

TEMA 1. INTRODUCTION TO MACROECONOMICS

1. The subject of macroeconomics. Macroeconomic aggregates
2. The model of economic circulation in macroeconomics

1. The subject of macroeconomics. Macroeconomic aggregates

Unlike microeconomics, which studies the behavior of individual economic agents and individual markets, macroeconomics studies the national economy as a whole. It studies the results of the joint activities of all economic agents. At the same time, it focuses on such generalized indicators of economic performance as gross domestic product, levels of unemployment and inflation, the state budget and balance of payments of the country, the rate of economic growth.

The most important methodological feature of macroeconomic research is aggregation. First of all, the macroeconomic view of the national economy distinguishes in it four generalized economic subjects: households, the entrepreneurial sector, the state and abroad.

Households are all private economic units within a country whose activities are aimed at satisfying their own needs. They are the owners of all the productive resources they sell to firms. Through the sale of resources, households earn income, which is allocated to current consumption and savings. Consequently, households exhibit four types of economic activity: they sell factors of production, consume part of the income received, and save the other part.

The entrepreneurial sector is a set of firms registered within the country. Their activity is limited to the purchase of production resources, production and sale of finished products,

investment (the transformation of household savings into additional capital).

The public sector is all of the country's public institutions and agencies. They are involved in providing public goods that are available to consumers, as if for free (defense, law and order, services of the production and social infrastructure). The results of government activity are manifested in the reduction of the costs of firms, as well as the costs of households. At the same time, the goal of state activity is not to maximize profits, but public welfare.

A foreign country includes all economic actors permanently located outside the country. The impact of a foreign country on the domestic economy occurs through the exchange of goods, services, capital, and national currencies.

Macroeconomic aggregation extends to markets. All the many markets for individual goods are aggregated into a single common market in which one type of good is bought and sold. There are four such aggregated markets: the goods market, the labor market, the money market, and the securities market. For example, in macroeconomics, there are no markets for wheat, cars, oil, gold, or other individual commodities. Their place is taken by the general commodity market, where the total volume of social production - the gross domestic product - is sold and bought.

Thus, as a result of aggregation, the functioning of the national economy is represented as the interaction of four economic subjects in four consolidated markets. It is described by means of special macroeconomic models containing two groups of variables. **Exogenous** variables are those that are known in advance and introduced into model from outside. On the contrary, **endogenous** variables are unknown beforehand and are determined in the course of model calculations. The same variables can be both exogenous and endogenous in different models. Nevertheless, usually in

exogenous variables are government spending and transfers (gratuitous payments), taxes or tax rates, money supply in the economy, and some others. Endogenous variables are, as a rule, state budget revenues, consumer spending, firm investment, GDP size and economic growth rates.

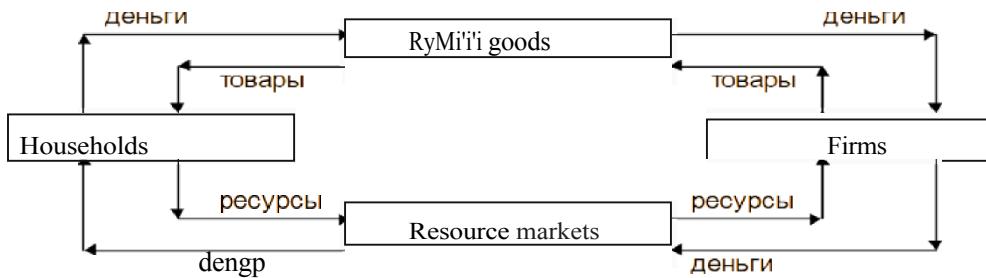
Macroeconomic variables are also divided into stocks and flows. A stock is a variable that can only be measured at a given point in time. Examples are the money supply in the economy, the number of employed and unemployed, the amount of capital, the amount of national wealth, etc. Flow - a variable measured per unit of time (day, month, year). Flows, for example, are the daily income and expenditure of households, the soda value of the country's gross domestic product, the state budget deficit, developed during a given month, etc.

Households sell their productive resources--the factors of production (labor, capital, land) to firms through resource markets. Firms turn these factors into finished goods, which they then sell to households in commodity markets. The circle is closed. This is the so-called "material flow" in the economic circularity model.

In the opposite direction there is a cash flow. By buying factors of production from households, firms pay them money, which is household income in the form of wages, interest, rent, and profit. This money is spent by households on commodity

markets, buying the goods they need from the firms. The second circle is complete. Schematically, all this can be represented as follows (diagram 1-1):

Figure 1-1: Economic Circle



Conclusions:

- (a) The product is always equal to income. The value of the product produced is necessarily decomposed into the income of the producers;
- 6) Expenditure equals income. Everything that households earn, they spend on commodity markets. In this case, national income (Y) equals household consumption expenditures (C): $U=C$.

Let's complicate the scheme by introducing the state and overseas, as well as accounting for savings.

In this case, not all household income is turned into spending on domestically produced goods. There are three ways of using money (national income) that do not involve the purchase of goods and services produced by national firms. These are: a) saving (S), b) paying taxes (T), and c) importing (M). These three ways of spending money are called "product and income circuit leakages." Thus:

$$\text{Leaks} = S + T + M$$

Consequently, national income (Y) in the process of its use is decomposed into household consumption expenditures, including expenditures on imports (C), household savings (S) and taxes (T): $Y = C + S + T$.

It follows that then household savings are equal to national income minus consumer spending, minus taxes: $S = Y - C - T$.

On the other hand, there are three types of expenditures on domestic goods that are not household expenditures. These are (a) investment spending by firms (I), (b) government spending (G), and (c) exports (X). Such expenditures are called "circular injections."

The cumulative expenditure on the national product is equal:

$$Y=C+I+G+X-M$$

This equation is called the "basic macroeconomic identity."

The expression (X-M) represents net exports of goods and services. When calculating the national product, imports must be subtracted from the sum of personal consumption and "injections" to avoid double counting, since variables C, I, and G include expenditures on both national goods and imports.

Since income equals expenses, then: $Y=C+S+T=C+I+G+X-M$. Hence:

$$S+T+M=I+G+X$$

Consequently, "leaks" always equal "injections."

But in certain pairs of "leaks" and "injections," there may not be equality: household savings (S) does not necessarily equal investment (I), taxes (T) do not necessarily equal government spending (G), exports (X) do not necessarily equal imports (M).

In addition to private savings of households, there are also savings of the state (SG), and savings of foreigners (SF). Since government savings are the difference between taxes and government spending: $(SG-T-G)$, and foreign savings are the difference between imports and exports $(SF=M-X)$, the sum of household, state, and foreign savings necessarily equals investment:

$$I=S+SG+Sr$$

From the last equation we can see:

- 1) Private savings by households are a prerequisite for investment by firms. Countries where households save a significant portion of their income (a striking example is modern China) also demonstrate high volumes of investment in the national economy and, accordingly, high rates of economic growth;
- 2) The state budget deficit (negative savings of the state) reduces investment, because to cover it the state has to borrow money, drawing on some of the free resources of the financial market;
- 3) A country's negative net exports (positive foreign savings) increase investment through foreign investment. Foreigners have free money generated in a given country, which they are able to invest in its economy.

SELF-STUDY ASSIGNMENTS

1. Which of the following is the flow , and what is a reserve? Justify your answers.
 - A. The amount of wages paid to employees;
 - B. Russia's state budget surplus in 2006; C. The number of students in Moscow;
 - Г. The hourly wage rate; D. The population of Russia;
 - E. The size of national income; G. Household savings;
3. Government spending; I. The tax rate;
 - K. Public foreign debt.
2. Last year the firm's profit was 100 rubles, and the amount of money in its bank account at the end of the year was 150 rubles. Can this be the case? Justify the answer.

3. Which of the following are leaks and which are injections? Justify your answers.

- A. Student Scholarship;
- B. Money spent by a foreign tourist in Moscow; C. Money spent by a Russian tourist abroad; D. State budget;
- Д. Gross Domestic Product; E. The tax on a firm's profits;
- Ж. Public debt;
- 3. Purchase of new equipment by the firm;
- И. Part of the wages withheld by the husband from the wife or vice versa;
- K. Payment by the Russian Ministry of Defense for a new frigate built in St. Petersburg.

4. If investment is 50, exports are 10, imports are 15, taxes are 30, and government spending is 40, what is the private savings of households?

5. The following data are known about the economy of a notional country:

$C=2000$; $G=500$; $T=450$; Net export=200; $M=150$; Sum of leaks=1700.

Find: X, I, Y, SG'S.

TEMA 1. INTRODUCTION TO ECONOMICS

1. Economics as a science
2. The production possibilities curve
3. Economic circulation

1. Economics as a science

- A. The subject of economics

Economics (economic theory) as a science exists because human needs are infinite, while the resources to meet them are limited. Hence the problem of choice about the rational use of resources. All human life is a choice, and in choosing one thing, we have to give up something else.

For example, a shopper cannot buy up the entire store because his money is limited. He will not buy only bread or only milk; his goal is to get the optimal set of goods for his money.

For its part, the firm cannot produce everything because of the same limited production resources; it has to choose the range of goods that maximizes its profits.

The local authorities are unable to build a school, a road, and a hospital at the same time. They also have to choose.

How individuals, firms, and society as a whole make their choices is what economics does.

The subject of choice is economic (rare) goods, i.e., goods whose quantity is limited in comparison with the need for them. Rare goods can be divided into two types: productive resources and consumer goods produced on their basis. Goods, the quantity of which is not limited compared with the need for them, are called rare goods. Examples are atmospheric air, clean drinking water for people living somewhere in a Siberian village, etc. As

The exhaustion of free goods can become economic goods.

In their reasoning, economists proceed from the hypothesis of rational human behavior. This means that economic agents are able to identify their needs and strive to achieve the maximum results with the available resources. Thus it is generally assumed that individuals maximize the satisfaction of their needs, firms maximize profits, and the state maximizes public welfare.

The subject of economics is the decisions made in society in the allocation of limited resources between different options for their use in order to maximize the welfare of people.

The choice involves answering three basic questions:

1). What and how much to produce?

For example, the local authorities stopped at the construction of the road.

2). How to produce?

You can build a road in different ways. You can hire a bunch of diggers and shovels, or you can use less manual labor and more machinery. It is, therefore, a question of the choice of production technology.

3). For whom to produce?

Once the "pie is baked," it must be divided. As applied to the road, this means deciding which cars are allowed to drive on it, whether tolls or free, who to provide

PJOeD LIBRITIES, etc.

B. Economic costs and sunk costs

In the process of selection there is a concept of economic costs (costs). It is fundamentally different from the familiar concept of accounting costs. In estimating costs, the accountant records the amount of payments actually made for the resources purchased by the firm. On the contrary, the economic cost of obtaining a good is another good that could have been obtained with the same resources, but from

which would have to be given up if the choice were made in favor of this good. This is why they are also called opportunity costs or opportunity costs.

Suppose someone decides to estimate the opportunity cost of attending a university. First of all, he would probably think of tuition in rubles or dollars. However, the size of the tuition in and of itself says very little. It is possible to say whether the study is expensive or cheap only by taking into account the amount of benefits that could be acquired with the tuition fee. If, for example, a semester costs as much as a student needs a new suit, then the economic cost of studying equals the suit. (Sometimes, though, that's what they say: "Been on vacation, rode in a new fur coat!")

In practice, however, economic costs are not limited to monetary payments. Studying requires time during which the student could earn money, repair his apartment, raise a child, simply rest... All of this he gives up when he decides to study. Therefore, the economic costs of studying also include unearned money (or rather the goods that could have been bought with this money), a neglected apartment, an uneducated child, a lost vacation, etc.

It is important to keep two things in mind. First: opportunity costs arise only where there is an alternative. From this point of view, for example, the costs of food during the period of study are not counted as an economic cost of education. The fact is that these costs are not related to learning: one wants to eat regardless of whether the individual learns or not. Only if study requires additional costs for food, the economic costs include this surplus.

Second, there are a lot of alternative benefits. A student can, for example, study economics all evening, or go to a club, or clean an apartment, or watch TV, etc. All of these cannot be done at the same time. So in order to estimate the opportunity costs of getting

The best possible alternative must be taken into account.

To summarize, we can once again say: in order to estimate the full economic costs of obtaining a certain good, it is necessary to summarize all the alternative losses (in the form of the best benefits not obtained), which have to bear in connection with this. It is very convenient if these losses can be measured in money. Under this approach, the economic cost of obtaining a given good is the value of other goods that could be obtained in the most advantageous of all alternative ways of using limited resources.

Measuring costs in money is not always easy. It's not easy, for example, to estimate in rubles the value of lost vacation or damage from "under-educated" because of the child's mother's studies. Nevertheless, people intuitively make this or that decision. A very common phrase, "For that kind of money I'd rather stay home!" can be translated into economic language as follows: "The wage I receive at work is less than my opportunity cost of labor, expressed in the value of the rest I would lose by going to work.

A distinction must be made between economic costs and sunk costs. **Non-recoverable costs** are costs that have been incurred previously and that cannot be recovered.

Let someone make a choice: to study or not to study. To make the choice, he will have to compare all the benefits of learning with all the economic costs associated with it. Suppose that both can be expressed in rubles. Suppose the benefits are 120 rubles, and the costs are 100 rubles. The benefits exceed the costs, and the student begins his studies.

Very soon, unfortunately, it turns out that they teach worse than expected. In this regard, the actual benefits of such an education are only 80 rubles. Thus, a new question arises: to continue or drop out. If the student had known about the bad education earlier, he would not have gone to study at all (the costs exceed the benefits), but

Now the situation is more complicated. Let's say that out of 100 rubles of expenses 70 rubles. - is the tuition fee, and 30 rubles. - all other costs, expressed in losses in wages due to classes, lost time off, etc. After the tuition fee is paid, these 70 rubles, which the student won't get back anyway, have turned from alternative costs into sunk costs. Further they can be disregarded.

Therefore, a rationally thinking individual will reason something like this: "I, of course, was deceived, promising better knowledge. However, if I take the documents, then I will not receive benefits from the education of 80 rubles, saving only 30 rubles of costs. As for the 70 rubles already paid, they are lost to me in all circumstances. Better to go on!"

So, sunk costs do not affect future decisions. Therefore, economists who study alternative uses of resources do not take them into account.

B. Microeconomics and Macroeconomics

Economic theory includes two main parts - micro- and macroeconomics.

Microeconomics studies the behavior of individual economic agents (firms, consumers, savers, etc.) and their interaction in individual markets. It focuses on prices and production volumes of individual goods, individual consumer choice, output and resources of an individual firm, etc.

