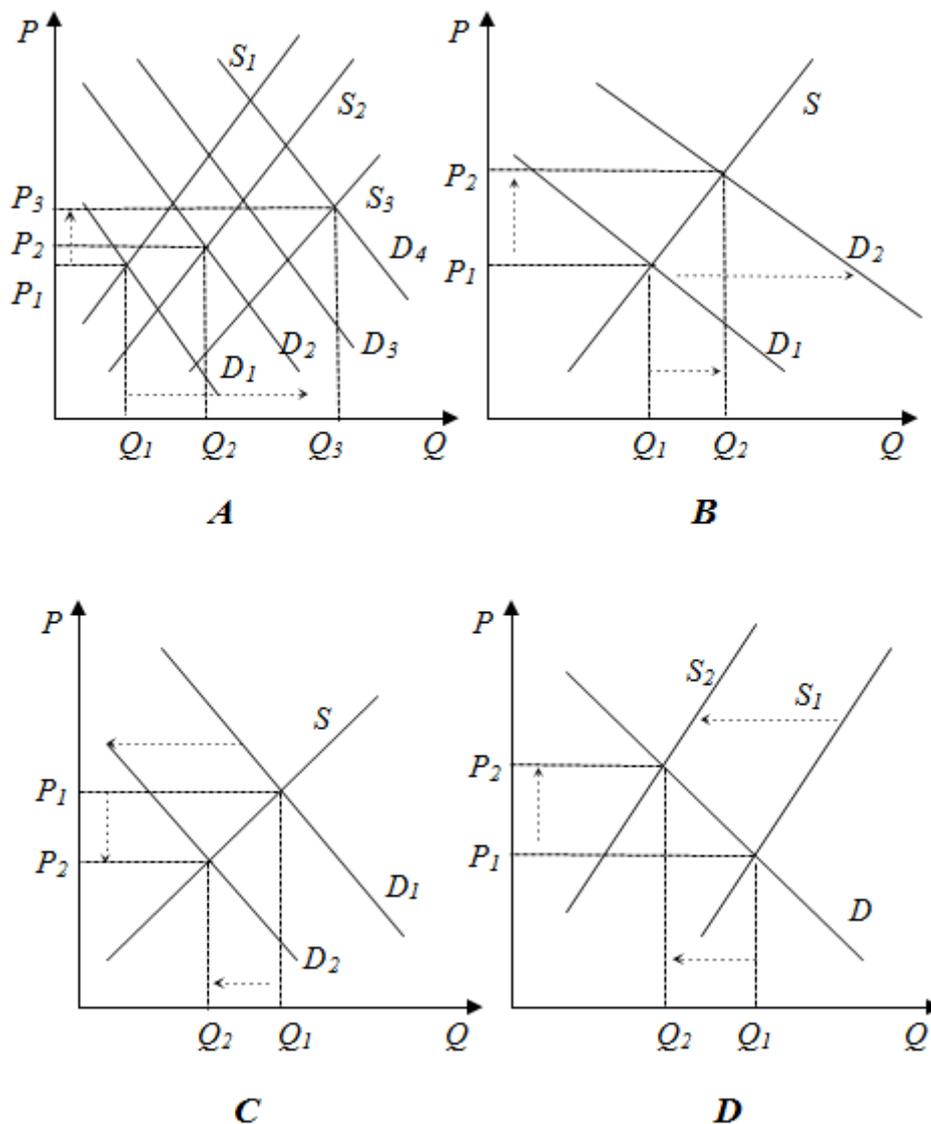
Figure 10.1 – Relationships between Markets A, B, C, and D

Suppose that initially, the markets for all consumer goods and inputs are in equilibrium. However, a shift in consumer preferences toward good A occurs, possibly leading to an increase in demand for good A (the demand curve will shift to position D_2), leading to an increase in its market price and, most likely, a subsequent increase in supply (the supply curve will shift to position S_2), establishing a new market equilibrium.

The new equilibrium will correspond to an equilibrium price of P_2 and an equilibrium output of Q_2. By carefully studying the market consequences of changes in consumer preferences for good A, we can identify numerous price adjustments in the markets for other goods that are substitutes or complements for good A. The equilibrium output of substitute good B will increase, while the price of this good will simultaneously increase (figure 10.1 B).

Conversely, the production of the complementary good C will decrease, and its price will fall (figure 10.1 C). There is also a possibility of a

slight decrease in the supply of good D, whose production uses significant amounts of the same inputs required for the production of good A (figure 10.1 D).

Thus, multiple price and production volume adjustments will occur for many goods. Ultimately, this will affect the demand or supply of good A, i.e., ***a feedback effect*** will occur, reflecting changes in partial equilibrium in a given market as a result of changes in related markets influenced by the initial changes in this market. Thus, an increase in the price of good B will lead to an increase in demand for good A (the demand curve will shift to position D_3).

A decrease in the price of good C will result in an even greater increase in demand for good A (the demand curve may shift to position D4). A decrease in the production of good D will reduce the prices of the inputs used in the production of D and A, and accordingly, the supply curve for A will shift rightward to position S_3. These feedback effects will result in an increase in the equilibrium volume of output A to Q_3 and its price to P_3. And the process of market adjustment will continue.

Thus, general economic equilibrium:

1. Takes into account the interrelations between product markets.

2. Takes into account the interrelations between product and resource markets.

3. Takes into account the effect of forward linkages between markets.

4. Takes into account the effect of backward linkages between markets.

5. Is established in all markets simultaneously.

6. Assumes a situation in which neither buyers nor sellers are willing to change their purchase and sale volumes.

According to Walras, the path to general equilibrium is a gradual process, a "feeling search" for the correct exchange proportions through the mechanism of flexible elastic prices.

2 Exchange efficiency. Indifference Curve

When analyzing general economic equilibrium, it is necessary to examine:

1. How efficiency is achieved in the exchange of produced goods.

2. How efficiency is achieved in the production of goods.

3. The extent to which the structure of goods produced corresponds to the structure of consumer demand.

The answers to these three questions are given using two main tools:

1. The Edgeworth box.

2. The Pareto efficiency (optimum) criterion.

Let's analyze this problem using a diagram known as the Edgeworth box. Francis Ysidro Edgeworth (1845–1926), an English economist, was one of the first to use this analytical tool (figure 10.2).
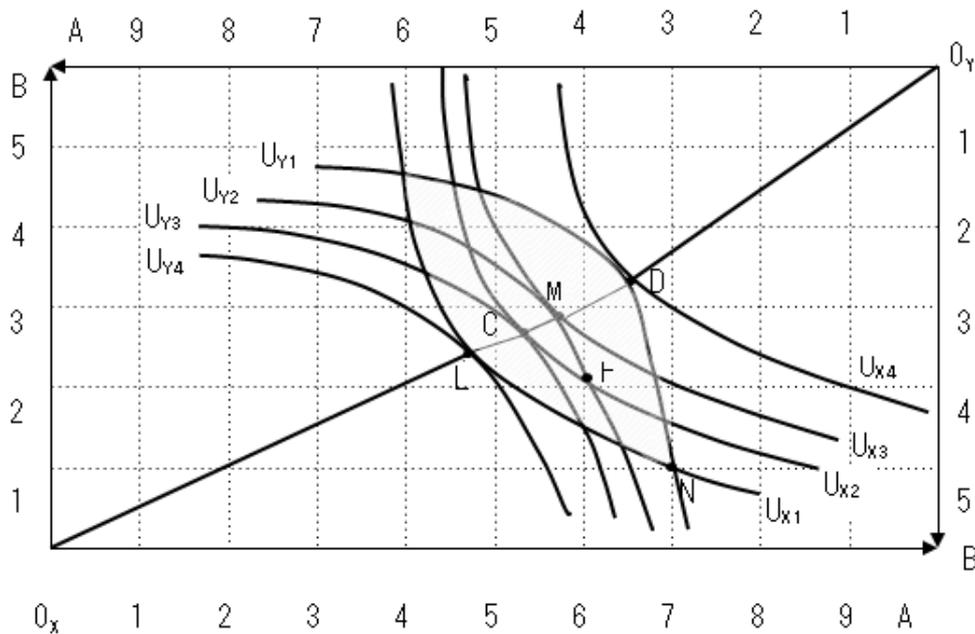
Figure 10.2 – Exchange in an Edgeworth Diagram

The horizontal axis represents the quantity of good A, and the vertical axis represents good B (figure 10.2). Accordingly, the length of the box equals the total quantity of good A available to consumers X and Y (in our example, 10 units), and the height of the box equals the total quantity of good B (6 units).

Each point inside the Edgeworth box represents the market baskets of both consumers. Individual X's consumption baskets are measured from the origin 0_X (the lower left corner), while individual Y's are measured from the origin 0_Y (the upper right corner). X's utility increases to the right (upward), while Y's utility increases to the left (downward).

Is the state N, which corresponds to the initial distribution of consumer goods between X and Y, an efficient distribution? This depends on the shape of the indifference curves of consumers X and Y (the marginal rates of substitution between goods A and B for consumers X and Y) and the chosen criterion for assessing the efficiency of distribution.

The Pareto optimality criterion states that, given an efficient distribution of goods, their further redistribution cannot improve the situation of even one consumer without worsening the situation of another. Since the slopes of the indifference curves characterize the marginal rate of substitution between two goods, the formal criterion for the existence of Pareto efficiency in exchange is the achievement of their equality:

$$MRS_{AB}^X = MRS_{AB}^Y \qquad (10.1)$$

This is the *first condition of social efficiency*.

The shaded region is the region where buyers x and y are better off. That is, any distribution of goods in this region improves their position relative to the starting point N, meaning it is the region of mutually beneficial transactions for both partners. However, no transaction, except those at the points of tangency of the indifference curves, is efficient, as the Pareto condition is not satisfied.

At the points of tangency, when the slopes of the indifference curves are equalized, the exchange of goods is optimal.

The O_xO_y curve is a contract curve, all points of which are points of efficient distribution of goods between two consumers. On this line, all transactions are mutually beneficial and imply equality not only of the marginal rates of substitution for x and y, but also of the marginal rates of the market price ratio.

$$MRS_{AB}^X = MRS_{AB}^Y = \frac{P_A}{P_B}, \qquad (10.2)$$

$$\frac{MU_A^X}{MU_B^X} = \frac{MU_A^Y}{MU_B^Y} = \frac{P_A}{P_B}, \qquad (10.3)$$

where P_A is the price of good A; P_B is the price of good B.

The contract curve can be represented as a consumer possibilities curve (figure 10.3).
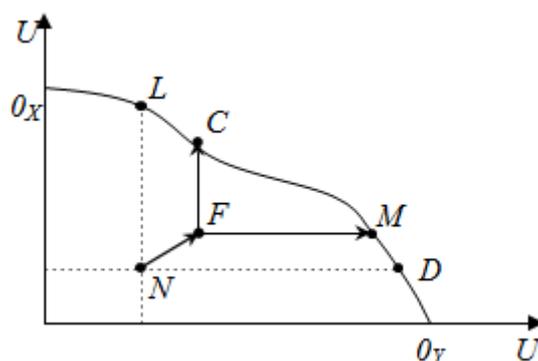
Figure 10.3 – Consumer Possibilities Curve

The consumer possibilities curve suggests that moving beyond its boundaries upwards and to the right makes trade unprofitable, while points within the curve indicate movement toward efficient exchange and the search for mutually beneficial trade opportunities. All points on the consumer possibilities curve indicate that the benefit from exchange for each consumer is maximized, and the search for further improvements is impossible.

3 Production Efficiency. Production Possibilities Curve

A similar model is used to analyze production efficiency, with one difference: resources L and K are allocated between producers of two goods, A and B.

The length and width of the Edgeworth box correspond to the volumes of resources, and each point in the box represents the actual allocation of resources between the two types of sellers.

On the axes of the Edgeworth box diagram, instead of consumer goods, we will plot production resources (figure 10.4).
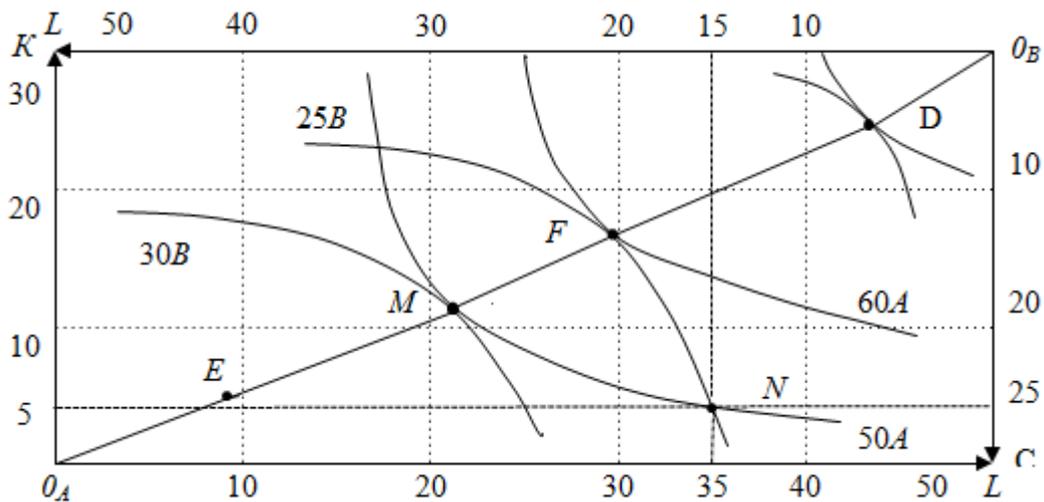
Figure 10.4 – Production on the Edgeworth Diagram

Each point on the diagram represents the labor and capital inputs required to produce specific quantities of goods A and B. For example, point N corresponds to the inputs of 35 units of labor and 5 units of capital for the production of good A, and 15 units of labor and 25 units of capital for the production of good B. As can be seen, the total resources available to society are 30 units of K and 50 units of L.

A set of production isoquants (equal output curves) shows output levels for different combinations of resource inputs. Recall the definition of an "isoquant" – it is a curve showing all combinations of variable production resources that can be applied to produce a given volume of output. For example, point N corresponds to the production of 50A and 25B (the numbers 50 and 25 are arbitrary).

The allocation of resources in production is technically efficient (Pareto efficient) if the output of one good cannot be increased (by reallocating resources between industries) without decreasing the output of the other good. Resources are allocated inefficiently if their reallocation would increase the output of one good (with the output of the other remaining unchanged) or would increase the production of both goods.

Thus, allocation at point N is inefficient. Any combination of resources in the region bounded by isoquants 50A and 25B yields greater output of both good A and good B (or of one good with the output of the other remaining unchanged).

One can move to point M by transferring some labor from the production of good A to the production of good B and some capital from the output of B to the output of A. Under these conditions, the same quantity of good A (50 units) will be produced, but a greater quantity of good B (30 units, not 25). When moving to point F, the output of good A will increase while the production of good B remains unchanged (25 units). Points M and F are the points of the most efficient allocation of production resources, since in each of them the isoquants of goods A and B touch.

Connecting the multiple points of tangency of these isoquants yields a **production contract curve**, which graphically illustrates all technically efficient combinations of labor and capital allocation. Any point outside this curve can be characterized as a point of inefficient resource allocation, because at this point the isoquants for goods A and B intersect.

$$MRTS_{LK}^{A} = MRTS_{LK}^{B}, \tag{10.4}$$

where MRTS is the slope at each isoquant point.

As is well known, the marginal rate of technological substitution of capital for labor is the amount of labor that an additional unit of capital can replace without changing output.

The production contract curve 0A0B can be represented as a production possibilities curve (figure 10.5). Points 0A, E, M, F, D, 0B, and N, shown in figure 10.4, should be positioned accordingly in figure 10.5.
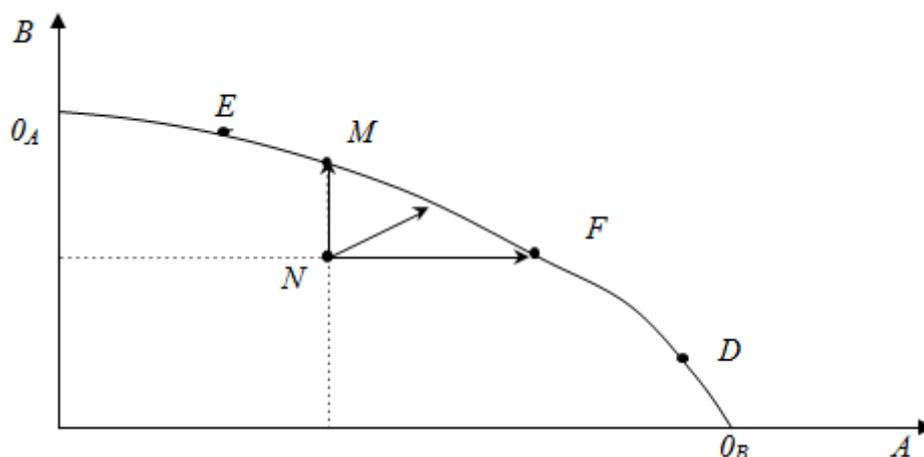
Figure 10.5 – Production Possibilities Curve

The arrows indicate possible directions of movement toward efficient resource allocation (efficient production). The transition from point N to

point E cannot be assessed using the Pareto efficiency criterion, as it corresponds to an increase in the production of good B and a decrease in the production of good A.

The set of points on the production possibilities curve, like the corresponding points on the production contract curve, reflects the level of efficient production of goods A and B. The slope of the production possibilities curve at any point is determined by the value of the marginal rate of transformation.

Thus, $MRS_{AB}^X = MRS_{AB}^Y$ is *the second condition of social efficiency* – the efficiency of resource allocation in production.

To achieve economic efficiency, a third condition is also necessary: namely, the structure of output must correspond to the structure of consumer demand.

$$MRT_{AB} = MRS_{AB}, \qquad (10.5)$$

where MRT$_{AB}$ is the marginal rate of transformation of goods A and B; MRS$_{AB}$ is the marginal rate of substitution of goods A and B.

The *marginal rate of transformation* (MRT) is used to quantitatively characterize the possibility of transforming one good into another. It shows how much the production of one good must be reduced to increase the production of another, while optimally utilizing available resources (figure 10.6).

$$MRT = \frac{Q_A}{Q_B}, \qquad (10.6)$$

where MRT is the marginal rate of transformation.

Figure 10.6 – Production Possibility Curve and Indifference Curves

At the point of tangency of U$_2$ with the production possibility curve (E), is *the third condition of economic efficiency.*

4 General economic equilibrium and Social Welfare

Thus, three conditions are necessary to achieve general economic equilibrium:

1. The exchange of produced goods must be efficient.

2. Efficiency in the production of goods is achieved.

3. The structure of goods produced corresponds to the structure of consumer demand.

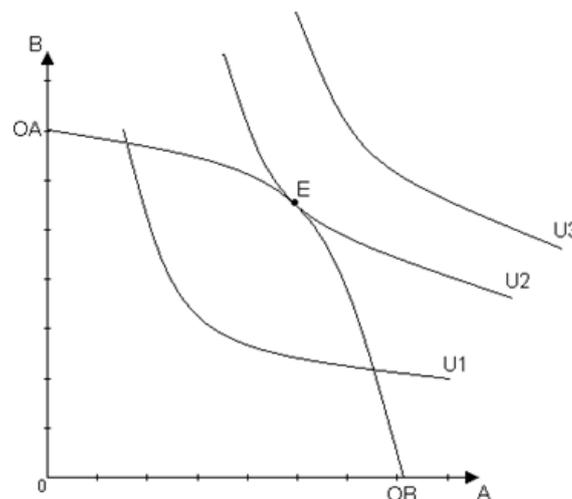All three conditions of general economic equilibrium and efficiency can be summarized as follows: to achieve efficiency for subjects and objects, the marginal rates of substitution between any two goods must be equal for all consumers and producers, respectively. A perfectly competitive economy corresponds to these three conditions.

Two theorems of economic welfare can be formulated.

1. The equilibrium allocation of production resources is necessarily Pareto efficient.

2. A Pareto-efficient allocation of production resources is a competitive equilibrium.

General economic equilibrium is a Pareto-optimal state in which the welfare of at least one participant in the market economy cannot be increased without reducing the welfare of other participants.

Advantages of the theory:

1. A uniform criterion for all individuals.

2. No interpersonal comparison of utility is required.

3. Simplicity of analysis.

However, there are also controversial points in this theory:

1. The welfare of the economy cannot always be compared with the maximum utility of each individual.

2. Not every individual is able to accurately measure his own usefulness; he may give an erroneous assessment.

The main advantage of the welfare model is that it offers a precise and clear criteria-based approach to the problem of distribution.

However, competitive markets often exhibit a highly uneven distribution of income, so many economists and politicians believe that the state must ensure the redistribution of income and goods to achieve social justice, even if this reduces efficiency.

The fairness of a particular distribution of goods depends primarily on the interpretation of the concept of "justice". There is no general criterion of justice.

The fairness of a particular distribution of goods depends primarily on the interpretation of *the concept of Justice."* There is no general criterion of justice.

According to the egalitarian approach, the distribution of income and goods is fair if all members of society receive equal income and equal amounts of goods.

The utilitarian approach to defining justice assumes maximizing the total utility of all members of society, even if the utility of individual individuals decreases.

The Rawlsian approach to defining justice assumes the mandatory maximization of the utility of each member of society. According to this approach, social welfare depends only on the welfare of the individual with the lowest level of well-being – the individual with minimal utility.

According to **the liberal approach**, a fair distribution of income and goods is created by market mechanisms, without any government intervention. However, in a market system, the problem of distribution has no clear solution, since distribution is the result of a game, depending on the individual's contribution, chance, and luck.

Thus, attempts to create a universal criterion for identifying the results of microeconomic policies that lead to increased social welfare have met with only relative success, as the levels of well-being of individuals are quantitatively incommensurable, and the problem of increasing well-being is inseparable from the issue of justice. Nevertheless, welfare economics has proposed a number of criteria and their modifications (most notably, the Pareto criterion), used, with varying qualifications, to assess changes in levels of social welfare.

5 Market failure and the need for microeconomic equilibrium

Market failure (fiasco) is the failure of the market mechanism to account for all the effects and consequences of market transactions and bring the economy to a state of equilibrium.

Market failure manifests itself in:

1. The presence of externalities in the economy – additional costs or benefits that affect groups of individuals or society as a whole not participating in the market transaction.