Macroeconomics studies the national economy as a whole as a unified system. It focuses on such generalizing indicators of social production as gross domestic product economic growth, employment and unemployment, inflation, etc.

Three things are important here. First, the prefix "micro" (small) in the word "microeconomics" should not be misleading. It is not about size at all. Microeconomics deals with the behavior and interaction of individual economic agents as the primary links

economic system. However, these are not only individual consumers or households, but also firms up to giant ones. On the other hand, microeconomics studies the price formation of individual goods in individual markets. But we are not necessarily talking about local or even national markets; the world market for a crucial commodity is also a subject of microeconomic research.

Second, we cannot say that microeconomics deals with problems that are less important than macroeconomics. Just as everything big is made of small things, the functioning of the whole economy and its large aggregates is directly determined by the activities of each economic entity and cannot be correctly understood in isolation from the latter.

Third: it is impossible to draw a clear line separating micro- and macroeconomics. The two branches of economic theory are closely intertwined, complementing each other and imperceptibly passing from one to the other.

Г. Methods of economic research

As a science, economic theory has not only its own subject (what is studied), but also special methods of research (how it is studied). The most important method is the construction of economic models.

Models are widely used in our everyday life, without even realizing it. A typical model is a map of a city, i.e. its image described according to certain rules. On it we see the location of streets and traffic arteries, objects of interest. Such a map does not contain, however, information that seems unimportant in this case (working hours of stores, cleanliness of streets, condition of the road surface, etc.).

Similarly, **an economic model** is a simplified formal description of aspects of an economic phenomenon of interest. Examples are a model of firm behavior, a model of individual consumer behavior, a model of market price formation, etc.

A good economic model has a number of properties: 1) it is not overloaded with details, the information it contains should not be more than necessary to solve the problem; 2) the assumptions and assumptions of the model are meaningful and realistic; 3) it is possible to collect information that corresponds to the conditions of the model; 4) the model allows to explain and predict the actually observed economic phenomena.

Models are built for normative и positive analysis. Positive analysis establishes the causes and consequences of economic phenomena without evaluating them. Such analysis answers questions like: "What and why is happening in the economy today?", "What and why was happening yesterday?", "What will happen if...?" For example, a Russian bogatyr at the crossroads sees signs: "If you go right, you will lose a horse. If you go to the left, you will lose your head". etc. All these are typical examples of positive statements.

On the contrary, normative analysis contains an assessment of the desirability of certain consequences. Its range of questions is: "What should be done to...?" The normative analysis contains, therefore, the recommendatory part. There is a close relationship between these two types of analysis: normative statements influence the choice of the subject matter of positive analysis, while the results of the latter facilitate the achievement of normative goals.

For example, it is recognized as necessary to reduce inflation in the economy. This is a normative statement. But this goal can be achieved in different ways: a) by raising taxes to reduce the state budget deficit; b) by reducing government spending; c) by freezing the prices of basic raw materials and energy; d) by limiting the growth of the dollar against the ruble, etc. A positive analysis will help you choose the best way to do this. For example, an increase in taxes will lead to this and that; a decrease in government spending will lead to that and that... Economic theory does not

thus relieving people of choices, but allowing them to make those choices more consciously and responsibly.

2. The production possibilities curve

A. Construction of the production possibilities curve

The production possibilities curve (PCC) is a model that allows us to determine the economic costs at the level of the economy as a whole. It assumes that the economy produces two goods. The production of the first is plotted on the X-axis, the second on the Y-axis. If all the resources available in society were devoted to the production of good X, then good Y would not be produced at all, and we have point M lying on the X-axis. In the opposite case, we have point N on the y-axis. Connecting these two extreme points, we obtain the KPV (curve MN).

To clarify how a PDA is constructed, let us give a conditional example. Suppose someone has a plot of 10 acres on which he can grow potatoes and carrots, and all the land is exactly the same in terms of the ability to grow both. Let's assume that each hectare can yield a maximum of 2 units of carrots and 1 unit of potatoes. If an individual decides to occupy all the land with potatoes, the maximum possible yield would be 10 units of potatoes and 0 units of carrots. If all the land is given to carrots, the maximum yield will be 0 potatoes and 20 carrots. But any intermediate variant of land distribution is also possible. For example, 8 hectares are given for carrots, and 2 hectares for potatoes. Then the maximum yield will be 2 units of potatoes and 16 units of carrots. And so on.

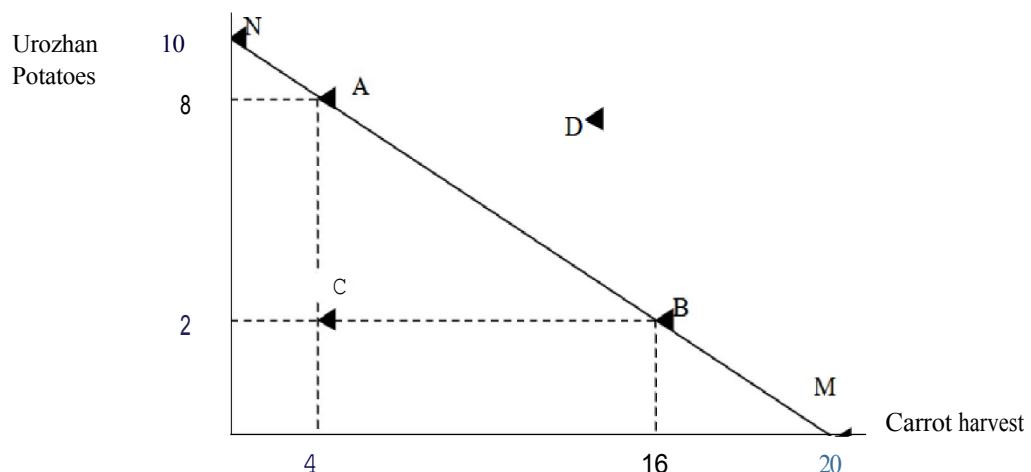
We can thus construct a table of production possibilities depending on the distribution of land (Table 1-1):

Table 1-1: Table of Production Possibilities

Площадь под картофелем	40т.	30т.	20т.	10т.		20т.	10т.	0т.
Площадь под морковью	40т.	30т.	20т.	10т.		20т.	10т.	
KZrtoQel's upoZhafi	10	9	8	7		2	1	0
сrops моркови	0	?	4	6		16	18	20

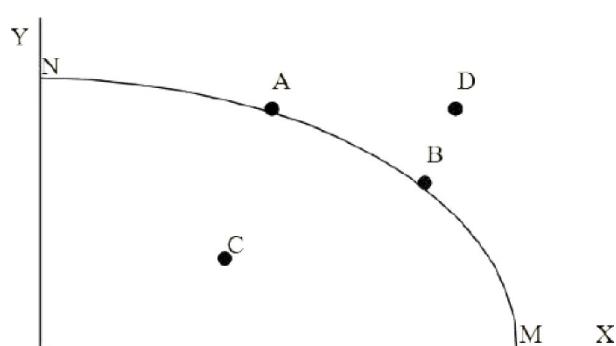
Transferring these figures to the graph, we get the KPV (Fig. 1-1):

Figure 1-1. An example of a production possibilities curve



This curve is suitable only as a conditional example. In reality, the economy as a whole is characterized by a convex upward curve, as shown in Fig. 1-2 (more on why later):

Figure 1-2. The production possibilities curve



The production possibilities curve reflects all possible combinations of two goods that could be produced in the economy with the full use of available resources and a given level of technology.

Points A and B on this curve (see Figures 1-1 and 1-2) show alternatives for producing these goods: compared to point A, point B corresponds to greater production of good X, but less production of good Y. This reflects the fact that society's resources are not unlimited, and if we want to increase production of one good, we have to sacrifice some of the other. For example, our conditional villager might grow more potatoes at the expense of carrots and vice versa.

In turn, the output corresponding to t. C indicates that some of the resources available in society are not used, because from this point it is possible to move to any point on the production possibilities curve. Using the example of the dacha farmer, we can assume the situation when he sows only part of the land, and he himself works half-assed. If we take the economy as a whole, this situation is characteristic of periods of crisis, when factories do not work at full capacity, fields are not sown, many people can not find work, etc.

Finally, t. D is currently not available to the economy, because there are simply not enough resources to produce the two goods in appropriate quantities. So our dacha owner cannot grow, for example, 16 units of carrots plus 8 units of potatoes on his ten acres. For such a combination to be possible, he needs to have more land and involve his relatives in its cultivation.

The question may arise: "Which of the points lying on the KPV is preferable?" In fact, the production possibilities curve itself does not answer this question. We should not forget that it only illustrates the possibilities of the economy, i.e., it shows what we can do, but not what we want to do.

Suppose our gardener loves potatoes, but can't stand carrots. Then the best one for him would be t. N in Fig. 1-1. For another gardener, on the contrary, the best t. M, for the third - t. A, etc.

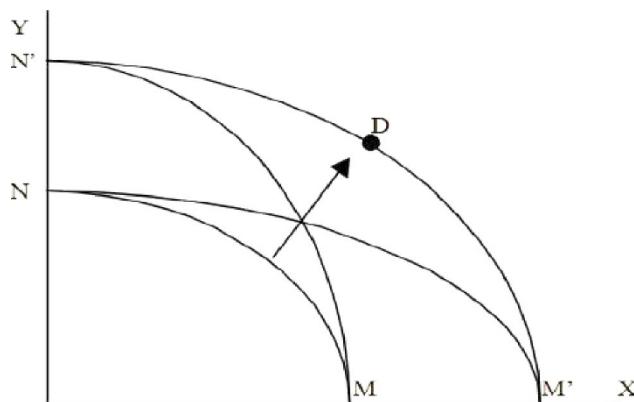
This is true for the economy as a whole. Let the X-axis be for the production of tanks, and the Y-axis for the construction of housing. If there is a war, we have no time for apartments, i.e., the best point on the KPV for us will be t. M in Fig. 1.

2. If there is peace and no military threat, we would probably prefer t. N. Any intermediate option is also possible.

B. Shifts in the production possibilities curve

Suppose now that society's resources have increased, or that the resources already available are now better used because of technological progress. This means that previously inaccessible outputs of both goods are now attainable. This will cause the production possibilities curve to shift upward and rightward from position MN to position M'N', and then t. D will probably become available (Fig. 1-3):

Figures 1-3. Shifts in the production possibilities curve

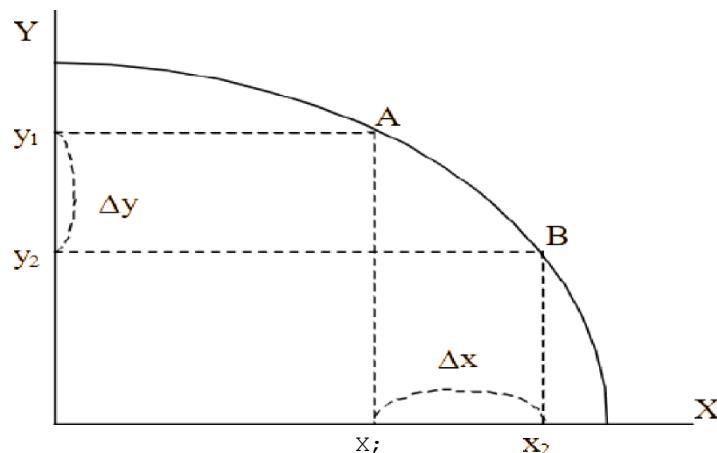


Suppose technical progress is observed only in branch X, and there is no progress in branch Y. If in this case we direct all the resources to branch X, we will reach t. M', and if we do the same with branch Y, we stay at t. N. In other words, the curve takes the form of M'N. If we do the opposite, the curve will be MN'.

B. Calculation of economic costs using the production possibility curve

The production possibilities curve can be used to estimate the economic costs of producing two goods. Let the goods X (tanks) and the good Y (housing) be produced. Initially, the economy is in point A, which corresponds to the production of x_1 tanks and Y housing (Fig. 1-4). It is decided to increase the production of tanks to x_c , but in this case we would have to reduce the input of housing to y_0 . Thus, we find ourselves in t. B.

Figure 1-4. Economic costs on the production possibilities curve



What is the economic cost of producing *one additional tank*? For the right answer to this question we need to remember the definition of such costs, given in the previous paragraph: opportunity costs are the benefits that will have to give up for the sake of obtaining this benefit. In our example, the production of additional tanks ($Ax=x - x_1$) required the reduction of housing ($Ay=y' - y_1$). Consequently, the economic cost of *one additional tank* is calculated by the formula:

$OS = - \frac{Ay}{Ax}$, where OS , is the economic cost of producing the good x (opportunity cost), Ax - increment of good x, Ay - increment of good y. The sign "minus" is necessary because the numerator in the formula is negative (housing starts are down), whereas the opportunity cost must by definition be positive; "minus" by "minus" will give "plus".

Here is a conditional example. Society produces 10 thousand tanks and 30 million square meters of housing. It is deemed necessary to increase the production of tanks to 15 thousand, but we will have to pay for it by worsening of living conditions: the input of housing will fall to 20 million square meters. In other words, an additional 5,000 tanks would cost us 10 million square meters of housing. Consequently, costs for one tank will be:

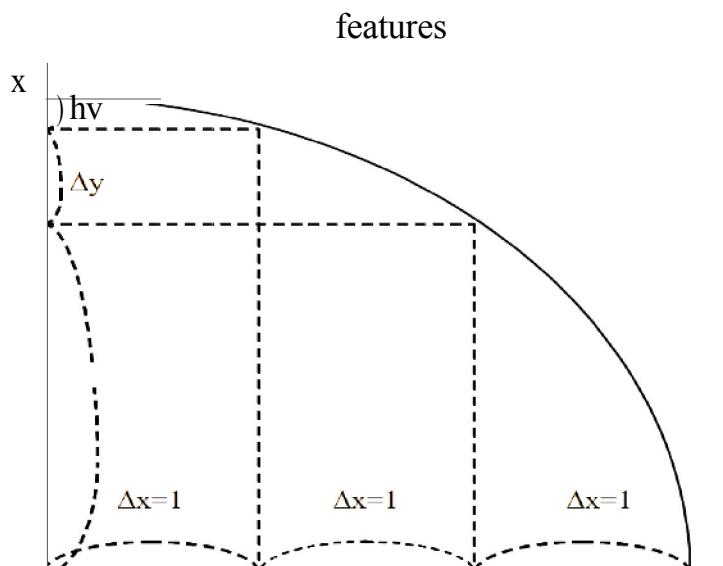
$$-\frac{10 \text{ млн. кв. м.}}{5 \text{ тыс. танков}} = 2 \text{ тыс. кв. м}$$

And what if we want, on the contrary, to increase housing construction from 20 to 30 million square meters, sacrificing 5,000 tanks for the sake of it? In that case, the numerator and denominator are reversed, and the cost of producing one additional million square meters of housing would be as follows: - $\frac{5 \text{ тыс. кв. м.}}{10 \text{ млн. кв. м.}} = 0.5 \text{ тыс. ман. к.}$

Г. Why does the production possibilities curve bulge upward?

The production possibilities curve is usually convex upward. This character of the curve corresponds to the law of increasing economic costs. According to this law, producing each successive unit of any good will require giving up more and more of the other goods. To illustrate this, let's look again at the production possibilities curve (Fig. 1-5):

Figure 1-5. Growth of economic costs on the production curve



The graph shows that for increasing the production of good X by one standard unit each time, society has to pay with an increasing reduction in the output of good Y. Thus, when the denominator (A_h) is constant, the numerator (A_u) is always increasing, so the fraction that shows the economic cost of producing good X also increases.

However, we should not forget that this reasoning is not a proof, but only an illustration of the law of increasing economic costs. In other words, this law is valid only if the KPV is convex upwards. At the same time, it does not apply if the KPV, for example, is linear as in Figure 1-1. If we go back to this graph and to the production possibilities table it is based on, we see that increasing potato production by one unit each time requires reducing the carrot crop by two units all the time. The economic cost of producing an additional unit of potatoes, therefore, does not increase, but is constant all the time.

So, to prove the law of increasing economic costs it is necessary to justify that the KPV on the scale of the economy is indeed convex upwards.

The production possibilities curve is convex upward (the law of increasing economic costs applies) because different productive resources (e.g., labor) are not equally suitable for producing different goods (one person may be an excellent builder, but a bad cook, while another is not). Thus, as we increase the output of some good, we have to draw in less and less suitable resources, while diverting them from those areas where they are efficient. Consequently, each additional unit of a given good causes society to sacrifice more and more of any other good, which is exactly what the law of increasing economic costs states.

Let us explain this with a conditional example. Fpynna students formed a construction crew for the duration of the vacation. At the construction site the brigade can do two things: dig a pit and cook food for themselves. Let's plot the number of meals cooked on the X-axis, and the cubic meters of excavated earth on the Y-axis. Suppose on the first day the foreman sent the whole brigade to the pit. At the end of the day, we will get some point on the Y axis, i.e., some earth has been dug, but not a single portion of food has been cooked. It is possible that such an arrangement will not quite satisfy the brigade, and the next day the brigadier decides to send one person to the kitchen. Will Koro be removed from the pit? Probably the weakest girl, who is of little use there anyway, but who is nevertheless a skilled cook. (Recall the premise of the model: resources - people are not equally suitable for different functions.) As a result, several dishes will be cooked, and the amount of excavated earth will remain almost the same by the end of the second day, because our girl could only load one shovel for the entire shift. It is possible that this situation will not seem optimal to the team, and then another girl, who is a slightly better digger but a worse cook than the previous one, will go to the kitchen. By the same principle of turning diggers into cooks, we will see that the "hump" curve of the brigade's production capabilities bends downward more and more steeply. In the end, the foreman himself will be left in the pit. He is the king there, but he is hardly needed in the kitchen, i.e. the curve of production possibilities will eventually become almost vertical. We see, therefore, that for each additional portion of food the brigade has to sacrifice more and more excavated earth. This is what we needed to prove.

3. Economic circulation

A. Production resources and their remuneration

Scheme economic of the economic cycle cycle (cycle of product and income) - is model, allowing to see the main directions

material and monetary flows in the economy, to show the relationship between economic agents and markets.

There are two main types of economic agents: households (families) and firms. The former own all the productive resources of society; the latter use them in the process of production. Resources are extremely diverse, but they can be combined into groups called factors of production. There are four such factors: labor, capital, natural resources, entrepreneurial activity.

Labor is the intellectual or physical activity of man, carried out in the process of production.

Capital is the means of production created by people. This includes buildings, structures, machinery, equipment, vehicles, stocks of raw materials and semi-finished goods, etc. We must distinguish physical capital from financial capital (money invested in businesses).

Natural resources usually pass under the code name The term "land," but in essence it refers to all natural resources that are not the result of human labor (land, forests, subsoil, water).

Entrepreneurial activity is a special kind of labor aimed at coordinating the use of other factors. A distinctive feature of entrepreneurship is the assumption of risk, since entrepreneurial income is by no means guaranteed.

When the owners of these four factors come together, a firm emerges. A **firm** is an association of owners of productive resources for joint production activities.

The four factors of production correspond to the four types of their remuneration:

- (a) The remuneration of labor is called **a wage**;
- (b) The remuneration of capital is called **interest**.
- (c) The remuneration of the land is called rent;

d) The remuneration of entrepreneurial activity is called profit.

From the latter follows a very important circumstance: in contrast to the ordinary consciousness, economic theory treats normal profit not as a surplus of revenue over costs, it is unclear where it arises, but as a necessary reward for special entrepreneurial work. Thus, normal profit is part of economic costs.

B. Schemes of the economic cycle

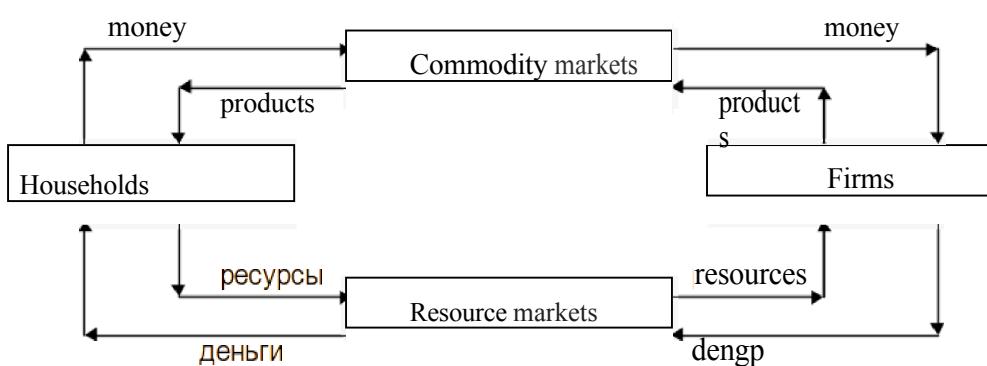
Households sell their factors of production to firms through resource markets. The firms turn these factors into finished products, goods, which they then sell to households in commodity markets. The circle is closed. This is the **s o - c a l l e d**.

"material flow" within the framework of the economic circulation model.

In the opposite direction there is a cash flow. By buying factors of production from households, firms pay them money, which is household income in the form of wages, interest, rent, and profit. Households spend this money in commodity markets, buying the goods and services they need from firms. The second circle is complete.

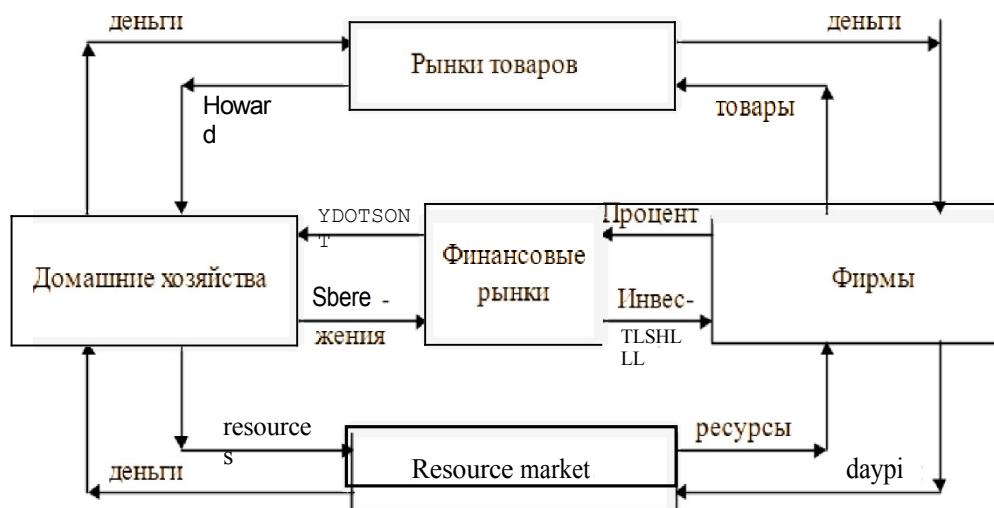
So, in the economy, two rivers - resource and commodity and money - are forever flowing toward each other. Schematically, all this can be represented as follows (scheme 1-1):

Figure 1-1: Economic Circle



This scheme simplifies reality because it assumes that households spend all income received on current consumption. In reality, people usually save part of their income. This can be done in a number of ways. First, the money being saved can simply be put in a desk drawer. Second, you can do the same thing by first exchanging rubles for dollars. But in a market economy it is more common for people to buy stocks of companies with their savings, or to put their savings in a bank. Both stock exchanges and banks are institutions of financial markets. Thus, through financial markets, the savings of households get to firms, which use them to increase capital - to buy machines, machinery, equipment, etc., i.e. to make investments. As always, one flow is matched by the other. In this case, firms pay interest to households for the use of their money (scheme 1-2):

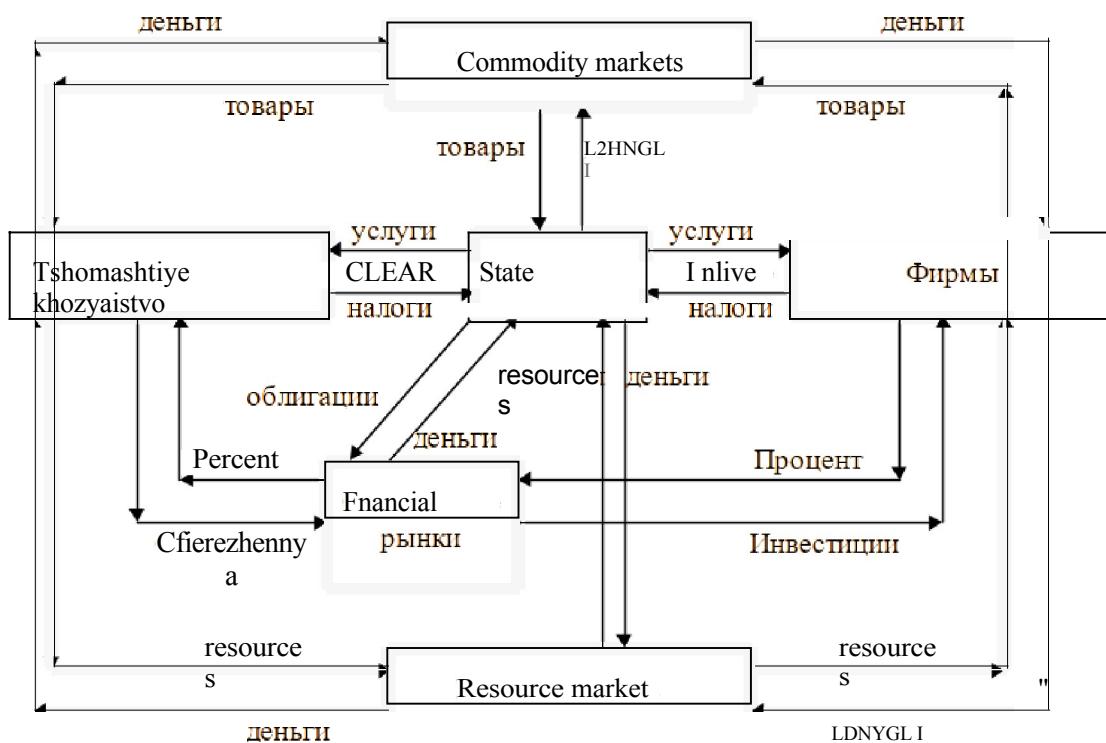
Figure 1-2. Economic circulation with participation of financial markets



Since this chart shows the relationship between savings and investment, it allows us to draw an important conclusion: a high share of savings in personal income is a necessary (but not sufficient!) condition for economic growth.

This is vividly illustrated by the example of modern China, where a very high share of savings in national income causes significant investments, and these, in turn, lead to rapid economic growth. The state plays an important role in the economy. Its functions will be discussed in the next topic. For now, it is only necessary to characterize the main flows in the economic cycle, which the state diverts to itself (diagram 1-3):

Figure 1-3. Economic circulation with state participation



The main source of government revenue is taxes collected from households and firms. Part of these taxes is paid back to households and firms in the form of various benefits, subsidies, etc. The difference is made up by so-called net taxes, the flows of which are fixed in the chart.

After collecting net taxes, the state buys the goods and resources it needs to carry out its activities from the relevant markets (see flows in the diagram). For example, the state hires a policeman and buys him a patrol car.

Through purchased goods and resources, the state provides services to both households and firms. Examples of such services are national defense, law and order, basic science, development of standards in various fields, etc. The flows of these services are also shown in the diagram.

Often government expenditures exceed revenues, so there is a budget deficit. Once taxes and other revenues have been approved, the deficit can only be covered by borrowing. There are two sources of borrowing: loans from the Central Bank and loans in financial markets from firms and individuals (we do not consider foreign loans yet).

Borrowing from the Central Bank means an additional issue of money and thus leads to inflation. When borrowing on domestic financial markets, there is no additional emission: households and firms buy government bonds (see Figure 1-3) and money temporarily changes hands until it is repaid. Therefore, this source of deficit financing is called inflation-free.

Nevertheless, this way of covering the budget deficit has another very negative consequence - the crowding-out effect. Its essence is that the state, trying to attract financial resources, increases the interest rate on loans. As a result, many firms are unable to borrow at the new rates and cannot buy new equipment, i.e. they remain without investment. Public expenditures are thus crowding out private investment.

Figuratively, this picture can be presented as follows. Rivers of household savings flow into the fields of firm investments. Suddenly on their way there is a dam and a diversion channel, where the water mostly goes, and the pitiful drops fall into the investment fields.

B. Russian Problems

The crowding-out effect was quite evident in the Russian economy. In the first years after the 1992 reform, the government largely occupied the

The Central Bank and thereby solved its budget problems by means of the printing press. However, the logic of fighting inflation forced the government to switch to covering the deficit by borrowing in the financial markets. Since 1995, it abandoned the direct use of Central Bank loans. Instead, a variety of government bonds, such as State Short-Term Bonds (GKO), Federal Loan Bonds (OFZ), State Savings Loan Bonds (SSLB), etc., were released on the market.