The market is unable to resolve the problem of externalities. Industries with negative externalities produce goods in excess of the optimal level for society, while industries with positive externalities underproduce goods. The role of the state is to regulate externalities to ensure the production of goods in quantities that meet social needs.

2. The inability of the market to produce a public good—a collective good with characteristics of non-excludability and non-selectivity in consumption.

These properties of public goods make them difficult to sell on the market–many people will not agree to pay for them, knowing that they cannot be deprived of the opportunity to use them. In this regard, it is

important for the state to act as the organizer of public goods production, collect taxes (regardless of the possible disinterest of a minority in paying for public goods), and purchase these goods for society.

3. Asymmetry of market information, as well as the adverse selection and moral hazard associated with it.

A market only functions well if all participants have complete information about how the market operates. However, more often than not, buyers and sellers have different levels of information about a product: sometimes the seller knows more, sometimes the buyer. A transaction in which both parties are unequally informed can only be concluded at optimal prices by chance.

Most likely, one participant will benefit at the expense of another (usually the more informed at the expense of the less informed). The role of the state is to disseminate market information, forcing more informed participants to share information with less informed ones. Furthermore, some markets (for example, the insurance market) are fundamentally based on risk and uncertainty, and government regulation measures that help reduce risk thereby lead to price optimization and, consequently, increased sales volumes in the market.

4. Another market failure is monopoly.

In a monopolistic industry, goods are produced in smaller quantities than in a perfectly competitive industry, and their prices are higher. Government antitrust regulation is necessary to improve the efficiency of resource allocation. Market failure, in practice, gives rise to cyclical development, crises, high inflation and unemployment, unbalanced development, etc.

To mitigate the consequences of market failure, state regulation of the economy is necessary, which can be implemented within the minimum necessary and maximum permissible limits. Using administrative and economic regulation methods, the state:

1) participates in the distribution and redistribution of income;
2) funds fundamental science;
3) regulates the employment-unemployment ratio;
4) resolves regional problems;
5) controls externalities;
6) organizes the supply of public goods.

However, recently, alongside market failure, state failure has also begun to manifest itself, which has many specific manifestations.

Key concepts

Partial market equilibrium, general economic equilibrium, Edgeworth box, Pareto optimality, exchange efficiency, MRS, contract curve, consumer possibilities curve, production efficiency, MRTS, marginal rate of transformation, social welfare.

TOPIC 11. THEORY OF EXTERNALITIES

1 Public and private, positive and negative externalities

Previous analyses of market functioning were based on the assumption that market transactions have no impact on anyone other than the participants in those transactions, and that all costs and benefits are factored into the market price. In other words, it was assumed that there are no side effects associated with the production and consumption of goods.

However, sometimes the consequences of a private transaction affect the economic situation of third parties not involved. These parties sometimes bear costs, and in others, receive benefits, but the market price does not reflect this. The real costs, or utility, are greater than those implied in the market price. Therefore, the market price fails to convey reliable information, resulting in inefficient resource allocation.

The primary advantage of the market mechanism is its ability to efficiently allocate resources available in the economy. Situations of inefficient resource allocation encountered in practice are called market failures. Neoclassical theory identifies the following causes of market failure: monopoly power, externalities, public goods, uncertainty and risk, and incomplete and asymmetric information.

Externalities are factors that are not factored into market prices and represent additional costs or additional benefits for third parties – that is, individuals who are not participants in market exchange. They are distinguished by two key characteristics. First, they are effects that affect the well-being of others. Second, the entities creating these effects do not bear the costs or receive compensation equal to the change in the well-being of others. The transfer of some costs or benefits to individuals not participating in market transactions is known as spillover effects, or externalities.

Externalities in the real economy manifest themselves in a wide variety of ways. Based on their impact on the subject, externalities are classified as positive or negative.

An impact is considered ***positive*** if it results in an increase in the utility of a third party or the output of a firm. An increase in utility or output is an external benefit of a given activity.

Externalities that lead to a decrease in the utility of a consumer or the output of a firm are called ***negative***. A decrease in utility or output is considered an external cost of a given activity.

By origin, externalities can be divided into four groups:

1. "Production-to-production": Here, the economic activity of an entrepreneur influences the production levels of other entrepreneurs.

Example: Negative externality: Chemical plant waste prevents the use of land for grain cultivation. Positive externality: A beekeeper's apiary and a garden, located nearby, have a positive impact on each other.

2. "Production-to-consumption": The economic activity of an enterprise influences the level of utility of a household.

Example: Negative impact: Residents near a railway suffer from harmful emissions and noise. Positive impact: A company builds a road linking two residential areas.

3. "Consumption-production": A household's economic activity influences the level of production of entrepreneurs.

Example: Negative impact: Family picnics cause fires that damage forestry. Positive impact: Improving the surrounding area reduces the work of public utilities.

4. "Consumption-consumption": A consumer's economic activity influences another consumer's utility.

Example: Negative impact: An individual's utility decreases if their neighbor plays music loudly at night. Positive impact: If an individual plants a flower garden in front of their house, their neighbors' utility from viewing the flowers increases.

The following cost groups are typically distinguished based on external effects.

Private costs (PC) are the costs incurred by market participants directly related to the production of a good (figure 11.1). Included in the market price of goods, they are of an internal nature.

External costs (EC) are the costs incurred by non-participants in the production and consumption of a given good (figure 11.1). Since they are not reflected in the price of the good, they are external to it.

Social costs (SC) represent the total costs of participants in a market transaction and third parties (figure 11.1).

$$PC + EC = SC. \tag{11.1}$$

Changes in each cost type, as an increase caused by a certain increase in the production of the good (ΔQ), will be represented by marginal private costs MPC, marginal external costs MEC, and marginal social costs MSC, which can be found as derivatives of the corresponding cost functions.

Marginal private costs (figure 11.2):

$$MPC = \frac{\Delta PC}{\Delta Q}. \tag{11.2}$$

Marginal external costs (figure 11.2):

$$MEC = \frac{\Delta EC}{\Delta Q}.$$

(11.3)

Marginal social costs (figure 11.2):

$$MSC = \frac{\Delta SC}{\Delta Q}.$$

(11.4)
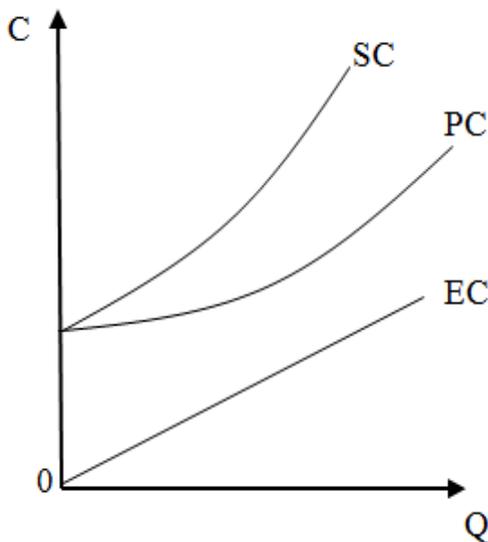
Figure 11.1 – Costs Curves   Figure 11.2 – Marginal Costs Curves
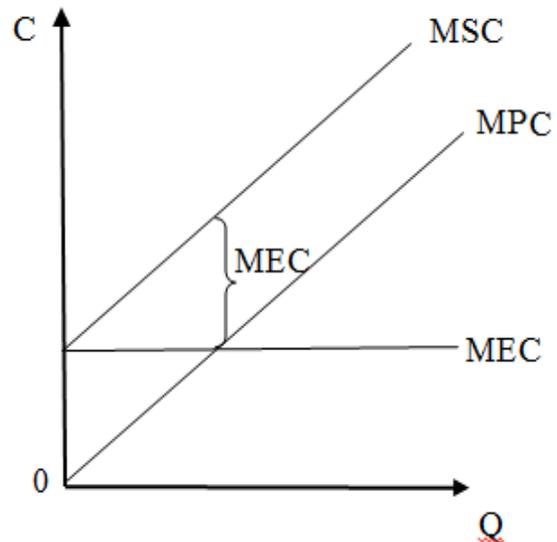
2 Internalization of Externalities. The Coase theorem

The problem of efficient resource allocation, taking into account externalities, poses the problem of their internalization.

Internalization is understood as the transformation of externalities into internal ones based on bringing marginal private costs (and benefits) closer to marginal social (social) costs (benefits). An economic agent whose activity generates an externality must bear the costs in full, rather than shifting them to third parties (in the case of a negative externality) or receiving compensation for providing additional utility (in the case of a positive externality).

In externality theory, two alternative approaches to the problem of internalization were known. The first was proposed in the 1920s by Antoine Pigou, the second in the 1960s by Robert Coase. The first approach proposed the use of corrective taxes and subsidies as a solution to this problem.

To understand the need for internalization of externalities, let's consider market equilibrium in the markets for goods generating externalities (figure 11.3).
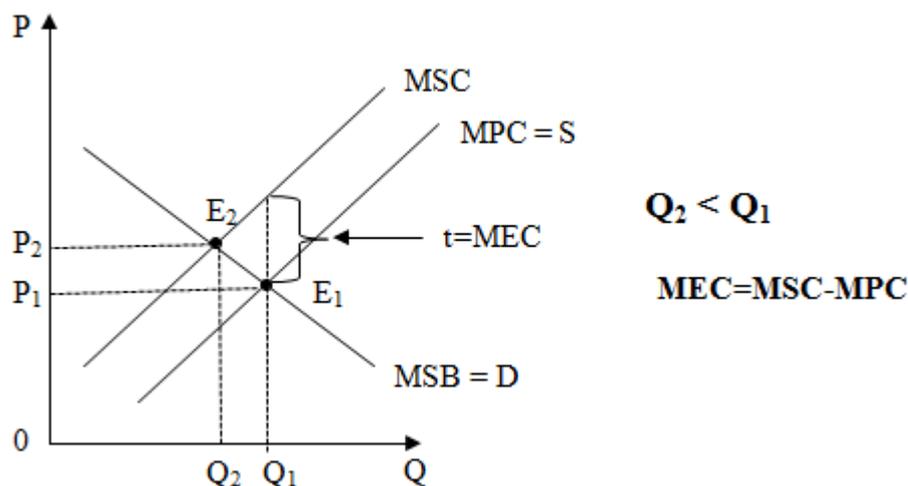
Figure 11.3 – Internalization of Negative Externalities

Market equilibrium is established at point E_1 with price P_1 and output Q_1. This equilibrium takes into account only the costs of market participants. However, this equilibrium does not take into account negative externalities, which are expressed as the marginal social benefit (MSC). That is, the real equilibrium should be at point E_2 with the corresponding price P_2 and output Q_2. Equilibrium E_2 takes into account negative externalities. An increase in marginal private cost (MPC) by the marginal external cost (MEC) will lead to an increase in price from P_1 to P_2 and subsequently cause a decrease in supply from Q_1 to Q_2.

The main problem with negative externalities is the overproduction of goods and the negative externalities they generate ($Q_2 < Q_1$).

The main method of internalization is a corrective tax equal to the marginal external cost MEC (t = MEC - Pigou). A corrective tax, or Pigou tax, is a tax on the output of economic goods characterized by negative externalities, which raises marginal private costs to the level of marginal social costs.