At the same time, the problem of the budget deficit not only did not become less acute, but, on the contrary, significantly increased. To cover the deficit, it was necessary to sharply increase the placement of bonds, with a significant part of the proceeds from new issues going to the repayment of debts on previous series. As a result, most of the savings of households and firms through banks were invested in government securities, leading to a catastrophic shortage of borrowed funds for businesses, which had no money to purchase new capital. Investment fell as a result.

At the same time, the government debt was growing very rapidly, and by the first half of 1998 the problem of its repayment reached a critical acuteness. The situation was considerably aggravated by the outflow of foreign capital from the Russian financial market. Despite the emergency measures taken by S. Kiriyenko's government, it was not possible to cope with the budget deficit and solve the problem of the state debt repayment. This led to the government's refusal to pay its obligations in August 1998.

The economic growth that followed, combined with high world oil prices, led to a state budget surplus (excess of revenues over expenditures) in 2000-05. As a result, the government no longer needed new loans to cover the deficit and was drawing back considerably less

funds from the financial markets. This contributed to the beginning of the growth of investment after years of decline.

Problems, however, remain. Today, investments are made mainly at the expense of enterprises' own funds. At the same time, sustainable growth is impossible without affordable credit. However, the level of bank lending to production is still insufficient. This is due both to the high risks of non-repayment of credits, and to the shortcomings of the banks themselves.

We cannot say, however, that nothing changes in this sense. The most noticeable positive shift in the development of the banking system in recent years has been the increase in lending to the real sector. But on the whole, the investment climate is still far from meeting the needs of the development of the Russian economy.

SELF-STUDY ASSIGNMENTS

1. "People fall in love when they find they have found the best in the marketplace, given their own limited means of exchange." Do you agree? Explain your position.

2. Indicate which of the following statements relate to micro- and which relate to macroeconomics:

A. The expected unemployment rate in Russia by the end of the year will be 8%;

B. In connection with the conversion, company X is laying off 100 man;

B. The war in the Middle East has led to an increase in world prices of oil;

Г. In 2005, the growth of industrial production in Russia slowed down; D. The state budget deficit leads to inflation;

E. Sberbank reduced the interest rate on deposits.

3. Specify, which of the following statements are

}Ee3 LbTflOM POSITIVE, 3 KftKIE - NO]ZMMNTIVE ECONOMIC tH tL13Z:

- A. The state budget deficit will lead to inflation;
- B. For reducing inflation it is necessary to reduce the state budget deficit;
- C. The decline in production is a consequence of high taxes;
- D. High market prices dictate the need to provide food stamps to the poor.

4. Explain what your opportunity costs of attending a university are? Do these costs include: a) commuting costs while studying; b) lost earnings due to classes; c) meal costs; d) separation from family?

5. A student is going to the movies to see a new movie. Instead of going to the movies, he might study economics that night, or watch TV, or raise his little brother. What is included in the student's opportunity cost of going to the movies?

6. You want to get from point A to point B as cheaply as possible in someone else's car. Obviously, you will catch the car while standing on the side of the road that leads from A to B, not the other way around. Explain your behavior in terms of opportunity cost theory.

7. To renovate his apartment docent X needs wallpaper (15 rolls), glue (5 packs) and vodka (1 case). All this he can buy in a supermarket near his home or at a wholesale market. The prices in rubles are as follows:

	Wallpaper (1 roll)	Glue (1 pack)	Vodka (1 bottle)
In the supermarket	600	200	100
On the market	400	120	60

A trip to the wholesale market would cost 3 hours of extra time and require 1,200 rubles in transportation costs. What should be the hourly wage of an assistant professor so that he would prefer to make a purchase at the supermarket?

8. Suppose the government succeeded in getting the prices of all goods and resources, including labor, to fall by half. How do you think this would affect opportunity costs in the economy?

9. Being abroad, you bought an 8-hour yacht tour as part of a tour group. During the tour you are unobtrusively photographed, and at the very end you are offered to buy ready-made photo cards. One card costs about \$3. You may or may not buy. What is the photographer's opportunity cost at the time the pictures are taken, printed and hanging on a string? What course of action would you take in this regard?

10. The business school needs a package of methodological documentation for the economic theory course. Meanwhile, the fee for it is very modest; in any case, it does not cover the cost of its development. At the same time, the school management believes that for this kind of money they can do a very good job. Do you share the management's optimism? Justify your point of view based on the theory of sunk costs.

11. Explain, what happens to the curve of production opportunities in a given country if:

- a) the weather conditions were very favorable this year; b) the war had just ended;
- c) the economy is in crisis.

12. Here is a table of production capabilities for civilian and military products:

Product Type	Production alternatives				
	A	Б	В	Г	Д
Cars (millions)	0	2	4	6	8
Rockets (thousands)	30	27	21	12	0

A. Graph these data graphically. What do the points on the curve show? How is the law of increasing opportunity cost reflected? If the economy is at point B, what would be the opportunity cost of producing an extra million cars or an extra thousand rockets?

B. Mark point E inside the curve. What does it show? Mark point G outside the curve. What does it show? Under what conditions is it possible to achieve output corresponding to this point? Under what conditions can point E begin to correspond to the full use of all resources?

B. Suppose production technology improved in rocket science, but remained the same in automobiles, and vice versa. Draw new production opportunity curves corresponding to these cases. Draw a production possibilities curve corresponding to the situation where the improvement in technology covers both industries.

13. A table of production possibilities is given:

Benefit A	29	27	22	16	?	0
Blago B	0	3	6	9	12	15

Fill in the blank cell. Justify your answer.

14. The economy has three parcels of land on which to grow potatoes or corn or both.

On the first site, with the fullest use of all available resources, it is possible to grow a maximum of 100 tons of corn or 100 tons of potatoes (all intermediate options are also possible, the production capacity curve of this site is linear).

Similarly, from the second plot we can maximally get 80 tons of corn or 160 tons of potatoes. Finally, the third site can give us a maximum of 50 tons of corn or 200 tons of potatoes (the production capacity curves of these two sites are also linear).

Construct a general production possibilities curve.

15. Use the economic model

to estimate the consequences of the following events:

- A. Because of unreliability banks
households households B In Russia,
households prefer to transfer their disposable money into dollars and euros;
- B. To save their savings from inflation, people invest in durable goods;
- C. The state increased subsidies to industry;
- D. The state reduced defense spending.

TEMA 2. GROSS DOMESTIC PRODUCT

1. The concept and methods of measuring GDP
2. Nominal and real GDP
3. GDP and other macroeconomic indicators

1. The concept and methods of measuring GDP

Gross Domestic Product (GDP) is the market value of all goods and services intended for final consumption and produced in the country for a certain period of time. GDP is a generalizing indicator of social production, the amount and dynamics of which characterize the state of the economy. Another important indicator is GDP per capita, which allows to estimate the standard of living in the country. At the same time, a country can lead in the absolute value of GDP and lag behind in GDP per capita. For example, China is now the sixth largest country in the world in terms of GDP, but it lags behind many countries, including Russia, in GDP per capita.

The size of GDP can be measured in three ways:

1. By cost of production (production method);
2. By Amount expenses of all consumers (the method end-use method);
3. According to the amount of primary income (distributive method).

The correct use of all three methods should produce the same results. The logic here is as follows: if the product is produced, it will be bought by someone (the cost of production equals the expense); if the product is sold, the money paid turns into income for the participants in production (the expense equals the income).

1. Calculation of GDP by the production method

In this calculation, GDP is measured as the sum of added value in all sectors of tangible and intangible production. **The value added** is the value of the

goods and services, minus the value of intermediate consumption. Intermediate consumption includes the value of raw materials, materials, electricity, semi-finished goods, services, etc., fully consumed in the production process. Consequently, value added takes into account the value of products created by producing firms and includes the remuneration of factors of production used by firms (wages, interest, rents, and profits) as well as the value of fixed capital consumed and net taxes on products (taxes on products minus subsidies on products).

Calculating GDP as the sum of added values avoids double counting. Since the cost of metal, for example, is included in the cost of a car, simply adding up the sales volumes of metallurgy and machine-building would result in metal being counted twice in the calculation of GDP. Obviously, the value of double counting in such calculations would be the greater the longer the process chain from extraction of raw materials to production of the final product.

Example. There are five industries in the economy, each of which produces raw materials or semi-finished products for the next one. The data on production are shown in the table:

	Cost of sales	Value added
Industry A	100	100
Industry B	180	80
Industry C	300	120
Industry D	350	50
Industry E	500	150
GDP		500

Assuming that the production value of the first industry coincides with the value added in it, we see the coincidence of GDP as the sum of the added values of all industries with the production value of the last industry producing goods for final consumption.

2. Calculation of GDP by the end-use method

When calculating GDP by the end-use method, it is necessary to sum up the expenditures of all consumers for the purchase of final products. From this point of view, GDP is defined as the sum:

- expenditures on the final consumption of goods and services;
- of gross savings (investment expenditures of firms);
- net exports (spending by foreigners).

A. Final consumption expenditures on goods and services include expenditures of households for the purchase of goods and services, expenditures of public administration institutions (budgetary organizations), and expenditures of non-profit organizations serving households.

(a) In calculating *the expenses of Households*, the following shall be taken into account:

- expenditures on the purchase of current consumption items, durable goods, and services;
- consumption of goods and services received in kind;
- consumption of goods and services produced by households for personal needs.

In calculating GDP, household expenditures on second-hand goods (to avoid double counting), as well as private transfers - uncompensated payments - are not counted. For example, if someone sends a money transfer to a relative, it is an expense for him/her, but there is no production behind such an expense, and therefore it cannot be taken into account when calculating the GDP value.

For the same reason it is impossible to take into account the expenses of the population for the purchase of securities - stocks, bonds, etc. If one buys shares

"In the case of the gas pipeline, if Gazprom purchases the pipes for the pipeline with the money received, it will be taken into account only once - when the pipes are purchased.

b) Public bodies whose expenditures are included in GDP are defined as budgetary organizations of health care, social welfare, education, culture and art, as well as

public administration, defense, science, law enforcement, etc.

Public expenditures include the expenditures of these institutions and agencies for the purchase of goods and services, as well as the payment of salaries to civil servants. To calculate GDP, public expenditures do not include transfers (pensions, benefits, etc.), because they are not related to today's production.

E. Gross capital formation (investment spending by firms) consists of:

- gross fixed capital accumulation;
- changes in inventories of tangible current assets;
- pure acquisition of value.

a) Gross fixed capital formation includes the value of buildings and structures (both production and residential) constructed, as well as acquired machinery, equipment, vehicles and other types of fixed assets.

b) Change in inventories of tangible current assets is the change in inventories of raw materials, materials, fuel, semi-finished products, work in progress and finished but not yet sold products.

c) Net acquisition of valuables includes the value of gold, jewelry, and other items purchased not for production or consumption purposes, but to preserve value and protect savings from inflation.

In connection with the above, we should pay attention to two points. First, if a private person buys a house or an apartment for himself, the statistics consider such a purchase not as a personal consumption expenditure, but as a gross accumulation of fixed capital. In other words, this person is considered to be a firm investing in real estate, since he will probably be renting out his real estate.

Second, if the firm has produced some products, but has not yet had time to sell them, then it is believed that so far it has sold the products to itself, i.e. made an investment in inventory.

B. Net exports - spending by foreigners - is the difference between our exports of any goods and services to other countries and our imports from those countries. To calculate GDP, exports and imports take into account goods supplied (received) as humanitarian aid, gifts, etc. If imports exceed exports, net exports may be negative.

In Russia in recent years the structure of GDP by expenditures changed as follows (Table 2-1):

Table 2-1. Structure of Russia's GDP use in 1998-2003 (in %)
for the total)

Years	1998	1999	2000	2001	2002	2003
GDP	100	100	100	100	100	100
Final Consumption Expenditures:	77,8	68,0	61,3	65,1	69,2	67,8
- households	56,8	52,2	45,2	47,7	50,4	49,7
- government agencies	19,1	14,6	14,9	16,2	17,6	16,9
- others	1,9	1,2	1,2	1,2	1,2	1,2
Gross accumulation:	15,4	15,0	18,6	22,1	20,3	20,8
- gross accumulation main capital	16,5	14,5	16,9	18,7	18,0	18,4
Netexport	6,8	17,0	20,1	12,8	10,5	11,4

At the same time, in recent years the fastest rates of growth of consumer expenditures of households associated with the increase in incomes of the population. In 1999-2000 rr. a very favorable impact on

SAVINGS OF OKLZYBaL J3OGT BdJIOBOFO NZKOPLANy - INVESTMENTS

firms. But in 2001-2002 the growth rate of investment steadily declined, which is a very alarming trend. At the same time, government spending increased markedly in 2002. Russian exports also grew rapidly, primarily due to high world oil prices. Nevertheless, the share of net exports in our country's GDP is decreasing. The latter is due to the outstripping growth in imports compared to the increase in exports. About all this

The dynamics of GDP and its components after the crisis of 1998 (Table 2-2):

Table 2-2. Growth of Russia's GDP and its components (in % to the previous year)

Fods	1998	1999	2000	2001	2002	2003
GDP	-4,9	5,4	9,0	5,0	4,3	7,3
Expenditures for the final consumption:	-1,5	-2,4	7,4	6,2	6,9	6,2
-households	-2,4	-4,4	9,3	8,7	8,5	6,2
-State institutions	0,6	3,0	1,4	-1,0	2,4	7,3
Gross accumulation:	-28,7	8,5	31,9	17,0	1,6	3,7
-capital accumulation	-11,2	2,4	15,0	6,5	3,0	8,5
Net Exports:	111,0	72,3	-6,2	-10,1	-4,5	11,3
-export	-0,3	9,4	8,7	2,0	10,2	25,3
-import	-11,0	-15,6	12,7	8,6	19,1	22,7

3. Calculation of GDP by the distributive method

When GDP is calculated by the distributive method, all the income received by the owners of the factors of production, as well as two types of income that are not the income of the suppliers of productive resources are summed up: the value of consumed fixed capital and taxes on production. More specifically, GDP, calculated as the sum of primary incomes, breaks down into:

- the remuneration of wage earners;
- net taxes on production and imports;
- gross profit and gross mixed income.

Compensation of employees includes wages and employers' social security contributions. Wages and salaries include all types of wages and bonuses paid in cash and in kind.