A **Pigou tax** is primarily incentive-based: its purpose is to decouple the price paid to consumers from the price received by producers, promoting a market equilibrium where the quantity of goods exchanged corresponds to the optimum (MSB = MSC).

Since firms can benefit from the difference between the cost of reducing emissions and the tax, the tax acts as a powerful incentive for firms to reduce emissions through technological improvements, while the tax contributes to increased government revenues.

The main problem with the internalization of negative externalities is the transformation of externalities into internal ones, into an element of market price.

Let's consider the equilibrium in the market for goods generating positive externalities (figure 11.4).
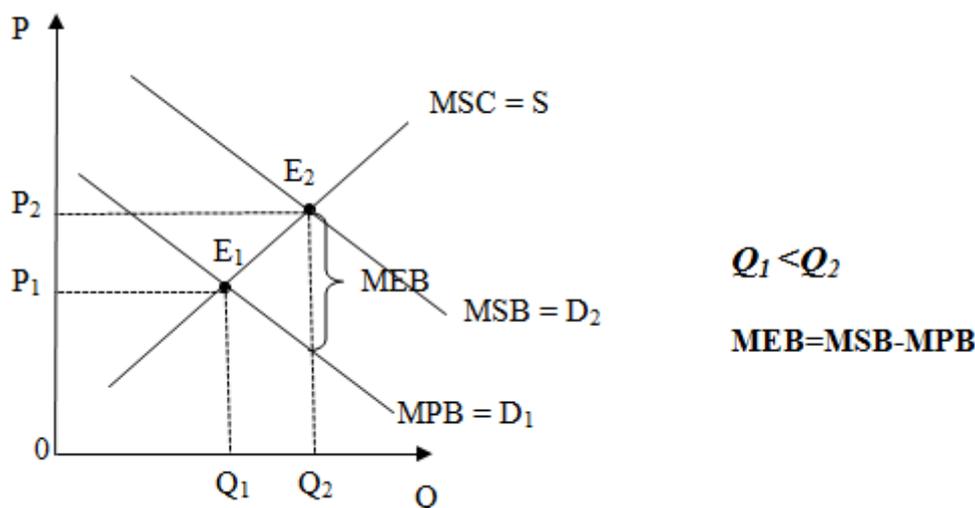
Figure 11.4 – Internalization of Positive Externalities

Market equilibrium is established at point E1 with price P_1 and output Q_1, where (MPB = MSC). Social equilibrium is reached at the point where MSB = MSC. This is the real equilibrium, where all additional benefits, both included and not included in the price, are taken into account.

The main market problems are the underproduction of goods that generate positive externalities ($Q_1 < Q_2$).

If these externalities were included in the market price during internalization, the price of goods would be higher and output would be higher. Therefore, internalization in this case implies:

1) an increase in MPB by the amount of MEB, which is achieved through corrective subsidies equal to the marginal external benefits.

2) demand for goods increases;

3) output increases to the optimal Q_2. A corrective subsidy is a subsidy to producers or consumers of economic goods characterized by positive externalities that bring marginal private benefits closer to marginal social benefits. A subsidy equal to the marginal external benefit S = MEB increases demand (production) to the level at which MSB = MSC.

Subsidies are payments to consumers or producers of goods. Subsidies can be aimed at stimulating both demand and supply. Demand subsidies can take various forms: food stamps; cash payments to the poor; free vaccinations; educational scholarships, etc.

Taxes and subsidies are aimed at redistributing resources toward greater efficiency to achieve equality MSC = MSB.

However, corrective taxes and subsidies cannot completely solve the problem of externalities. First, the size of the marginal social harm or benefit must be quickly determined. Secondly, it is important to establish the specific activity that leads to adverse consequences and whether there is a clear relationship between the volume of output and the size of the externality, which is a complex task. Thirdly, the extent of damage or benefit is determined through legal and political debate, typically with insufficient information about the nature, direction, and long-term consequences of externalities.

An alternative approach to internalization was proposed in the 1960s by the American economist and 1991 Nobel Prize laureate Robert Coase.

The key idea put forward by Robert Coase was that externalities arise from the lack of established property rights to resources. The presence of marginal external costs or benefits indicates the possibility of alternative uses of resources and goods. Clean air can be consumed by the population or polluted by businesses.

The essence of these processes lies in the lack of established property rights to resources, which allows them to be used free of charge. When property rights are established, the resource is valued and used as an external factor of production, leading to an increase in marginal private production costs to the level of marginal social costs.

If property rights to resources are established and can be freely exchanged, then producers and recipients of externalities can, on a compensatory basis, agree on a distribution of these rights that ensures equality of their costs and benefits.

In other words, by exchanging property rights based on consideration of the costs and benefits of externalities, they can be transformed into internal ones, and an optimal allocation of resources is achieved. For example, if those providing additional benefits were granted property rights (the right to admire a flower garden), they would demand payment for the utility they provide, which would equate the marginal private and public benefits. A similar mechanism would operate in cases of negative externalities (the right to clean air for the population), raising internal (private) costs to the level of public costs.

Consequently, established property rights would be redistributed such that monetary resources would be transferred to those economic actors who benefit most from them. Thus, the use of any resource without incurring costs equal to its opportunity cost becomes impossible. The neutralization of the externality occurs without government intervention.

3 Regulation of Externalities

Regulating externalities is the implementation, through restrictions or incentives, of methods for internalizing externalities aimed at optimizing resource allocation.

Regulating externalities requires taking into account the "cost-benefit" trade-offs, but this accounting is fraught with several difficulties:

1) it is difficult to precisely identify those who experience externalities;

2) it is difficult to reduce the costs and benefits of externalities to a single time interval;

3) cost-benefit analysis is not applicable to those types of goods associated with political activity and national security.

Thus, the "cost-benefit" method can unjustifiably distort the accounting of external benefits: overstating or understating them.

Therefore, various methods of regulating externalities (methods of internalizing externalities) are used.

The state plays a leading role in regulation, using the following methods:

• introduction of standards;
• corrective taxes and subsidies;
• licenses;
• "compensation" mechanism;
• "credit" mechanism;
• Monitoring.

Standards are government-imposed restrictions. For example, on the types and volumes of environmental pollution from industrial emissions.

Taxes and **subsidies** increase marginal private costs (benefits) to marginal total costs (benefits).

Licenses are a mechanism for creating a market for pollution rights with the freedom to buy and sell such licenses.

The "offset" mechanism is the practice of a firm purchasing pollution rights from other firms with the goal of reducing that pollution.

The "credit" mechanism is a mechanism for firms that have achieved lower pollution levels than normal to receive rights (credits) to exceed pollution standards by an equal amount in the future through the accumulation of credits.

Monitoring is the control and tracking of emission standards for each component of pollution, giving a firm the right to exceed the standard for one type of emission if it ensures an equal reduction in emissions for another type.

The most common method of regulating positive externalities is subsidies, which are payments to consumers or producers of economic goods. Subsidies can be aimed at stimulating demand when their recipients are consumers of the good that generates the positive externality. Such subsidies can take various forms: food stamps; cash payments to the poor; educational stipends; and free vaccinations and medical examinations.

Subsidies can also be aimed at stimulating supply. In this case, the direct recipients of the subsidies are producers, and their effect is expressed in a reduction in the marginal private costs of producing economic goods. Examples of this type of regulation include subsidies for agricultural production and housing construction.

The specification of property rights was proposed by Coase in 1960. It can also be considered a method of regulating externalities.

4 Use of the theory of Externalities in economic practice

The optimal form of internalization of externalities cannot be chosen according to a template. It is determined by the specifics of a particular situation, the form of the externality, and the practical feasibility of achieving the result with the lowest possible cost. The degree of government involvement in internalizing externalities depends on the scale of the externality's impact on the population, the extent of the damage caused, and the magnitude of the necessary transaction costs to eliminate it. The theory of externalities has been most widely applied in solving environmental problems.

The theory of externalities attracted the attention of the global community as early as the 1960s and 1970s and was recognized in 1987 by the World Commission on the Environment as a principle of sustainable development.

Sustainable development is understood as development that meets the needs of current generations without posing a risk that future generations will be unable to meet their needs.

In global practice, economic prescriptions are widely used in the form of:

1) standards and norms that help reduce the burden on the environment;

2) charging for emissions;

3) using environmental licenses through the creation of license markets.

A significant portion of the costs of environmental protection measures is covered by public funds.

Economic science considers effective environmental control measures to be those that balance the marginal social benefits obtained from such measures with the marginal social costs of their implementation.

In the Republic of Belarus, priority is given to administrative methods of regulating externalities, primarily through environmental standards.

The Belarusian system of economic standards includes:

Natural environmental standards are economically justified and technically achievable values for the most efficient use of natural resources (water, air, land, soil, mineral resources, etc.), calculated based on the capabilities of scientific and technological progress.

Price standards in a market economy are intended to provide economic incentives for environmental protection. These standards include basic standards for fees for emissions and discharges of harmful substances, as well as for waste disposal.

Production and economic standards are intended to limit the parameters of a specific enterprise's production and economic activities from the standpoint of environmental protection. These include technological, urban planning, recreational, and other business activity standards.

Recreational standards define the rules for the use of natural complexes to ensure conditions for full-fledged recreation and tourism.

Urban planning standards are developed to ensure environmental safety during the planning and development of populated areas.

Technological standards include maximum permissible emissions of harmful substances into the atmosphere, maximum permissible discharges of pollutants into water bodies, and maximum permissible fuel combustion levels.

Sanitary and hygienic standards regulate the conditions and characteristics of drinking water supply zones, water use facilities, and sanitary protection zones of enterprises and are intended to protect human health and reduce the harmful impact of pollution sources on elements of the natural environment. Sanitary and hygienic standards, in turn, include independent groups: hygienic and sanitary protection.

Environmental standards establish limits on permissible harmful anthropogenic impacts on the environment, exceeding which may pose a threat to optimal conditions for the coexistence of humans and their environment. They include environmental-hygienic and environmental-protective standards, as well as maximum permissible regulatory loads on the environment.

Methods for regulating environmental management are conventionally divided into regulatory and legal, organizational and administrative, and financial and economic.

Key concepts

Externalities, negative externalities, positive externalities, private marginal costs, external marginal costs, social marginal costs, private marginal benefits, external marginal benefits, social marginal benefits, property rights, Coase theorem, corrective tax, corrective subsidy.

TOPIC 12. INFORMATION, UNCERTAINTY AND RISK IN ECONOMICS

1 Choice under Uncertainty. The concept of Asymmetric Information
2 Markets with Asymmetric Information. Adverse Selection. Types of market signals
3 Moral hazard. Principal-Agent Problem
4 Asymmetric Information as a cause of Government Microregulation
Key concepts

1 Choice under Uncertainty. The concept of Asymmetric Information

A prerequisite for the optimal functioning of a market economy is the complete awareness of economic entities regarding prices, product quality and product range, demand structure, economic growth prospects, etc. However, only the market as a whole can guarantee complete and comprehensive information; no individual entity possesses it all. In a real market economy, market transactions are conducted in the absence of complete information.

Reasons:

1. The existence of information search costs – transaction costs.

2. Information is constantly becoming outdated, changing, and may be inherently inaccurate (problems with information reliability arise).