Net taxes on production and imports are the difference between the taxes levied by the government and the subsidies it pays on production and imports. Production and import taxes include taxes on products (value added tax, excise taxes, etc.), taxes related to the use of factors of production

(land tax, corporate property tax, etc.), as well as payments for the right to engage in certain types of activities (license fees).

Gross profit includes entrepreneurial profit proper, as well as property income: interest, rent, dividends, etc. With regard to small individual enterprises, whose owners themselves work in their firms without receiving wages, the concept of gross mixed income is used instead of gross profit. Both gross profits and gross mixed income are determined before deducting the value of consumed fixed capital. After this deduction, we obtain net income and net mixed income.

In Russia, the structure of GDP by source of income has changed in recent years as follows (Tables 2-3):

Tables 2-3. Structure of Russia's GDP formation by sources of income
(in % to the total)

Years	1998	1999	2000	2001	2002	2003
GDP - total	100	100	100	100	100	100
Remuneration of employees	47,6	40,1	40,2	43,0	46,6	46,0
Net taxes on production and imports	14,2	15,7	17,1	15,7	14,1	13,7
Gross profit and gross mixed income	38,2	44,2	42,7	41,3	39,3	40,3

It is noteworthy that since 1999 there has been a tendency for the share of wages to increase while the share of gross profits and gross mixed incomes in Russia's GDP has been decreasing. This was especially evident in 2001-02, when wages and salaries grew much faster than profits.

It should be borne in mind that regardless of the chosen method of calculation, GDP statistics are not perfect. First of all, it is difficult to take into account the scale of the shadow economy. The shadow economy is that part of the economy which is not controlled by society and is hidden from tax and other government agencies. It includes:

- (a) Illegal activities;
- b) the so-called informal sector, which usually includes services provided by members of households to each other (cooking, cleaning, laundry, repair of household equipment, child-rearing, etc.);
- c) legal activities, the income from which individuals or businesses do not show or do not show in full.

Revenues from the shadow economy cannot be estimated by conventional statistical methods; indirect data are used to account for it. The size of the shadow economy ranges on average from 10% of GDP in developed countries to 40% or more in developing countries. In countries with transitional economies, its scale is estimated at 20-25% of GDP. This is also the estimate given by the Russian Goskomstat. At the same time, according to a number of experts, the shadow economy in Russia reaches 40-50% of GDP.

In addition, GDP does not take into account such a form of non-market activity as community service. The problem is also accounting for changes in the quality of goods. For example, the quality of personal computers is constantly increasing, while their prices are decreasing.

2. Nominal and real GDP

In 1990 Russia's GDP was 644 billion rubles, and in 2003 it exceeded 13.1 trillion rubles. Does this mean that national production in our country has increased by more than 20 times during this time? No, of course not. Since GDP can only be measured in monetary units, its value is influenced not only by changes in production itself, but also by price increases. In this regard, we should distinguish between nominal and real GDP.

Nominal GDP is GDP calculated in current prices. The figures reflect the dynamics of nominal GDP. **Real GDP** is GDP calculated in constant prices, which are taken as prices of a certain base year.

Example. Let the economy produce a single commodity. In the base year it was produced 100 pieces at a price of 1 rub./pc. In the accounting year production was 50 pieces at a price of 4 rubles. On the basis of these data we can make a table:

Reference year		Reporting year	
Nominal GDP	Real GDP	Nominal GDP	Real GDP
100 rubles.	100 rubles.	200 rubles.	50 rubles.

In the base year, nominal and real GDP necessarily coincide, because prices have not yet had time to change. In the reference year, nominal GDP is calculated by multiplying the output by the prices of that year ($50 \cdot 4 = 200$), while real GDP is obtained by multiplying the same output by the prices of the base year ($50 \cdot 1 = 50$). Thus, when calculating real GDP, price constancy is assumed.

It is real GDP, being cleared of price fluctuations, that reflects the level of national production.

The relationship between these indicators of nominal and real GDP can be seen with the help of formulas:

$$\text{Nominal GDP} = \text{Real GDP} \cdot \text{Price Index}$$

Nominal GDP Index = Real GDP Index / Price Index. The price index is a coefficient reflecting the change in the price level in the reporting year compared to the base year. It is calculated by dividing the price level of the reporting year by the price level of the base year. In our example it is equal to 4.

Similarly, the indices of nominal and real GDP are obtained by dividing the nominal and real GDP of the reporting year by the nominal and real GDP of the base year, respectively.

The price index used to link nominal and real GDP is called **the GDP deflator**.

3. GDP and other macroeconomic indicators

First of all, we should distinguish between GDP and gross national income (GNI).¹ GDP is the product produced within a country by all economic agents regardless of their nationality. GNI is the sum of primary income,² received by residents of a given country as a result of their participation in the creation of that country's GDP, as well as the GDP of other countries.

For example, a firm owned by American capital operates in Russia. The value of the product produced by the firm is wholly included in Russia's GDP, because the product was created on its territory. At the same time, part of this value, which is the income of the owners of the firm, is created by Americans, and, therefore, is included in the GNI of the United States.

Quantitatively, the relationship between GDP and GNI is shown by the formula:

$\text{GNI} = \text{GDP} + \text{Balance of primary income received from abroad or transferred abroad (SPD)}$

The primary income balance is the difference between primary income received by residents abroad and primary income received by foreigners in our country. If it is positive, GNI is greater than GDP. And vice versa. In practice, however, the balance of primary income is usually insignificant, i.e. the difference between GDP and GNI is insignificant.

Subtracting the consumption of fixed capital from GDP³ (NPC), we get the net domestic product (NDP):

$$\text{GDP} - \text{PK} = \text{GDP}$$

Similarly, subtracting consumption of fixed capital from GNI yields net national income (GNI):

$$\text{view} - \text{poc} = \text{chnd}$$

¹ Previously this indicator was called the gross national product.

² Primary income include wages labor, income, income
The income from property (interest, rent, etc.), taxes on production and imports.

Residents are individuals and legal entities with a "center of economic interest" in the territory of a given country.

³ Consumption of fixed capital represents a decrease in its value due to physical and moral wear and tear.

Theoretically, indicators of domestic product and national income are better calculated on a "net" rather than a "gross" basis. However, in practice the calculation of consumption of fixed capital is very complicated, and accounting data on depreciation of fixed assets are not suitable for this purpose. Therefore, for domestic and international comparisons, GDP and GNI are widely used.

Another important macroeconomic indicator is gross national disposable income (GNDI). It differs from GNI by the balance of current transfers (CTT) - gratuitous payments received from abroad or transferred abroad:

$$\text{vi e} = \text{species} + \text{stt}$$

Current transfers include humanitarian aid, gifts to relatives, penalties, fines, etc. Thus, GNDI covers all income received by residents of a given country as a result of primary and secondary income distribution.

Ultimately, GNDI breaks down into national final consumption expenditure and national saving.

SELF-STUDY ASSIGNMENTS

1. Are the statements true?

A. Household spending on new homes is included in consumer spending.

B. Added cost includes wages and salaries wages, but does not take into account the amount of profit.

B. The volumes of nominal and real GDP can only be measured in monetary terms.

G. Recipient of transfers must anything give back to for to the state.

D. Gross fixed capital formation increases by the value of finished but not yet sold products.

E. If Gazprom sells more gas, the volume of GDP increases regardless of whether the gas is bought by domestic or imported consumers.

Ж. If a firm replaces an old computer with a new one, it does not change the amount of GDP because the total number of computers has not changed.

3. if Avtovaz produces more cars than it sells, it causes GDP to grow less than it would if all the cars produced were sold.

2. people trying to draw attention to the gigantic size of corporations often compare their turnover (gross revenue) with the GDP of certain countries. The result is that, for example, the Exxon oil company is, in a sense, larger than Sweden, because its turnover exceeds Sweden's GDP. Why is such a comparison incorrect?

3. Which of the following types of income and expenses are counted in calculating the GDP of a given year? Explain your answer.

A. Interest on XYZ bonds; B. Former worker's pension;

B. A painter's job painting his own house; D. A dentist's income;

Д. Monthly transfers received by the student from home;

E. The money Sidor received from reselling the fashion magazine to Tryphon;

Ж. Purchase of shares in PAO UES of Russia;

3. The growth of the firm's stocks by 10 million rubles;

И. Money received from the sale of the 2000 Zhiguli; K. Wages of a governess.

4. State several reasons why the relationship between the dynamics of real GDP per capita and the dynamics of the well-being of citizens may be indirect.

5. GDP deflator = 1.05, nominal GDP index = 1.04. Calculate the index of real GDP. Has real GDP increased or fallen?

6. The nominal GDP in the given year was 216. The GDP deflator equals 1.2 relative to the previous year, when GDP was
 200 denomination units. How much changed real
 GDP в compared to compared to the previous year?

7. Nominal GDP in the base year was 500. After 6 years, the GDP deflator is 2, while real GDP has increased by 40%. Calculate the value of nominal GDP after 6 years.

8. The economy produces bread and automobiles. The table shows data for two years:

	1990 г.	2000 г.
Car price The price of a loaf of bread	10,000 dollars.	12,000 dollars. 2 dollars.
Number of cars produced by	1 dollars.	120
Number of loaves of bread	100 baked500000	400000
Taking 1990 as the base each year	year,	calculate for
nominal GDP, real GDP, GDP deflator.		

9. In 2001, Russia's nominal GDP was about 9,000 billion rubles, and in 2002 it reached 10,800 billion rubles. At the same time prices rose by 14%. Calculate the index of real GDP in 2002 compared to 2001.

10. Using the following data, calculate gross domestic product, gross national income, and gross national disposable income.

Personal consumption expenditures Balance	219,1
of current transfers Consumption of fixed capital Exports	0,9 11,8
Wages	13,4
Net taxes on production and imports	194,2
Individual taxes Public expenditures	12,2
Gross accumulation Imports	40,5
Primary income transferred abroad Primary income received from abroad	59,4 52,1
	16,5
	3,8
	5,0

11. A Russian citizen is temporarily employed in the United States by a U.S. firm. Should his income be included: in the Gross Domestic Product of Russia?, in the Gross Domestic Product of the USA?, in the Gross National Income of Russia?, in the Gross National Income of the USA? Justify the answer.

12. The firm B Moscow is owned by American capital, and Russian citizens work there. Let the firm's product cost 40 rubles, of which 10 rubles is the income of American investors, and 30 rubles is the wages of Russians. Fill in the table showing the contribution of the firm in gdp (view) of Russia and gdp (view) of the USA:

Russia		USA	
BBM	view	BBM	view

13. Based on the data below, calculate the amount of GDP using the end-use method and the distribution method.

Personal consumption expenditures	245
Balance of current transfers	2
Renta	14
Consumption of fixed capital	27
Contributions of entrepreneurs to social insurance	20
Interest	13
Net mixed income	31
Net exports	3
Dividends	16
Wages	201
Net taxes on production and imports	18
Retained earnings of corporations	21
Individual taxes	26
Corporate income taxes	19
Corporate profits	56
Government spending	72
Gross accumulation	60
Change in inventories of tangible current assets	6

14. The following data about the economy is available: $\text{GDP} = 570$;
 Individual Income Taxes = 90; Primary Income received from abroad = 30; Primary Income paid abroad = 35;
 Interest payments to the public = 10;
 Current transfers received from abroad = 5; Current transfers paid abroad = 7; Personal savings = 70.
 What is the gross national disposable income?

TEMA 2. ECONOMIC SYSTEMS

1. Types of economic systems. Market economy.
2. The economic role of the state in market conditions

1. Types of **economic** systems. **Market economy.**

Let us recall again the simplest scheme of economic circulation, given in the last paragraph of the previous theme. This scheme is universal in the sense that it is applicable to any society. Indeed, social production in any case presupposes interrelations between people as owners of all productive resources and the firms transforming these resources into finished products. It is another matter that these interrelations may be carried out in different ways, and it is these differences that distinguish one economic system from another.

An economic system is a way of organizing the relationships between economic agents that determines the answers to the questions: "What to produce?", "How to produce?" and "For whom to produce?"

In the course of the historical development of human society, four main economic systems were formed:

- traditional economy;
- A centrally controlled economy;
- market economy;
- mixed economy.

In a traditional economy, the distribution of resources and finished products is based on established traditions and customs. This system played a great role in the life of society up to the Middle Ages, when many activities were passed on by inheritance, there were rigid boundaries of living standards for different social groups, the shop and communal isolation, etc.

At present, the traditional economy has retained its importance in underdeveloped countries, but its remnants can also be seen in quite

"modern" society. They manifest themselves in the division of professions into "men's" и "feminine", dominant stereotypes regarding "normal" differentiation income, some some of the ways in which consumer goods are distributed.

In Russia, elements of the traditional economy are manifested in the semi-feudal dependence of workers on employers, the preservation of the institution of registration of citizens at the place of residence, the presence of objects of socio-cultural sphere on the balance sheets of enterprises, etc.

In a centrally controlled economy, the distribution of economic goods is based on top-down instructions. The basis of such an economy is state ownership of production resources. The leading role in management is played by state planning authorities, which determine for each enterprise what products it should produce, what technology it should use, and, finally, to whom it should supply what it produces. Such an economy rests on three "pillars": centralized production planning, centralized supply of resources (funding), and centralized pricing.

An important distinguishing feature of a centrally controlled economy is the ability to quickly mobilize resources to achieve the goals set from above. Under certain, usually extreme, conditions (wars, natural disasters, etc.) this is the virtue of the system. It is no coincidence that the role of centralized regulators increases during wars, even in the most market economies. In Russia, the command economy showed its potential most clearly during the industrialization of the *1930s*.

At the same time, the system also has a number of inherently serious shortcomings. They stem primarily from the fact that the system, contrary to propaganda declarations, is not democratic: key decisions are made by the party elite, concerned about self-preservation and consolidation of its power. Undemocratic power is at its best

feels in emergency situations - wars, conflicts, upheavals - and for self-preservation constantly provokes such situations, maintains a state of emergency in society, whether to repel an external threat (most often imaginary) or to fulfill the next five-year plan.

The main strategic goal of the authorities or the basic economic law of the centrally controlled economy under such conditions is the maximum production of means of internal and external oppression - weapons systems, the "services" of the secret police and propaganda organs. As for consumer goods, funds for them are allocated on a residual basis at the level of the necessary minimum. This is no accident: wealthy people are not natural allies of the system, since they are more concerned with increasing their own wealth and are not very eager to make sacrifices "in the name of the party and the people.

Proof of this was the Soviet economy, which offered the citizens of the CCCP squalid housing, decrepit cars, and inedible foods, but at the same time produced in unimaginable quantities, unimaginable to "potential adversaries", the most modern tanks, warplanes, and submarines, and maintained a gigantic army.

Today's example of such a policy is the impoverished but constantly threatening North Korea. And China's communists (although the KHP economy is more of a transition from a centrally controlled to a market economy) really need enemies in independent Taiwan, Japan, and the United States to maintain their power.

"duly unrepentant" for the sins of World War II, as well as the United States.

But even when the system does allocate resources to meet the needs of the population, it is faced with the fact that it is impossible to correctly identify such needs from a single center. Some

products are therefore constantly produced in excessive quantities, others in insufficient quantities, and still others are not produced at all.

All of the above means that a centrally controlled economy does not make rational use of limited resources in terms of public needs. In other words, the system's answer to the first question of economic choice: "What to produce?" is not conducive to maximizing public welfare.

The system does not answer the second question any more satisfactorily: "How to produce?" Once the decision to produce is made, the question of economical use of resources recedes into the tenth plan. Moreover, objectively, producers become interested in overconsumption of resources, because the superior bodies evaluate their work by the volume of output in rubles, which is the greater the more resources are "mastered."

From this essential characteristic of the system, that producers work not to meet the needs of the consumers of their products, but to report to their superiors, such significant shortcomings of production as low quality and insensitivity to technical progress also arise.

No less detrimental to public welfare is the arbitrary distribution of the social pie by the state between regions, labor collectives and individual citizens (the answer to the question: "For whom do we produce?"). This way of distribution "according to the higher officials' reasoning" stimulates not conscientious and effective labor, but the ability to please the bosses, to be attached to a profitable distributor, etc.

A market economy involves the distribution of economic goods through voluntary exchange. In its pure form, the market mechanism excludes any government interference in determining prices or volumes of production; each economic agent here decides independently, based on its own interests, how much and what goods to offer to the market, to whom and at what prices to sell them.

The economic basis of the system is private ownership of the factors of production, respectively, and the driving motive for the behavior of economic agents - their egoistic desire to maximize their own welfare.

Is it good or bad in terms of the public interest? One of the greatest economists of all times, A. Smith, gave an affirmative answer to this question in the 18th century. In his economic activity, he stressed, every man is an egoist - thinking only about his own profits. At the same time, the "invisible hand of the market" directs individual egoisms toward the general welfare.

Take the baker, for example. When he bakes first-class bread, he is not motivated by the desire to make his fellow citizens happy; his goal is money. But at the same time, the market and competition force him to produce precisely what society needs, with high quality and minimal expense. Otherwise, our baker would simply go bankrupt.

"In pursuing his own interests, he often serves the interests of society more validly than when he really seeks to do so," A. Smith wrote.

Here we see two most important advantages of the market. First, the market directs production to meet the needs of consumers, expressed in their ability to pay. Second, through prices the economy receives signals for production. Price for the entrepreneur is like a beacon for the captain of a ship. If it rises, profits from investments in this sphere rise, and that is where resources are directed. On the contrary, a fall in price signals a decline in social demand for the product, and thus encourages the withdrawal of resources from the industry. It follows that the market mechanism ensures the fullest and most efficient use of limited resources.

But is the picture painted here too idyllic? Numerous examples from Russian reality are common knowledge,

when the market activities of economic agents only undermine social welfare. These examples are manifold and arise from a variety of causes. Nevertheless, these reasons can be divided into two groups:

- The reasons related to the shortcomings of the market as such. The point here is that even the most perfect market mechanism cannot solve a number of economic problems and needs to be adjusted by the government. Such market imperfections will be discussed in the next section;
- Reasons related to the shortcomings of the specific market mechanism that has emerged in Russia today.

The fact is that the efficiency of the market system depends on the dominant types of markets. Thus, in highly competitive markets it is virtually impossible for individual economic agents to increase their own profits without contributing to the maximization of public welfare. On the contrary, the dominance of monopolies leads to the fact that enterprises with market power are able to increase their profits by reducing output and raising prices. Thus, their welfare is built on the basis of redistribution of public wealth in their favor, i.e., to the detriment of the interests of society. It is the latter situation that is characteristic of modern Russia, which inherited from the centrally controlled system a record high degree of monopolization of the economy.

Another reason for the low efficiency of today's Russian market is related to the problem of property. Effective private property, which is, as noted, the basis of the market system, is far from being fully formed in our country. The absence of a real effective owner, with his own capital responsible for the course of affairs, prevents the adoption of rational management decisions, leads to squandering of resources.

An acute problem is the arbitrariness and abuses of the top managers of joint-stock companies in relation to their owners, the weak legal protection of private property.

A mixed economy is an economic system that combines the use of market and centralized regulators. This system is a compromise between a centrally controlled economy, where major decisions are made by government agencies, and a pure market, where economic agents make their own decisions without any government restrictions.

Obviously, both a centrally controlled and a market economy are as impossible in their pure form as absolutely pure water. All we can say is that the economy of a particular country is more or less close to one of the two extremes. For example, the CCCP, especially during the Stalin period, was very close to the ideal of a centrally controlled system.

Today, the Heritage Foundation and The Wall Street Journal publish an annual Index of Economic Freedom. When it is compiled, the economies of each of the 155 countries under consideration are analyzed according to 50 indicators reflecting the government's tax, monetary and trade policies, the degree of government intervention in the economy, the level of protection of property rights, etc. As a result, all countries are divided into 4 categories: "free",

"predominantly free," "predominantly unfree," and "repressive," and each country gets its own economic freedom rating, ranging from 1.0 (a perfect free economy) to 5.0 (a totally unfree economy).

The economy of Hong Kong is consistently recognized as the freest (1.35 in 2005). Hong Kong first topped the ranking when it was still a British colony and managed to maintain its leadership by becoming a special administrative region of the KHP. In addition to Hong Kong, another 16 countries - Singapore, Luxembourg, Ireland, Great Britain, Chile, and the United States - are considered economically free,

Switzerland and several others. Of the post-Soviet countries, only Estonia, which was in fourth place in 2005 with a rating of 1.65, made it into the leading group.

At the other end of the list is the DPRK, which has consistently received the highest score of 5.0 for economic unfreedom. Thus, North Korea can now be considered a bastion of a centrally controlled economy. As for Russia, in 2004 it shared 114th place with the African state of Malawi, and in 2005, after getting a score of 3.56, it moved down to 124th place, which it no longer shares with anyone.

All developed capitalist countries today are mixed economies: with the leading role of market relations in them the guiding hand of the state is also quite visible, although the degree of state intervention in the economy varies there.

In this regard, we now have to consider the main functions of the state in a modern mixed economy, to determine the limits of effective state intervention in the operation of the market.

2. The economic role of the state in market conditions

Among economists there are two extreme points of view views

The GOPI GONSTSTROY in the JSOMEWORK ECONOMY.

Some economists believe that the market economy is efficient by itself, and that government intervention only undermines that efficiency. Such economists advocate the minimization of government functions, calling for every opportunity to replace government regulation with market regulation. A corresponding current of economic thought is now represented by modern neoconservatives.

At the same time, other economists hold the opposite view, according to which the free market by itself is not able to ensure the effective functioning of the economy, and therefore needs constant government adjustment. This

position was substantiated by the greatest economist of the 20th century, D. Keynes, and today is defended by his followers, the neo-Keynesians.

Despite these theoretical divergences, virtually all economists today agree that the market is not omnipotent in any case. In other words, it is incapable of performing a number of important economic functions, and behind each of these tasks that the market does not solve, there is a need for state intervention. This approach allows us to outline the minimum limits of state intervention in the economy, which will be discussed below.

A. Minimum economic functions of the state

1. The market is unable to provide the economy with the optimal amount of money. Let us imagine that the central bank of a country disappears one day, along with the paper money it issues. The place is not empty, and the economy, having recovered from the initial shock, will switch to commodity money produced by private enterprises.

In the history of mankind, the most common monetary commodity has been gold. In this case, however, the price level turns out to be tied to the productivity of the gold mines: as new deposits are discovered, there is more gold, which means that the prices of other goods expressed in gold go up. And vice versa. As a result, during the reign of the gold standard, prices jumped up and down: a year with high inflation was as likely to be followed by a year with high as with low inflation. But unpredictable price hikes are as bad for the economy as sudden acceleration or deceleration is for the human body, because any long-term business planning becomes impossible. Who will carry out a serious business project without knowing what the price of resources and finished goods and the interest rate will be a year from now?

In this regard, now paper money is not exchanged for gold, their number is not tied to the gold reserve of the country, and is determined by

exclusively by the policy of the Central Bank. Being weighted, this policy avoids price shocks. Therefore, the regulation of the money supply is the prerogative of the state.

2. The market needs a legal basis for its functioning. Thus, private property must be protected by law, as well as the performance of contracts. No less important is such aspect of legislative activity of the state as prohibitions on sale of harmful and adulterated products, imposing obligations on sellers to fully inform buyers about quality features of goods.

This is because sellers and buyers of goods often have inconsistently complete (asymmetrical) information about their quality. When you buy a used car, in particular, you cannot know all of its defects, which are well known to the owner. Similarly, it is not written on vegetables whether they were grown in a favorable ecological zone or in the Chernobyl area. Under such conditions, purely market relations (without state intervention) obviously do not contribute to the optimal allocation of resources, respectively maximizing public welfare: why try to make something of quality if you can create a defect and pass it off as a candy.

Economists call this one of the "market failures. Its existence prompts states with developed market economies to carefully regulate such aspects of market relations.

The aforementioned areas of legal activity of the state allow us to liken its role in the economy to that of a soccer referee. The latter does not prevent teams from identifying the strongest, but with strict adherence to the rules of the game: you cannot kick your opponent, play with your hands, etc.

3. Market mechanism not have immunity against the emergence of monopolies, the harm of which was discussed in the previous

paragraph. Here it should only be emphasized again that when a monopoly occurs, the prices of goods are higher and their output lower than under competitive conditions. Monopolists can, therefore, influence the market to their own advantage and to the detriment of society as a whole. We will discuss in detail the societal losses due to the establishment of a monopoly in Topic 9, Section 3.

As a result, monopoly generates irrational use of economic resources, which leads to the need for anti-monopoly public policy.

4. The market is unable to provide the economy with the necessary amount of public goods, i.e., co-consumption goods. The latter include national defense, law and order, environmental protection, basic science, utilities, transport communications, etc.

The pure public good has two properties:

- (a) The consumption of such a good by one person does not reduce its usefulness for another person (the property of indiscriminate consumption);
- b) it is impossible to prevent a person who has not paid for the good from consuming it (the property of non-excludability from consumption).

For example, an air defense system that protects a country from an air attack protects not only the bona fide taxpayer, who paid for its maintenance with his taxes, but also the homeless person, who never paid any taxes in his life. It is impossible to protect a taxpayer without also protecting a homeless person.

By comparison, private goods are goods that, while being consumed by one person, cannot be simultaneously consumed by another. Typical examples are food, clothing, housing, etc. For example, if you eat a chocolate bar, no one else can eat it. The production and consumption of private goods is usually quite effectively regulated by the market: whoever paid for the chocolate bar eats it.

At the same time, the above-mentioned properties of public goods lead to the fact that individual consumers tend to avoid paying for them, reasoning something like this: "Even if I don't pay, others will pay, and I will use the good equally with everyone else. As a result, purely market relations (without state intervention) often lead to a situation in which public goods are not produced or are produced in insufficient quantities.

In this regard, the function of customer and distributor of many public goods on behalf of society as a whole is assumed by the state. Without the state, we would have no tanks, no airplanes, no missiles. Instead, everyone with a Kalashnikov assault rifle (a private good) would be defending his own apartment!

5. Market activity generates side (external) effects, both negative and positive. **External effects** are the costs (benefits) of market operations that are not reflected in prices.

A serious example of a negative external effect is the suffering of city residents due to pollution by a chemical factory. The plant produces first-rate laundry detergent, using certain production resources for this purpose, whose cost is built into the price of the detergent. Consumers and manufacturers alike are thus satisfied. And the residents of the city? They lose the community resources (clean environment) they previously had. The mill received these resources free of charge. He paid, therefore, only a fraction of the resources he actually consumed.

There are also examples of positive externalities. For example, the residents of the village benefit from the fact that one of them improves the area adjacent to his house for free.

Obviously, the existence of externalities undermines public welfare. In particular, the above-mentioned factory would have to compensate for the damage caused by its fault to the residents of the city, which it has not yet done. Similarly, the recipients of positive effects on

justice would have to pay an amount equivalent to their benefit to the producer of such an effect, assuming part of their cost. As a result of both, the external effects would disappear.

When externalities exist steadily in the economy, the government must be involved in solving them. It eliminates externalities by, for example, taxing producers of negative effects (a fine imposed on a factory for air and water pollution, with compensation paid to victims), or by paying subsidies to producers of positive effects. Thus, the state subsidizes education, because students benefit not only themselves, but society as a whole, i.e., they create a positive external effect on other people.

The problem of externalities and public goods will be discussed in more detail in Topic 12.

6. The market generates an unjustifiably high differentiation of income from the point of view of society and does not ensure people's right to work. In this sense, it can be likened to a soulless machine: as long as a person possesses a resource valuable to the market (labor of the right qualifications, land, capital), his income is high; otherwise, he has to settle for low incomes or starve to death - the market does not blink an eye. Purely market relations recognize as fair any legally obtained income, regardless of whether it is earned through hard work, natural talent, or rich inheritance.

But what is fair for the market is not always acceptable to society. Therefore the state implements a variety of social programs to support the needy: it pays benefits for poverty and unemployment, organizes retraining courses, provides free medical care, food stamps, etc. These are so-called transfer payments - through taxes, money is taken from the rich and given to the poor.

Contemporary neoconservatives do not deny the importance of government social policies to overcome poverty, but they emphasize that each person must, first and foremost, help himself. In this regard, they believe that the task of the state is not simply to pay benefits, but to encourage people to work.

B. The Actual Limits of Modern State Intervention in the Economy

The activities of the modern state are subordinated to four main goals: stable economic growth, full employment, curbing inflation, and maintaining the balance of payments. In the long run, these goals go hand in hand, but in the short run they may contradict each other. Thus, the stimulation of production and reduction of unemployment often turns out to be an increase in inflation and deterioration of the balance of foreign trade.

In pursuing these goals, the state is nowhere limited to performing only its six minimum enumerated functions, but carries out large-scale Stabilization (countercyclical) as well as structural policy.

Stabilization policy is a set of measures for overcoming crises and maintaining uniform and sustainable growth of production. It includes fiscal, monetary (fiscal) and income policies.