3. The inability of market agents to fully assimilate and digest information.

4. Some information may be lost during processing.

Thus, economic entities most often make decisions under conditions of *market uncertainty* – a situation in which the number of outcomes is infinite, or the probability of events cannot be determined. Incomplete information has significant and sometimes negative consequences for decision making. One of these consequences is the necessity of taking risks. Risk is the potential danger of loss. One of the first economists to study the problem of uncertainty was F. Knight (1885–1974).

To determine the optimal amount of information for each entrepreneur, it is necessary to compare the expected marginal benefits of information with the expected marginal costs of obtaining it. The corresponding relationships are shown in figure 12.1.

The intersection of the marginal benefit (MG) and marginal cost (MC) curves, denoted by B, reflects the balance between these two indicators. The quantity (QB) and price (Pb) of the required information represent the coordinates of point B.

If the expected benefit from acquiring information exceeds the expected marginal cost (MG > MC), then such information should be

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acquired. If not, then it is better to forego such costly acquisitions: some errors would be cheaper.
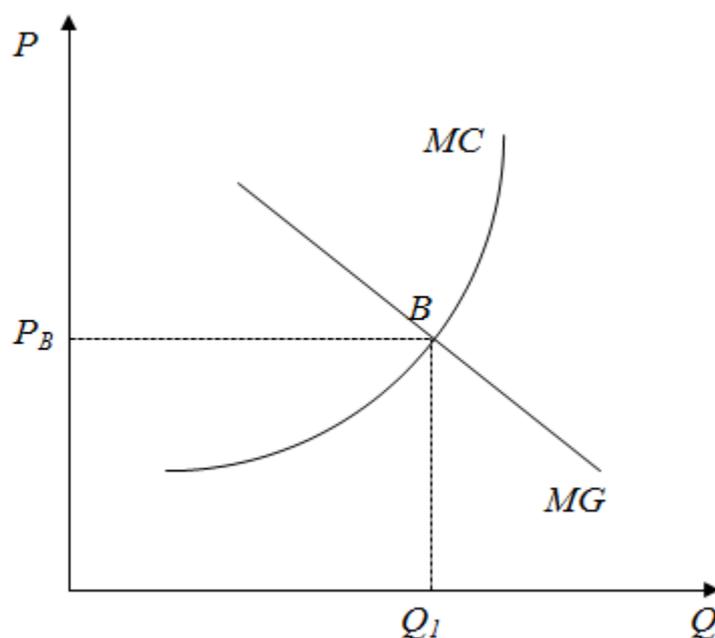

Figure 12.1 – Optimal amount of information

Risk is a situation in which all possible outcomes and the likelihood of their occurrence are known.

In the economics of uncertainty and risk, the key concept is probability. In its most general form, probability represents the likelihood of a certain outcome or the occurrence of an event. In other words, probability is the possibility of something occurring.

Depending on the predicted event, the following types of probability are distinguished:

1. A priori (mathematical) probability – calculated based on a scientific law or logical principle.

2. Statistical probability – determined solely experimentally, i.e., empirically, based on statistical observations.

3. Expected probability – has no rational calculation algorithm.

Thus, risk is an estimated probability, while uncertainty is something that cannot be estimated.

Economic risk is the possibility that the characteristics of an entity's economic condition will deviate from expected values. In specific economic conditions, as well as when solving innovative problems, business entities should identify the possible positive and negative consequences of their actions, considering the likelihood of achieving the desired result, undesirable consequences, and deviations from the chosen goal.

Risk can be classified according to various criteria.

Based on *the source of risk*, a distinction is made between systematic risk, which is derived from factors inherent to the system as a whole, and individual risk, which is derived from factors inherent to a given individual entity.

Based on *its impact on economic performance*, risk is classified based on the degree of profit potential. The risk of losses reflects the likelihood of direct losses. The risk of lost profits results from an initial focus on an unfavorable outcome, while the actual situation allowed for more effective management of available resources. The risk of additional revenues is associated with the likelihood of favorable market changes.

Risk classification based on *the decision-making level* is based on the degree of globality of risk factors, that is, the ability of these factors to influence market conditions, the financial and technical condition of the enterprise, and the implementation of decisions. Based on this, risks are classified as global, external, and internal.

Based on *the period of action*, risks are classified as long-term, medium-term, and short-term. Based on insurance affordability, risks can be classified as insurable and non-insurable.

By *the nature of the source*: risk of uncertain nature, socio-technical risk, and natural risk.

By *the aspects of the object under study*: socio-political risk, production and technological risk, environmental risk, medical risk, and economic risk.

By *the nature of the source*: random risk, systematic risk.

By *the relationship of the source to the object*: internal risk, external risk, and complex risk.

By *subject structure*: individual risk, collective risk, institutional risk. By assessment of the scale of consequences: catastrophic risk, critical risk, significant risk, moderate risk, insignificant risk, small risk.

By *assessment of the attractiveness of the consequences*: attractive risk, acceptable risk, unacceptable risk.

By *connection with other risks*: independent risk, dependent risk, substitutable risk, non-substitutable risk, primary risk, complex risk.

By *management capabilities*: obvious risk; hidden risk, measurable risk, immeasurable risk, predictable risk, unpredictable risk, transferable risk, non-transferable risk, manageable risk, unmanageable risk, direct risk, indirect risk, risk of ineffective plans, risk of deviation from plans.

Market participants' attitudes toward risk can vary and can be explained based on the law of diminishing returns: each additional unit of income has less utility than the previous one.

1. Risk averse individuals, given a given income, prefer a guaranteed outcome to a series of uncertain, risky outcomes (figure 12.2).

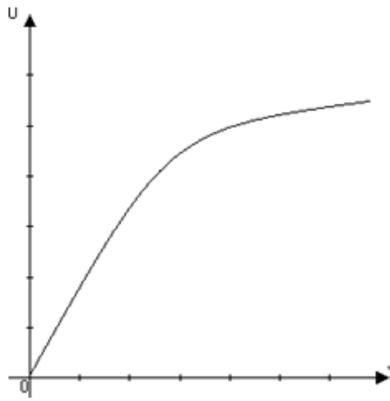Figure 12.2 – Situation typical for risk-averse individuals

2. Risk-seeking individuals prefer a risky outcome to a guaranteed outcome (figure 12.3).
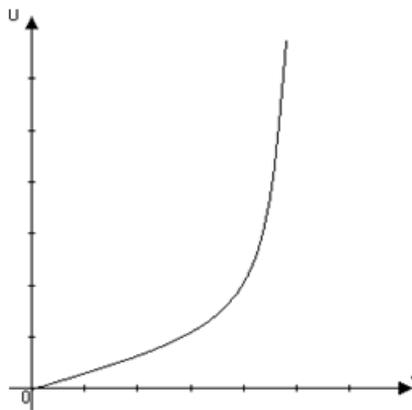

Figure 12.3 – Situation typical for risk-seeking individuals

3. Risk-neutral (indifferent) individuals – individuals are indifferent between the choice between a guaranteed and a risky outcome (figure 12.4).
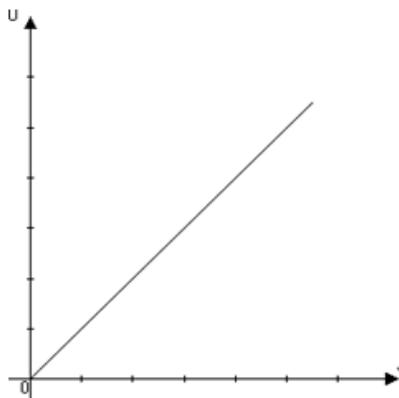

Figure 12.4 – Situation typical for risk-neutral individuals

In reality, three types of risk attitudes are intertwined in the behavior of market participants.

In a market economy, there are many ways to reduce risk.

1. Risk sharing (diversification). Risk can be distributed among participants or among risky commodities.

2. Risk pooling (insurance) – reducing risk by converting random losses into constant, low costs.

3. Information seeking.

4. Hedging – insurance through which futures and options are used to offset one market against another.

Futures are forward contracts for the delivery of a certain quantity of commodities at a specified date and price.

Options are the right to buy or sell a certain quantity of commodities at a future date and price at a predetermined price.

A special case of incomplete information in the market is its asymmetry.

Information asymmetry is a situation in which some market participants have information, while others do not. The main consequence of markets with asymmetric information is adverse selection. It is a situation in which inferior goods, services, and resources are purchased in a market with asymmetric information.

The second consequence is **moral hazard** – the hidden actions of one participant in a market transaction that affect another participant but remain unnoticed.

2 Markets with Asymmetric Information. Adverse Selection. Types of market signals

The role of asymmetric information in determining product quality and influencing market pricing was first identified by American economist and 2001 Nobel laureate in economics George A. Akerlof in his 1970 article "The Market for Lemons." He based his work on "The Market for Used Cars," by 1996 Nobel laureates William Spencer Vickrey and James Mirrlees. In this article, Akerlof demonstrated that a lack of information about the quality of a product leads to a perpetual decline in prices.

In a situation where a buyer lacks access to all the information necessary to purchase a good, the quality of the product will be measured as an aggregate average, which will undoubtedly be reflected in the price. J. Akerlof's article generated considerable interest because he was the first to conclude that used car sellers' profit from having complete information about the quality of their vehicles, while buyers may have only limited information. This is known as adverse selection, which significantly reduces the efficiency of a market economy.

The widespread prevalence of information asymmetry precludes treating this problem as a local one. By purchasing a good whose quality cannot be immediately verified, consumers enter a "lemon" market: examples include insurance or lending practices, as well as the use of reputation and standardization.

Adverse selection is also characteristic of markets with asymmetric information in favor of buyers. A classic example of adverse selection is the insurance market, specifically life insurance. Insurance buyers are more aware of their health status. Hidden characteristics are present. If an insurance company could distinguish healthy clients from sick ones, it would set different prices for insurance policies (lower for healthy ones, higher for sick ones).

In practice, however, insurance companies lack this ability, and they set an average price.

In reality, insurance companies can use various methods to combat asymmetric information, for example:

1. Conducting a medical examination when buying life insurance.
2. Group insurance.
3. Mandatory insurance for certain groups of people.

Information asymmetry also exists in many other markets. These include retail stores (the store knows better than you whether it will fix a defective item or allow you to return it); dealers in rare stamps, coins, books, and paintings (whether these items are genuine or counterfeit, the dealer knows much more about their authenticity than you do); restaurants (how often do you visit the kitchen to check the freshness of the ingredients and whether hygiene standards are met). In all these cases, the seller knows much more about the quality of the product than the buyer. And until sellers can provide quality information to buyers, low-quality goods and services will displace high-quality ones, and the market will fail.

Asymmetric markets are characterized by low efficiency overall, but asymmetry is particularly disadvantageous to sellers of good products. They are interested in providing additional information to buyers of their goods.

Additional information about a product is called a market signal.

Market signals provide a mechanism that allows sellers and buyers to eliminate or reduce information asymmetry; that is, they help an informed party convey information about itself to an uninformed party. Problems of asymmetric information can be resolved when buyers receive signals about the quality of goods from sellers. The concept of market signals was developed by American economist and 2001 Nobel laureate in economics Michael Spence, who found that in some markets, sellers provide signals to buyers of products. Price is the means by which information is transmitted, providing information about the opportunity cost of a product, allowing for sound business decisions. A market signal is a mechanism that allows an informed party to convey information to an uninformed party.

Types of market signals:

1. Warranties – manufacturers' obligations to replace defective goods upon consumer request or otherwise compensate for any discrepancies between product specifications and the parameters stated at the time of sale.

2. Reputation – a seller's assessment based on past customer experience and transmitted from buyer to buyer.

3. Brand – a symbol by which a specific seller is identified.

4. Quality standards – a set of criteria that determine product quality. Certification determines whether a product meets these standards.

3 Moral hazard. The Principal-Agent Problem

Since moral hazard was initially considered in the insurance industry, the following interpretation is most well-known.

Moral hazard is actions taken by an individual with the deliberate intent of increasing the likelihood of a potential loss in the hope that the losses will be fully (or even exceeded) covered by the insurance company.

Moral hazard is primarily a problem in the insurance industry, where the insured can influence the probability or significance of events resulting from the insurance payment.

Types of moral hazard in insurance:

1. Misconduct – deliberately increasing the likelihood of a potential loss.

2. Risk neglect – the insured fails to take precautions.

3. Excessive consumption of services paid for through insurance.

To reduce moral hazard, insurance companies carefully select clients; classify them into risk groups; differentiate insurance premiums; and offer partial compensation for losses. Share the risk of potential risk with the client.

A special case of moral hazard is a contractual relationship between parties where one of them commissions the other to perform certain actions for a fee. In this case, the party giving the commission acts as the principal, and the party executing the commission acts as the agent. A principal-agent relationship arises whenever an employment transaction makes the well-being of one party dependent on the performance of another.

The principal hires an agent with specialized knowledge and skills. This relationship poses a certain risk to the principal, as the more informed party, the agent, may engage in covert actions. The essence of the principal-agent problem lies in the threat of manipulation by the agent toward the principal when carrying out the latter's commissions and instructions. The principal may be deliberately misled. The main way to resolve this problem is through market signals

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4 Asymmetric Information as a cause of Government Microregulation

Markets with asymmetric information are Pareton inefficient. This provides grounds for government intervention through the following means:

1. Participation in pricing policy.
2. Participation in production.
3. Control over production and sales.

Government price regulation is accompanied by restrictions on price competition and mandatory product certification.

Government participation in production involves the organization of public health care, education, and other public services.

State control over production and sales – licensing, standardization, certification, and advertising controls.

The state can prevent unfair competition in the markets. The Law of the Republic of Belarus "On Combating Monopolistic Activity and Developing Competition" defines competition as competition between economic entities, where their independent actions limit each other's ability to influence the general terms of sale of goods in the market and stimulate the production of goods needed by consumers. The complete opposite is a monopoly, which is defined as a situation in which the number of sellers becomes infinitely small, allowing them to influence production volume and, consequently, price.

A monopolist can manipulate production volume and price, which most often leads to a decrease in the former and an increase in the latter. As a result, resources, including information, are distributed in a way that serves the interests of monopolistic producers rather than the goals of society, causing information asymmetry. To prevent the consequences of monopolization, government agencies intervene in the economy: they carefully study markets and calculate concentration indicators, identifying competitive and monopolized industries based on these indicators.

The state takes a differentiated approach, preserving natural monopoly zones in the economy while pursuing a strict antitrust policy toward other producers. The government can intervene in pricing mechanisms by setting fixed prices. Most often, government regulation in this area extends to natural monopolies. Since their existence in a number of industries is economically justified based on efficiency criteria, the state allows them to operate without applying antitrust measures.

However, to bring the situation closer to competition, the state intervenes in the pricing processes for the products of natural monopolies. If the goal of regulation is the efficient allocation of resources, including information, then the price should be set at marginal costs. If the goal of

regulation is to ensure fair profits, then the price is set at average costs. State restrictions on price competition, combined with standardization and certification mechanisms, can significantly increase the competitiveness of high-quality goods, which, with a relatively small price difference, become preferable to consumers.

To regulate information asymmetries, the state can use a combination of methods. Legislative and legal methods are focused on regulating the effective functioning of the market economy and ensuring monitoring of the economic activities of business entities. Socioeconomic methods regulate a range of regulatory instruments designed to address asymmetries in employment, wages, production organization, lending, insurance, etc. Administrative methods include the procedure for concluding agreements and contracts and determining the methods for their implementation. Organizational methods involve the creation of an infrastructure for regulating market asymmetries.

Key concepts

Perfect information, uncertainty, risk, risk pooling, risk sharing, asymmetric information, adverse selection, moral hazard, principal-agent problem, market signals, reputation, warranties.

TOPIC 13. PUBLIC GOODS

1 Pure Private and Pure Public Goods. Properties of Public Goods
2 Characteristics of Demand for Public Goods
3 Production of Public Goods and the Free-Rider Problem
4 The Role of Government in Ensuring the Supply of Public Goods
Key concepts

1 Pure Private and Pure Public Goods. Properties of Public Goods

Global economics and practice classify public goods as those goods and services that are not supplied by the market, as their characteristics are the opposite of those of private goods. To determine their essence, it's important to recall the properties of private goods studied previously. The classification of goods is based on two criteria: the distribution of a good's utility among consumers and its degree of availability for consumption. The first criterion distinguishes selectivity or non-selectivity, while the second distinguishes excludability or non-excludability.

A ***pure private good*** is a good, each unit of which can be sold to a consumer for a separate fee. This includes food, clothing, personal transportation, household appliances, etc. Markets are ideal for the circulation of pure private goods, which exhibit selectivity and excludability in consumption.

Selectivity in consumption means that private goods are purchased individually in accordance with the consumer's tastes and preferences. These goods are divisible, meaning they act as aggregate, independent units. Consumption of these goods by one person precludes their consumption by others.

The property of ***excludability*** refers to the inaccessibility of these goods to those unable to pay the market price. In the case of purely private goods, it is assumed that all costs of production are borne entirely by the producer of the good, and all benefits accrue to the consumer. The price of a good corresponds to its marginal utility.

A ***pure public good*** is a good that is consumed collectively by all citizens, regardless of payment.

Classic examples of public goods include national defense services, security agencies, emergency response agencies for natural, climatic, and man-made emergencies, and a wide range of similar goods and services. Consumption of these goods is associated with significant positive externalities, which prevents their realization through the price mechanism.

The key properties of pure public goods are non-selectivity and non-excludability in consumption.

Non-selectivity in consumption means that the addition of an additional consumer does not reduce the availability or usefulness of the good for

others. For example, the birth of a child within a country's borders does not reduce the security provided to other citizens. Therefore, these goods are non-rival in consumption.

Non-excludability in consumption means that additional consumers cannot be prevented from using public goods without paying for them. A pure public good has a unique positive externality: once produced, it becomes available to everyone, which in turn generates excessive costs and excludes consumers who haven't paid for it. For example, depriving a citizen of defense services is impossible without expelling them from the country.

A pure public good is characterized by the following properties:

1) it is indivisible, meaning that an individual cannot choose how much of such a good to consume;

2) it is shared and consumed;

3) the production and consumption of pure public goods is accompanied by externalities, usually positive;

4) the marginal costs (MC) of a pure public good provided to an additional consumer is 0;

5) consumption of pure public goods does not affect the provision of their volume to other individuals;

6) including an additional consumer in the consumption of pure public goods does not reduce the benefits enjoyed by existing consumers.

In addition to pure public goods, four groups of mixed public goods can be distinguished:

1) because the classification features have varying degrees of manifestation in different goods;

2) because the classification features can be combined in various ways.

Mixed public goods include:

• Communal public goods are goods characterized by a high degree of selectivity and a low degree of excludability.

Their characteristic feature is that restricting access to the good is associated with high costs.

• Collective goods are characterized by a high degree of excludability and low selectivity. Their specificity is that access to them can be limited by low costs.

• Congested public goods are goods whose non-rivalry in consumption is maintained only within a certain number of consumers.

• Club public goods are goods whose availability is limited by membership in special organizations – clubs.

A distinctive feature of public goods is the boundary within which they are consumed. This determines the specifics of production, distribution, and consumption of goods.

Based on territorial boundaries, the following public goods are distinguished:

1. International public goods. These are goods that are accessible and consumed by the population, regardless of the territorial boundaries of the state. Such goods include, for example, scientific and technological research and development, measures aimed at improving the environmental situation, and the international monetary system. The production and distribution of public goods at the international level is quite difficult, as it requires a significant concentration of resources not only from one state, but from the entire global economy. Only then can any tangible efficiency and effectiveness be achieved.

2. National public goods. These are goods that are produced, distributed, and consumed within a specific national economy. The scale of their distribution is strictly limited to the territory of a specific state and cannot extend beyond it, for example, to the international level. These include, for example, the army, navy, and the activities of federal government bodies.

3. Local public goods. These are goods that are produced, distributed, and consumed not at the national level, but at the local level. The production of these goods is necessary when a particular region has needs that differ from those of the national economy. Such goods include, for example, garbage collection, concerts, theaters, and city parks.

All three levels of production, distribution, and consumption of public goods are essential for the proper functioning of the national economy. During its operation, they all actively interact with each other.

2 Features of demand for Public Goods

The nature of demand formation for public goods differs significantly from that for private goods.

Differentiation in consumer demands for a private good manifests itself in the purchase of different quantities of the good at the same market price (figure 13.1). This is due to the excludability and divisibility of private goods. The total demand is formed by horizontal aggregation of individual demand, as the demand quantities for a given price are summed along the horizontal axis.

A pure public good, due to its non-excludability and indivisibility, cannot be supplied to one consumer in smaller quantities than to another (figure 13.2). The entire output is consumed in its entirety. Thus, the quantity consumed by each consumer equals the quantity supplied:

$$q_1 + q_2 + q_3 + \cdots + q_n = Q_s \qquad (13.1)$$

Differentiation in consumer demands is expressed in the differentiation of their willingness to pay. When forming individual demand for a pure public good, consumers therefore determine the payment amount themselves,

rather than being "price recipients," as is the case with a pure private good. The rationale behind this condition is clear: an individual consumer need not bear the entire "price" of supplying the good to the community; it is sufficient to make a contribution corresponding to their personal willingness to pay (their marginal benefit).