Fiscal policy is implemented through government spending on the purchase of goods and services and the levying of taxes on individuals and firms. In times of recession, government spending usually rises and taxes fall, and vice versa. Monetary policy means controlling the money supply in the economy. The government usually increases the amount of money during an economic downturn and restrains it during an upturn. Similarly, during recessions, the state's income policy is expressed primarily in the full restriction of wage growth; during booms, the rigidity of this policy is weakened.

At the same time, according to non-conservative economists, such stabilization policies are ineffective. They believe that a competitive market system in principle ensures stable economic development, while the observed economic fluctuations are precisely the result of arbitrary government manipulation of the budget and the money supply.

Hence the practical recommendations: reduce government spending and a stable, predetermined increase in the money supply of about 4% a year. Then the economy will grow steadily according to its natural capacity, and cyclical fluctuations will be a thing of the past.

If stabilization policy can be likened to various methods of treating a sick organism, structural policy is a policy of "healthy living. Its goal is to achieve a balanced development of the economic organism, so that it becomes immune to all kinds of diseases. The most important role is played by policies to promote competition and limit monopolistic tendencies. Another area of structural policy is the fight against unemployment by organizing the retraining of workers in accordance with the requirements of modern production. A very important element of structural policy is the support of sectors that are especially important for the development of the national economy or a given region. The production of public goods, mentioned above, is also an essential part of structural policy. Sometimes the state considers it necessary to place a particular industry or enterprise under its direct control by nationalizing it. In the opposite case, it transfers enterprises to private ownership (privatization process).

At present, privatization is a characteristic feature of government structural policies implemented in absolutely all developed countries. This situation reflects the modern understanding of

that the state, with few exceptions, should not be directly involved in production, this is the realm of private business.

B. The State in the Russian Economy

The state has a special role to play in economies in transition, such as Russia's. The specifics of our country is that radical economic transformations took place under conditions of a weak state. By the beginning of the 1990s, almost all institutions of state power had been destroyed, and their restoration was, in fact, the central political task of the first post-communist decade. At the same time, economic reforms progressed only as state institutions were restored, resulting in a much slower pace of change than in most other countries that had embarked on the path of building a market economy. Today we can talk about the restoration of state power and the achievement of political stabilization in society.

At the same time, expectations that a strong state will firmly implement liberal market reforms are not fully justified today. A strong state, adequate to the needs of a market economy and democratization of society, is not a state capable of arbitrary rule with impunity. In fact, both central and regional authorities constantly take on functions that essentially undermine the development of the market. The specifics of the Russian mixed economy is that many decisions of formally independent economic entities are made only with the permission or by direct order of the authorities. Seizure of private property with the use of the so-called "administrative pecypca" under the guise of "independent" courts and prosecutor's office has become a common phenomenon. As a result, market relations are replaced by administrative diktat, and the state serves not so much society as individual officials who are parasitic on the economy, and businesses closely connected with them.

The primary task of the state is transitional to create an efficient market. To this end, it is necessary to implement deep structural, institutional reforms aimed at the decisive liberalization of the economy, freeing enterprises from excessive tutelage and control on the part of government agencies.

This is not to say that the state should withdraw from economic management altogether. Only the state is capable of creating and protecting the basic rules and institutions of a market economy. First of all, these are the institutions of private property, market infrastructure, public administration, and independent judiciary. It is important that the "rules of the game" developed by the state be the same for all entrepreneurs. Without the latter, it is impossible to create a highly competitive market environment.

In the area of expenditures, the state must stop being a cash cow that directly finances enterprises, or a "welfare state" that guarantees a "decent life" for everyone. Instead, budgetary money should be used to create a network of insurance and similar funds that protect investors and share their risks. Along with this, the state is responsible for financing the production of public goods, supporting those members of society who are truly unable to provide for themselves.

To summarize, it should be emphasized that the very fact of state intervention in the economy does not guarantee economic efficiency. The role of the state has to be accepted in cases where the market definitely fails to cope with certain economic functions. But any attempt by the state to appropriate "additional powers," much less the fetishization of its capabilities, are fraught with the most serious economic troubles.

SELF-STUDY ASSIGNMENTS

1. Explain, в What consist of basic features of a market economy. What are the most important advantages and disadvantages of the market?

2. According to conception A. Smith в competitive market economy the selfishness of economic agents:
 - A. Harmful to society;
 - B. Leads to the sale of low-quality goods at high prices;
 - C. Forces firms strive κ to improve quality and reduce costs;
 - D. Makes state intervention unnecessary. Justify the correct answer.

3. What are the main functions of the state under market conditions? What are the features of stabilization and structural policy of the state?

4. В conditions market system the state intervenes in the economy in order to:
 - A. Reduce competition;
 - B. To provide consumers with goods of higher quality and cheaper than in the private sector;
 - C. Guarantee profits for all firms;
 - D. Reduce negative side effects of market activities.

Justify the correct answer.

5. A disgusting, broken road leads to the dacha village. All the dacha residents grumble, but no one is willing to do anything to remedy the situation. Something was done, however, by the head of public utilities of the nearby town, who has a dacha in the village. From the resources saved on landscaping, he allocated a couple of dump trucks

for repairs. A few particularly prominent potholes have disappeared, but the road has not become significantly better. Explain this situation based on the theory of public goods. What would you recommend you do to remedy the situation?

6. A small group of economists believes that the elimination of the state monopoly on the issue of national currency and its replacement by the free circulation of multiple currencies issued by private banks ("Bank of Moscow" issues its own rubles, "Bank of St. Petersburg" its own, etc.) would be useful. These currencies would compete with each other on the money market. Do you agree? Assess the positives and negatives of such an innovation.

TEMA 3. TOTAL DEMAND AND CO-SUPPLY

1. Aggregate demand and its factors
2. Aggregate supply. Potential GDP
3. Macroeconomic equilibrium

From the course of microeconomics we know how and why the prices of individual goods are formed and why their output rises or falls. But microeconomics does not explain why prices change as a whole, as well as the total volume of social production. To answer these questions, we must combine all markets for individual goods into a single total market. This means combining all prices into a single price level, and all production into an aggregate volume of production - real gross domestic product (GDP).

In the microeconomic "supply-demand" model, we were plotting the quantity of a given commodity in physical units along the X-axis and its price in rubles along the Y-axis. In macroeconomics, we cannot do so, because goods are different here. It makes no sense to sum up, for example, liters of beer and tons of oil, or the price of a car with the price of a chocolate bar.

So when we build the model "aggregate demand - aggregate supply" (the model "AD-AS"), we plot the real gross domestic product in rubles on the X-axis, and the total price level in relative units, or the price index - GDP deflator, on the Y-axis. In other words, when we plot the numbers 1, 2, 3, etc. on the y-axis, this means that prices are increasing by a factor of 2, 3, etc. relative to some level taken as a unit.

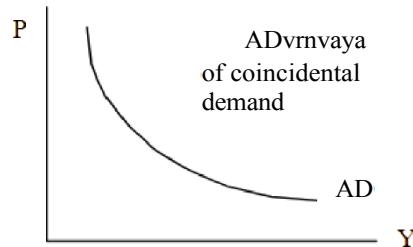
1. Aggregate demand and its factors

A. Construction of the aggregate demand curve

Aggregate demand is the amount of real GDP that all buyers would want to buy during a given time at different price levels.

The law of aggregate demand: the lower the price level in the economy (P), the greater, all other things being equal, the demand of all consumers for real GDP (Y). Graphically it looks like this (Fig. 3- 1)-

Figure 3-1. The aggregate demand curve



The curve aggregate demand curve can be derive from

The equation of the quantitative theory of money:

$$MV = PY,$$

where M is the money supply in the economy, V is the number of turns of each unit of money during a given time, P is the price level in the economy, Y is real GDP.

Rewriting this equation, we get:

$$Y = \frac{MV}{P}$$

This is the equation of aggregate demand. It shows that the higher the price level, the less, given M and V, the number of goods and services demanded. Logically, this can be explained as follows: if the price level rises, more money is needed for each transaction; if the money supply is constant, the number of transactions will decrease, i.e. the number of goods and services purchased will fall.

An increase in money in the economy, as well as its speed of circulation, leads to the fact that economic agents begin to buy more goods at all prices. Consequently, the AD curve shifts to the right. And vice versa. Thus, the parameters M and V are non-price factors

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B. Structure and factors of aggregate demand

Let us consider the factors that cause shifts in the aggregate demand curve,

in more in detail. Changes in of the money

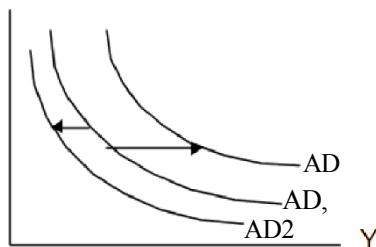
in the economy and the velocity of money circulation is

reflected in expenditures. As we know (Theme 2, paragraph 1), this can be the expenditure of private consumers - households (C), or gross savings - investment expenditure of firms (I), or the expenditure of public administration (G), or foreigners' expenditure of the Net Exports (XN) From this perspective, aggregate demand (Y) is given by the equation:

$$Y=C+I+G+XN$$

Thus, an increase in any of these components of aggregate demand at a given price level increases aggregate demand, and the AD curve shifts to the right. And vice versa (Figure 3-2):

Figure 3-2. Shifts of the aggregate demand curve



Suppose, for example, that AD is the original aggregate demand curve. Then an increase in government spending would shift the AD curve to the right to the AD1 position If firms, all else being unchanged, reduce their investment, then the AD curve would move to the left to the AD2

Let us now consider what factors cause changes in these four components of aggregate demand.

Household consumer demand (C) depends mainly on: a) total income of all consumers or national income; b) consumer expectations; c) taxes; d) transfers; e) interest rate.

Obviously, rising incomes as well as government transfers of uncompensated payments to households (pensions, benefits, etc.) increase consumer demand, while higher taxes reduce it. As for expectations, they can be different. Expectations of higher prices lead consumers to spend more today, i.e., aggregate demand increases. In contrast, if consumers expect to see a drop in their income due to economic recession and rising unemployment, they increase their savings, by reducing current expenditures (saving for a rainy day). As for the interest rate, it affects consumer demand because households make some of their purchases on credit. When the interest rate goes down, rate, consumer credit becomes more affordable, which stimulates purchases. And vice versa.

Investments of firms (I) are made, first, to compensate for the capital consumed, and secondly, to increase it. Accordingly, a distinction is made between gross и net investments. Net investments (IN) is obtained by subtracting depreciation (A)' from gross investment (I):

$$IN = I - A$$

Thus, net investment reflects the growth of physical capital in the economy. They can be negative if the retirement of equipment "due to old age" exceeds the purchase of new equipment. Nevertheless, when analyzing aggregate demand, it is gross investment that is taken into account, because we are interested in spending on new

' Depreciation is the compensation for the depreciation of elements of fixed capital (machines, machinery, equipment, etc.).

machines, machinery, equipment and other items produced
основного капитала.

Firms' investment demand depends mainly on: a) the real interest rate; b) national income; c) expected profits from investments; d) corporate taxes; e) government transfers of subsidies to firms.

In this regard, we should distinguish between the nominal interest rate and the real interest rate. The nominal interest rate (i) is the rate at which money is borrowed in financial markets. In contrast, the real interest rate (r) is the change in the purchasing power of interest income. The relationship between the nominal and real interest rates is described by the equation:

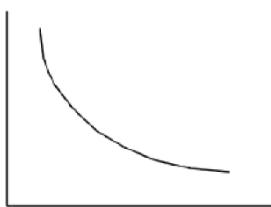
$$r = i - \pi,$$

where r is the real rate, i is the nominal rate, π is the inflation rate.

As an example, let's assume that the loan agreement is concluded at 10% per annum. This is the nominal interest rate. However, over the course of the year, prices rise by 6%. Under these conditions, in one year the lender will receive only 4% more money than the amount he lent in terms of purchasing power. This 4% is the real interest rate.

If the real interest rate goes down, the price of debt for enterprises, at the expense of which they make their investments, goes down. Investment, therefore, grows (Fig. 3-3):

Figure 3-3. Investment demand curve



In fact, it is an imprecise formula, which gives approximately correct results only for small rates of inflation. The exact formula:

$$\frac{i - \pi}{1 + \pi}$$

Suppose the real interest rate does not change. Investment,

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and the demand for firms' products grows. To meet the growing demand, firms increase their production capacity, i.e., they invest. The investment demand curve in Figure 3-3 shifts to the right. 3-3 shifts to the right. In contrast, when national income falls, investment declines.

Investments are made in anticipation of future profits and depend on the expectations of entrepreneurs. If the latter believe the business outlook is favorable, investment will rise at the same interest rates: the investment demand curve shifts to the right. Obviously, higher business taxes reduce investment, while higher subsidies to firms increase it.

Here's an example. In 2002, Japan's economy was in recession - GDP was declining. To overcome the recession, government economic policy aimed to stimulate aggregate demand in the country by increasing consumer spending by households and investment by firms. To this end, Japan's monetary authorities lowered the real interest rate to a negative level: the nominal interest rate became so low that it did not cover the rate of inflation. The intent was clear: to encourage firms and people to take cheap credit and spend it on Japanese products. Nevertheless, the desired result was not achieved immediately. Households and firms in Japan were reluctant to increase their spending, even at such low interest rates, because they had a negative view of their future income and profits. It took some time to overcome the negative expectations of economic agents, and the Japanese economy began to grow little by little.

Government demand - government spending (G) is determined largely arbitrarily. Usually government spending increases before elections. In macroeconomic models, government

costs are usually present as an exogenous (predetermined) parameter.

Foreign demand - net exports (XN) is the difference between a given country's exports (X) and its imports (M):

$$XN \equiv X - M$$

Accordingly, net exports are the greater the greater the exports and the smaller the imports. Net exports depend on three main factors: a) national income in other countries; b) national income in our country; c) exchange rates.

The relationship between the size of national income in countries that are our trading partners and Russia's exports to these countries is direct: the greater their national income, the higher our exports to these countries, hence our net exports.

Let us assume that the CIS countries are experiencing an economic boom: the incomes of the population and firms are growing. This will lead to the fact that consumers in these countries begin to buy more of all goods, including Russian goods, which leads to an increase in our exports. Thus, Russia's economic interest is to ensure that our neighbors do as well as possible, because beggars will not buy anything from us.

Suppose now that the national income in Russia grows. Now our consumers start to buy more different goods, including foreign goods. As a result, Russian imports begin to grow, i.e. our net exports decrease, provided that Russia's exports remain the same. This is a well-known paradox: economic growth in a country usually contributes to the deterioration of its trade balance (the difference between exports and imports) when all other factors are unchanged.