Marginal benefit is the increase in utility from consuming a public good, expressed in monetary terms. The fixed parameter in the summation is no longer the price, but the quantity of the public good demanded, meaning that individual demand curves are vertically summed. Aggregate demand is equal to the sum of individual marginal benefits:

$$\text{MSB} = \text{MB}_1 + \text{MB}_2 + \ldots + \text{MB}_n \qquad (13.2)$$

where MB is the marginal benefit, the purchase utility received by an individual from consuming an additional unit of pure public goods and expressing the individual's willingness to pay for that unit. MSB is the marginal social utility.
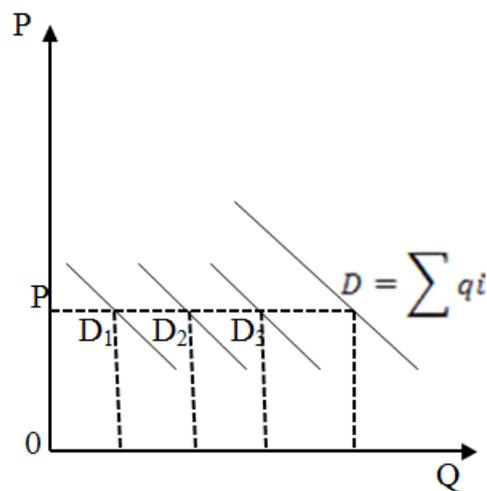

Figure 13.1 – Formation of Aggregate Demand for a Pure Private Good
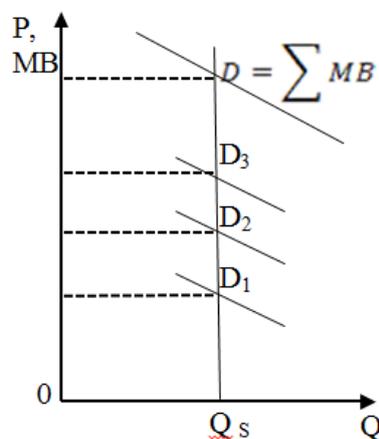

Figure 13.2 – Formation of Aggregate Demand for a Pure Public Good

This analysis of the characteristics of demand for public goods allows us to construct a model of the optimal level of public good production, taking into account various consumer preferences (figure 13.3).
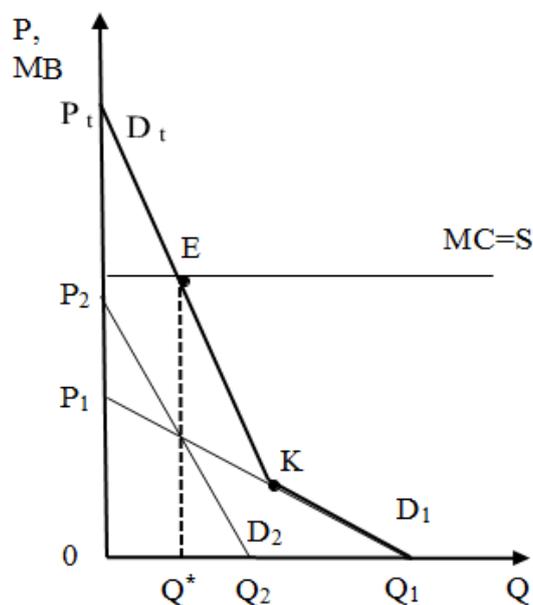

Figure 13.3 – Model of the Optimal Level of Public Goods Production

The aggregate demand curve (D_t), obtained by vertically summing the individual demand curves of the first individual (D_1) and the second individual (D_2), shows that as the supply of the public good increases, the second consumer's demand for this good gradually saturates, with the second consumer (at point Q_2) saturating faster than the first (at point Q_1). This results in the aggregate demand curve taking the form of a broken line P_tKQ_1, since at quantities exceeding Q_2, the second individual is no longer willing to consume and pay for the good, while the first individual still maintains a willingness to pay. Therefore, after passing point K, the aggregate demand curve coincides with the first individual's curve D_1.

The supply line S represents the line of marginal social costs, equal to the sum of the producer's marginal private costs and the positive (negative) externalities of production. The optimal level of production of a public good corresponds to point E, where the aggregate demand (D_t) and supply curves S intersect. At point E, the willingness of individuals to pay for the production of each additional unit of the public good coincides with the additional cost of producing that unit: $MSC = MSB$, where MSC is the marginal social cost of producing the pure public good, and MSB is the marginal social benefit from its production.

Thus, in the case of a pure public good, there is no correspondence between the amount that each individual consumer will subsequently pay for an additional unit of this good and its cost of production: this is what distinguishes pure public goods from pure private goods.

What is the efficient level of PPP?

The efficient level of production of a pure public good is the level at which the marginal social benefit (utility) MSB, which is the sum of the marginal benefits (utilities) of all consumers $\sum$ MB, is equal to the marginal social cost of its production MSC:

$$MSB = \sum MB = MSC. \qquad (13.3)$$

The last equality is the rule for determining the efficient volume of pure public good.

3 Production of Public Goods and the Free-Rider Problem

Since pure public goods are provided to everyone in full, users know that they can benefit from the pure public good without having to cover the costs of its production. Therefore, consumers tend to avoid contributing to the production of the pure public good or minimize the associated costs in the hope that others will do so. This phenomenon is known as the free-rider problem (the term "free rider" was first coined by the American economist M. Olson in 1965). People underestimate the amount of public goods they would like to have and their willingness to pay, hoping to "get away" at the expense of others.

The free-rider problem results in the amount of pure public goods produced through voluntary financing being lower than the effective amount, meaning underproduction of public goods. Seeking to extract benefits at the expense of other users' efforts, free riders understate their marginal social benefits (MSB), which in turn lowers the marginal social benefit (MSB). As a result, the volume of pure public goods decreases relative to the efficient volume.

Provision of public goods with government participation does not automatically ensure efficient production. Due to the tendency of low-income individuals to limit funding for public goods production by reducing taxes, the volume of public goods is reduced to below the efficient level. The use of a differentiated tax rate helps reduce the loss of efficiency in public goods production, but runs into the problem of determining consumer preferences, without which it is impossible to justifiably differentiate the tax.

There are several possible solutions to the free-rider problem:

1. Excluding free riders by restricting access to pure public goods, i.e., transforming pure public goods into excludable public goods. For example, introducing a subscription fee for cable television.

2. Coupling financing: selling a single package of goods, both excludable and non-excludable. For example, selling by-products or charging for advertising.

3. Subsidizing, i.e., financing pure public goods on the basis of voluntary donations.

Thus, allowing free consumption of public goods leads to inefficiencies in their production. Ultimately, it may turn out that no one wants to pay for a given good, and its production will have to be curtailed. One could also say that no one wants to pay for a public good, even though everyone has an interest in consuming it. This raises the dual challenge of ensuring the provision of public goods and achieving an efficient volume of their production in the presence of free riders. Both the market and the state have the potential to address this challenge.

4 The Role of the State in ensuring the supply of Public Goods

Modern economic systems are mixed economies, combining the private and public sectors. The public sector represents the aggregate of resources at the disposal of the state. The public sector economy addresses issues related to the production of public and collective goods, the determination of mechanisms for achieving social goals, and the non-market interaction of interests.

The most obvious advantage of state participation in satisfying the need for pure public goods is their non-excludability and non-rivalry. In most countries, the state not only finances the supply of such goods through taxes but also directly organizes their production through the public sector.

The supply of pure public goods is ensured by the state. The forms of state participation in providing pure public goods can vary:

1) direct production of goods;

2) financing of private sector production of public goods (garbage collection, types of medical care).

In both cases, the production of pure public goods is financed from the state budget, that is, from taxes paid by citizens. The state acts as a provider of public goods in two cases:

• when the positive externalities arising from the consumption of public goods cannot be internalized;

• when the supply of public goods is associated with high costs.

The main problem arising in the process of ensuring the supply of public goods is the problem of efficient taxation, the adoption of a single, equal tax for all, or differentiation in rates.

This problem is most often addressed based on principles of fairness and efficiency. From a social justice perspective, providing a public good to all consumers requires applying the principle of equal participation in its financing and, accordingly, the introduction of a flat tax rate.

However, this leads to a drop in the volume of public goods below the efficient level due to the tendency of low-income consumers to limit their financing of the production of such goods in order to reduce taxes. High-

income consumers also suffer losses, as their consumption of public goods decreases relative to their desired level.

To achieve an efficient volume of public goods production, their provision must take into account the differences in the marginal utility of consuming public goods for different consumers. These differences lead to unequal propensity for consumers to pay for the public goods they consume. In this case, the introduction of a differentiated tax rate will help overcome the inefficiency that arises due to the reduction in the volume of public goods produced under a flat tax rate. Given that the propensity to pay is an increasing function of income and is determined not by individuals' taste preferences but by their income level, high-income individuals clearly benefit from increased consumption opportunities, despite having to pay a higher share of taxes. At the same time, the use of differentiated tax rates, while helping to reduce efficiency losses, does not address the problem of consumer preferences for particular public goods, without which it becomes difficult to determine the degree of tax differentiation.

The state can also involve private firms in the production of public goods by concluding appropriate contracts with them. For example, government contracts with private security companies to protect state-owned socio-cultural facilities or with private firms in road construction and maintenance. The effectiveness of contracting largely depends on competition between providers of public goods. The higher the level of competition, the lower the state's costs per unit of public good delivery. Moreover, the state is called upon to control not only the relevant quantitative but also the qualitative parameters of the goods and services supplied. When organizing all kinds of tenders for the purchase of public goods from the private sector, the state must ensure that the reduction in production costs does not occur at the expense of a reduction in the quality of the corresponding goods.

Understanding the nature of public goods helps explain why public sector development strategies are shaped by political decisions. Public sector resources are primarily located not in the marketplace, but within the sphere of government authority. Therefore, the government's ability to achieve effective results and the decision-making processes themselves must be carefully analyzed. This is the basis for the development of the branch of economics known as public choice theory, the main tenets of which will be outlined in the next chapter.

Key concepts

Competitiveness, excludability, pure private good, pure public good, common good, excludable good, demand curve for pure public good, free-rider problem, optimal volume of public good, club goods.

TOPIC 14. PUBLIC CHOICE THEORY

1 Methodology of Public Choice Analysis
2 Model of interaction between Politicians and Voters. Model of Bureaucracy. Political rent-seeking
3 Political-Economic Cycle
4 The Problem of the efficiency of Government intervention in the economy
Key concepts

1 Methodology of Public Choice Analysis

Public choice theory (PCT) is the most striking manifestation of economic imperialism. Economic imperialism is the application of economic theory methodology to the study of non-economic processes and phenomena, that is, the use of economic analytical tools in the fields of sociology, psychology, political science, law, and elsewhere.

Public sector economics, or the microeconomic theory of government, emerged from economic imperialism. At the center of this theory is the "economic man," who is a selfish utility maximizer not only in the marketplace but also in politics. In its modern interpretation, ***public choice theory*** is a theory that studies the various ways and methods by which people exploit government institutions for their own self-interest.

PCT is the application of economic theory to political science. Its subject matter includes:

1. Theory of government.
2. Voting rules.
3. Voter behavior.
4. Party politics.
5. Bureaucracy.

The founder of PCT is James Buchanan. The theory emerged as an independent branch of economic science only in the 1950s and 1960s. Contributions to the theory included G. Tullock, M. Olson, D. Muller, R. Tollison, and others.

The theory is based on three methodological principles:

1. The principle of individualism: society is a collection of individuals whose behavior explains social and political processes.

2. The individual pursues his or her own interests, striving to maximize their own benefits and minimize costs.

3. Political processes, through which individuals realize their interests, are a form of exchange, and people's behavior in exchange, whether in the market or in politics, means:

- People maximize utility by comparing benefits and costs,

- They are stable in their basic preferences regarding their fundamental needs,
- They strive for economic equilibrium.

The interpretation of politics as an exchange process dates back to the dissertation of the Swedish economist Knut Wicksell, "Studies in the Theory of Finance" (1896). He saw the fundamental difference between economic and political markets in the conditions under which people's interests are expressed. This idea formed the basis for the work of the American economist George Buchanan, who received the Nobel Prize in 1986 for his research in public choice theory. Proponents of public choice theory interpret the political market in complete analogy to the commodity market. Politics is a mutually beneficial exchange, where the arena of interaction between individuals is the political market, where individuals, consumers of public goods, express their interests as voters, realizing their preferences through the voting mechanism.

The political market, unlike conventional markets, has a number of characteristics:

1. The fewer participants and the lower the competition, the more efficient the political market.

2. In the political market, each consumer of public goods is interested in the support of their preferences by other consumers (voters).

3. To achieve Pareto efficiency, political decisions must be made unanimously.

For the political mechanism to function effectively, individuals must unanimously enter into a social contract (agreement) called a constitution.

Unanimity has advantages, namely, it guarantees the unconditional observance of the rights of each individual; with the unanimous adoption of a constitution, all individuals agree to abide by it, even in the post-constitutional stage.

In this regard, the political process can be roughly divided into two stages:

1. Constitutional (contract conclusion, drafting of the Constitution).

2. Post-constitutional (compliance with the Constitution).

At each of these stages, the state plays a specific role. It protects and ensures that the game is played according to the rules, but does not define these rules themselves (the "protective state"). On the other hand, the state offers non-market public goods, acting as a "producing state."

2 Model of interaction between Politicians and Voters. Model of Bureaucracy. Political rent-seeking

There can be various types of political systems.

1. Absolute monarchy – a form of government in which all state (legislative, executive, governmental), and sometimes even spiritual

(religious) authority is legal and effectively vested in the monarch and is passed on by inheritance. Public elections favor the monarch.

2. Direct (absolute) democracy – a political system in which every citizen has the right to personally vote for a political course or program. The principles of direct democracy are used in clubs, work collective meetings, referendums, and the election of deputies and presidents.

Between monarchy and democracy, there are many financial systems:
• presidential (USA, Venezuela, Belarus);
• parliamentary (Austria, Great Britain, Germany);
• mixed (France, Poland, Finland).

Direct democracy has a drawback: every decision must be voted on, increasing the costs to the population. Therefore, ***representative democracy*** is necessary – a political system in which citizens elect only the political leaders of the state. These leaders represent the interests of the population.

Elections in a representative democracy take place in two stages:

1. The people elect the leaders of the state – the chief executive, president, or prime minister, and members of parliament. They are called politicians.

2. The elected governing bodies appoint the state apparatus. All appointees are called officials.

Thus, civil service positions are:
- elected (politicians);
- appointed (officials).

A perfect political system is one in which politics is primarily at work. An imperfect political system is one in which politics abuses its proposals.

The interaction between politicians and voters in a direct democracy can have several consequences:

1. When the costs of a public good are distributed evenly but the benefits unevenly, there is underproduction of the public good.

2. When the benefits are distributed evenly but the costs unevenly, there is overproduction of the public good.

3. All decisions are made in the interests of a centrist voter located in the middle of the community's interests (the median voter model).

The main drawback of representative democracy is the possibility of decisions being made that benefit specific groups pursuing their own narrow interests.

Voters are forced to vote not for their own position directly, but for a package of programs.

Public choice theory shows that voting results cannot be relied upon entirely; moreover, the democratic voting procedure itself in legislative bodies does not prevent the adoption of ineffective economic decisions.

The situation in which stable collective choice is impossible is described, in particular, by the voting paradox. This is a contradiction that

arises because majority voting does not ensure that actual public preferences are revealed.

As a result:

1. "Voting loops" occur – an endlessly drawn-out vote that yields no clear result.

2. Political decisions are made that do not reflect the interests of the majority of the population.

3. The possibility of manipulating voting results arises.

In a representative democracy, the number of participants in political decision-making expands:

– voters;

– politicians;

– pressure groups;

– officials.

Lobbying is the influence of interest groups on government officials (legislative or executive) to make decisions favorable to these groups.

Logrolling is the practice of mutual support for legislative initiatives by members of parliament through an exchange of votes (you give me, I give you).

Government officials can make some political decisions. This right is delegated to them by politicians. In public choice theory, the government apparatus and its employees are referred to as "bureaucracy."

Characteristics of bureaucracy:

1. Bureaucracy is a necessary attribute of public administration.

2. Bureaucracy has an inherent tendency toward extensive intervention.

3. The costs of bureaucracy's growth include bloated bureaucracy, extensive duplication of information, and conflicting documents.

4. Politicians lack the ability to control bureaucratic activity.

Political rent seeking. Anne Krueger's development of political rent theory, begun in 1974, was a major advance in public choice theory. Political rent seeking is the pursuit of economic rent through the political process. It is realized through government officials seeking material benefits at the expense of both society as a whole and individuals who push for the adoption of certain decisions. By participating in the political process, government officials strive to ensure that decisions are passed in such a way as to guarantee their own economic rent at the expense of society.

Politicians are interested in decisions that provide clear and immediate benefits and impose hidden, difficult-to-identify costs. Public choice theorists consider privatization, the development of "soft infrastructure," the creation of a constitutional economy, and the limitation of the state's spheres of activity as mechanisms for overcoming political rent-seeking. (The concept of "soft infrastructure" was coined by U. Niskanen and refers to the enhancement of human economic rights through strengthening property

rights, fairness and accountability for contract fulfillment, tolerance of dissent, guarantees of minority rights, etc.)

The classical rent-seeking model is based on the pure monopoly model (figure 14.1).

Under pure monopoly, output decreases from Qc to Qm, and the price increases correspondingly from Pc to Pm. Rectangle R represents the political rent, which is obtained through consumer surplus, and triangle L represents the social costs of monopoly, which are associated with rent-seeking.
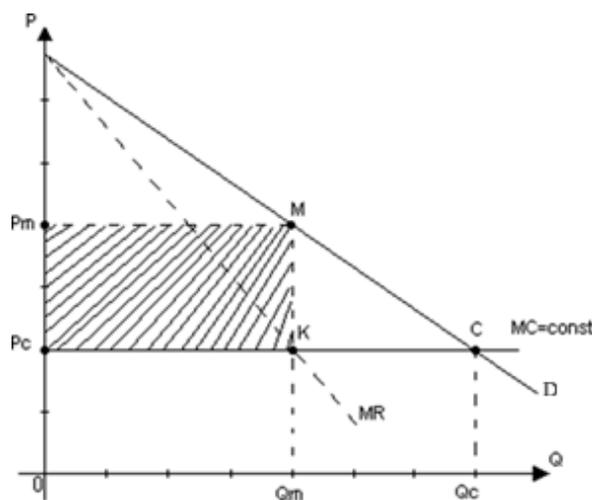

Figure 14.1 – The Political Rent-Seeking model

There are three levels of political rent seeking:
Level 1 – the struggle to gain access to specific privileges.
Level 2 – competition for office.
Level 3 – state policy toward specific industries.

3 Political-Economic Cycle

The political-economic (political business) cycle is the cycle of economic and political activity of the government between elections.

Government activity between elections is subject to certain patterns. After an election, a series of measures is implemented aimed at changing the goals or scope of the previous government's activities. These measures are particularly radical if a party that was previously in opposition comes to power. A series of measures are implemented to fulfill at least some of the campaign promises, ineffective programs are cut, and attempts are made to reduce the state budget deficit and public debt. Activity then declines, reaching a critical point. As the next elections approach, the government is again forced to undertake active measures.

When examining a graph in which time is represented on the x-axis and government activity on the y-axis, the political-economic cycle can be represented as follows (figure 14.2).
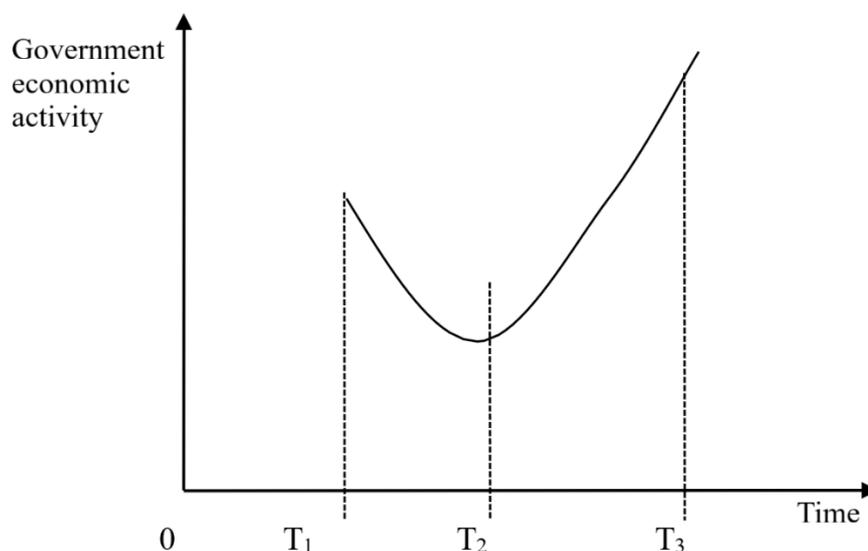

Figure 14.2 – Political-Economic Cycle

The T_1-T_2 segment reflects a decline in government popularity, while the T_2-T_3 segment reflects an increase in activity associated with preparations for the upcoming elections. Several patterns should be noted here: first, the peak of new activity should not occur too far before the upcoming re-election, as voters will have time to forget the period of active government activity; second, it is advisable for the level of activity at point T_3 to be no lower than the activity of the previous government at point T_1.

Thus, the analysis conducted allows us to conclude that government activity, aimed at eliminating market inefficiencies, is itself not without its drawbacks. Market failure is compounded by government failure. Therefore, it is necessary to carefully monitor their possible combination and implement a set of corrective measures.

The political decision-making process can cause a political-economic cycle. Two models are distinguished:
1. The Nordhaus model.
2. The Gibbs model.

Nordhaus cited the ruling party's policies before and after elections as the cause of political and economic fluctuations. In the lead-up to elections, the leading party stimulates fiscal and monetary policies, which accelerates economic growth (an economic upturn). After the elections, measures are taken to reduce inflation and the budget deficit, and to restructure the administrative apparatus, resulting in a slowdown in economic growth.

A political-economic cycle is an acceleration of economic growth before elections, followed by a decline after the elections.

Gibbs attributes the direction of economic policy to the nature of the party in power.

A distinction is usually made between right-wing and left-wing parties.

Right-wing parties enjoy the support of big business representatives – bankers and financiers. Left-wing parties enjoy the support of wage earners. When right-wing parties are in power, they focus primarily on measures to combat inflation. Left-wing parties, on the other hand, focus primarily on unemployment.

According to Gibbs, economic cyclicality is determined by the alternation of left-wing and right-wing governments.

4 The Problem of the efficiency of Government intervention in the economy

In addition to market failures, there are also failures of Government intervention in the economy.

"Failures" are situations in which the state is unable to ensure the effective allocation and use of public resources.

The main causes of state failures are:

1. Imperfect political processes (lobbying, logrolling, political rent-seeking, the political-economic cycle, etc.).

2. Limited and asymmetric information necessary for decision-making.

3. The state's inability to fully control the consequences of its decisions.

4. Limited control over bureaucracy.

5. Lack of motivation to make effective political decisions.

6. Extended timeframes for making and implementing political decisions, i.e., the problem of lags – the time intervals between decision-making and implementation.

Thus, the state cannot ensure optimal decision-making because it has an internal source of inefficiency. Therefore, the choice of the mechanism for providing goods (market or state) must be made by comparing the benefits and costs inherent in each method of producing goods.

Key concepts

Public choice, political decision, voter, politician, official, voting mechanism, majority rule, voting paradox, median voter, special interest group, lobbying, logrolling, bureaucracy, political rent seeking.

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