A very important factor of net exports is the dynamics of exchange rates. In this regard, it is necessary to distinguish between the nominal (NER) and real (RER) exchange rate of the national currency.

The nominal exchange rate is the price of the national currency expressed in a foreign currency. So the nominal exchange rate of the ruble today is approximately equal to \$1/28.

The real exchange rate is the ratio of prices of goods in two countries. It is calculated by the formula:

where R_i is the price of a product in our country, P_F is the price of a similar product abroad.

For example, a product in Russia costs 2,800 rubles, and a similar product in the United States costs \$200. Then:

$$RER = \frac{1}{28} * \frac{2800}{200} = \frac{1}{2}$$

In other words, Russian goods in our conditional example cost half as much as American goods. This encourages Americans to buy the product from our manufacturers, but it does not encourage Russians to buy it in the United States.

The lower, therefore, the real exchange rate of the ruble, the cheaper our goods are relative to foreign ones, which increases Russian exports and reduces imports. We can also put it this way: our country's net exports are greater the lower the nominal ruble exchange rate, the lower the prices in Russia and the higher the prices abroad.

These theoretical positions are most relevant to the Russian economy. In the early 1990s, the real exchange rate of the ruble was extremely low. As a result, exports from Russia were unrestrained, for our goods were much cheaper than foreign ones. Throughout *the* 1990s the nominal ruble exchange rate continued to fall, but prices in our country rose about twice as fast as the rate fell. The real exchange rate of the ruble, therefore, was rising. As a result, all new sectors of the Russian economy were losing competitiveness in world markets, which worsened conditions for our exports.

At the same time, the real appreciation of the ruble contributed to the growth of imports of foreign goods into Russia. In this regard, it should be understood that an increase in the real exchange rate of the ruble means nothing less than an increase in the salaries of Russians in dollar terms. This was exactly what was happening up until August 1998. Many Russians used this situation to buy foreign clothing, consumer electronics, travel abroad, etc.

Thus, when the real ruble appreciates, we lose as producers, because it becomes increasingly difficult to sell our goods, both domestically and internationally, but we win as consumers. In other words, money is becoming harder to earn, but easier to spend.

So, the real appreciation of the ruble contributed to a decrease in Russia's net exports. True, by the first half of 1998 it was still positive - exports exceeded imports, but this difference became insignificant.

After August 1998, the ruble was severely devalued - its nominal exchange rate fell significantly in a very short period of time. Prices in Russia rose, but to a lesser extent than the exchange rate fell. The real exchange rate of the ruble, therefore, fell. This made Russian goods more competitive on the world markets. At the same time, foreign goods became too expensive for many Russians, leading to a sharp drop in imports. But the high cost of imports meant that Russians were forced to buy domestic import-substituting goods: "Zhiguli instead of Skoda, domestic suits and foodstuffs instead of foreign ones, etc. Russian manufacturers recovered, temporarily strengthening their position in the face of foreign competitors. Net exports, as a result, rose dramatically.

But already since 2000 the previous trend resumed: prices in Russia were rising faster than the nominal ruble exchange rate fell. Moreover, since 2003 the nominal ruble-dollar exchange rate has even grown due to

large inflow of dollars into the country because of the unprecedentedly high world oil prices. The real exchange rate has therefore begun to rise again, worsening conditions for our net exports.

This was immediately felt by Russian manufacturers. Thus, despite a significant increase in GDP in 1999-2006, production in the light industry has been declining annually since 2003, because the expensive ruble has made our goods less competitive in comparison with foreign analogues. And if the exchange rate rises to 15 rubles per dollar, the Russian economy, according to experts, will simply collapse.¹

However, one should not consider the appreciation of the ruble (at least up to certain limits) as a purely negative factor for Russian production. Firstly, the tightening of foreign competition can stimulate an increase in the efficiency of production. Secondly, the relative cheapening of foreign goods associated with the appreciation of the ruble makes it easier to acquire advanced foreign equipment and technology and, consequently, to restructure the economy on the basis of modern technical progress requirements. Thus, the inflow of foreign currency will not have a negative impact on our production if the Russian economy finds itself in

"digest" the extra currency by spending it on investments. It is only necessary for Russian business to be really interested in such innovations. But this is already a problem of a favorable investment climate in our country.

In addition to exchange rate fluctuations, the economic growth that has been going on since 1999 also has an impact on net exports. It

¹ This is the so-called 'Dutch disease. In the 1960s, Holland began to produce and export gas intensively. The inflow of foreign currency into the country soared. As a result, the value of the guilder rose. However, the expensive guilder undermined the competitiveness of domestic goods, and it became more advantageous for the Dutch to buy necessary goods abroad than to produce them themselves. As a result, the country "sat on the gas needle": it was swimming in dollars, and the production of other goods was falling. Russia may face the same risk of "getting hooked on oil" if global oil prices are high.

contributes to an increase in the incomes of Russians and, consequently, to an increase in imports. In all recent years, Russian imports have been growing at a very fast pace, far outstripping GDP growth. Nevertheless, due to high world prices for the commodities exported by our country, primarily oil, Russian exports are growing even faster. As a result, net exports have been increasing all the time in recent years, reaching record levels: we sell goods abroad for a noticeably larger amount than we buy them there.

2. Aggregate supply. Potential GDP

The aggregate demand curve by itself does not show what the price level and the volume of social production (real GDP) will actually be. In order to determine them, we have to introduce the aggregate supply curve (the AS curve) into our analysis.

Aggregate supply is the real GDP that all producers are willing to produce and sell during a given time

P]EI]ZZZZn] eVen ceN.

To analyze the AS curve, we need to distinguish between short-term and long-term periods in macroeconomics. In the long run, the prices of all goods and resources change flexibly under the influence of supply and demand. In the short term, prices for goods and resources are less flexible and sometimes "stuck" at a certain level.

A. The aggregate supply curve in the long run

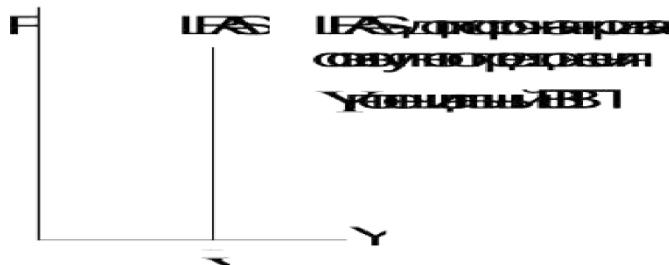
The behavior of the economy in the long run is described by

the classical model. According to the point of view of classical economists, a free market automatically, without government intervention, ensures the full use of productive resources, respectively, the achievement of potential GDP.

Potential GDP is the GDP that is maximally achievable with the full use of all available resources (the state of "full employment"). Full employment allows for some reserve of resources, including

and unemployment ("natural rate of unemployment"). Potential GDP (F) depends on the amount of resources and technology available, but not on the price level. Therefore, the long-run aggregate supply curve (LRAS) is vertical (Figure 3-4):

Figure 3-4. Long-term aggregate supply curve



This character of the aggregate supply curve suggests that the forces of market and competition ultimately ensure output at the level of potential GDP. The price level in this case can be anything and depends on the amount of money in the economy. If the money supply is high, prices will be high and vice versa. Thus, in the long run, the money supply only affects prices, but not output. This conclusion reached by the classics was called **the neutrality of money**.¹

Suppose the amount of resources in the economy increases or technological progress takes place. In this case, the potential GDP increases, and the LRAS curve shifts to the right (Fig. 3-5). If the amount of resources decreases or technical progress occurs, the opposite is true.

Figure 3-5. Shift of the long-term aggregate supply curve

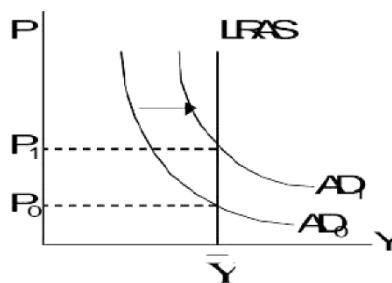
¹ Strictly speaking, money neutrality means that the amount of money in the economy affects only nominal indicators (nominal GDP, nominal wages, nominal interest rate, price level), but does not affect real indicators (real GDP, real wages, real interest rate, unemployment rate, etc.). The analysis of real indicators in isolation from nominal ones is called the **classical** dichotomy.

P	LRAS _n	LRAS ₁	LRAS _t - former long-term aggregate curve offers
			LRAS; - new long-term curve of aggregate supply
			Y' - former potential GDP Y' - new potential GDP

In Fig. 3-5, the growth of potential GDP from pre-U led to a shift of the long-run aggregate supply curve to the right from the LRAS position to the LRASI position.

If the aggregate supply curve is vertical, then an increase in aggregate demand (e.g., by increasing the money supply in the economy or government spending) leads only to higher prices while real GDP remains unchanged (Figure 3-6):

Figure 3-6. Growth of aggregate demand under the vertical AS curve



The increase in aggregate demand causes the AD curve to shift to the right to the position of AD_i. However, the economy is already working at full capacity, making full use of available resources. As a result, production remains the same, and the price level rises from P_t to P_i.

This model confirms the conclusion of the classics about the inappropriateness of state intervention in the economy.

Most modern economists agree that the classical model correctly describes the long-term period in macroeconomics. The classical economists, however, believed that any deviations of actual GDP from its potential level could be extremely short-lived and would be quickly and painlessly eliminated by the market. In contrast, twentieth-century economists came to the conclusion that

The existence of a time interval during which the classical principle of money neutrality does not work: changes in money supply affect not only the price level, but also real GDP, the unemployment rate, etc. This segment is associated with the relative inflexibility of prices and is called in macroeconomics a short-term period. During the short run, the aggregate supply curve is not vertical.

B. Keynesian aggregate supply curve The functioning of the economy in the short run was first

described by John Keynes. In contrast to the classical economists, Keynes assumed that a free market is incapable of ensuring full employment without government intervention, i.e. it is characterized by a lag between actual GDP and potential GDP.

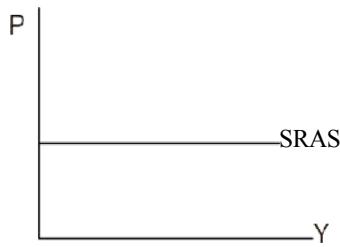
Your curve aggregate Д. Keynes Keynes
constructed the aggregate supply curve based on two basic assumptions:

- The economy functions under conditions of underutilization of available resources; '
- prices and wages are fixed.

Under these conditions, the short-term aggregate supply curve (SRAS) is horizontal (Fig. 3-7):

Figure 3-7. Keynesian aggregate supply curve

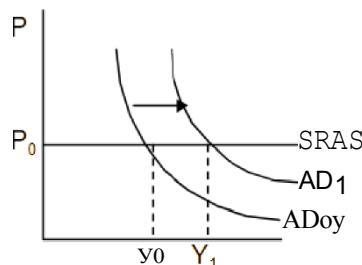
It should not be forgotten that Keynes wrote his major work, the General Theory of Employment, Interest and Money, during the Great Depression of the 1930s, when there was significant underutilization of production capacity and mass unemployment.



Logically, the construction of such an aggregate supply curve can be explained as follows: if there is a significant amount of unused resources in the economy, firms can attract additional resources when there is demand for their products without raising their prices. The unemployed, for example, do not demand higher wages when they are offered jobs. But since resource prices do not change, the prices of finished goods do not change as production increases. In other words, firms offer more goods and services at the same prices.

Under a horizontal aggregate supply curve, increasing aggregate demand (shifting the AD curve to the right), for example by increasing the money supply in the economy or government spending, entails only an increase in real GDP without an increase in prices (Figure 3-8):

Figure 3-8. Growth of aggregate demand under the horizontal aggregate supply curve



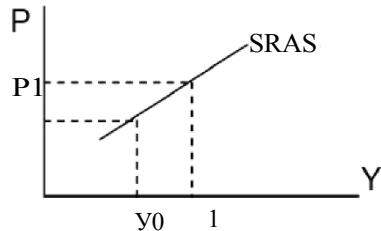
In this case, the aggregate demand curve shifted to the right to the position of AD_{oy}, which led to an increase in real GDP from up to three previous price levels (P₀)

On this basis D. Keynes concluded that it was expedient to stimulate aggregate demand, first of all, by methods of state fiscal policy.

B. Rising aggregate supply curve

Modern macroeconomics assumes that the short-term aggregate supply curve has a positive slope: aggregate supply increases as prices rise (Fig. 3-9):

Figure 3-9. Rising aggregate supply curve



Suppose that firms are going to increase output in response to increased demand for their products. To increase production, they need to use more inputs, primarily labor. It may well be that there are not many available workers on the labor market and higher wages must be paid to attract them. This leads to higher costs per unit of output and, consequently, higher prices. As a result, an increase in GDP from Y_i requires an increase in the price level from P_t to P_i .

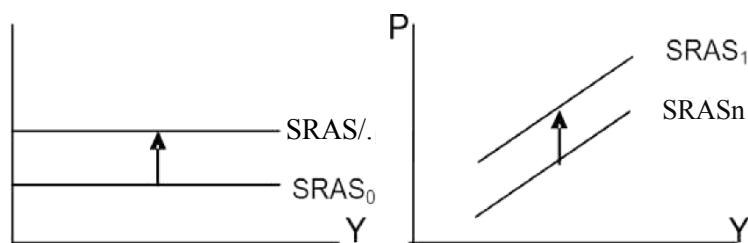
Conclusions:

1. The aggregate supply curve has a positive slope due to the fact that as GDP rises, wage rates also rise. More broadly, firms' costs per unit of output increase;
2. The slope of the aggregate supply curve depends on how much higher wages are required to attract additional workers. If a small increase in employment, and consequently in output, requires a sharp increase in wage rates, the aggregate supply curve will be close to vertical. If, by contrast, unemployment is high, wages respond weakly to higher labor demand. As a result, firms' costs, and hence prices, rise only slightly as GDP rises: the short-run aggregate supply curve is almost horizontal.

Both the Keynesian (horizontal) and ascending aggregate supply curves can shift up or down. This is due to changes in the unit costs of production needed to meet the same level of output. This can be caused by shifts in labor productivity or by changes in the price of key inputs that are not due to changes in output.

For example, trade unions have achieved higher wage rates with the same level of employment, or electricity rates have risen without an increase in consumption. As a result, firms increase costs and raise prices, producing the same amount of GDP - the SRAS curves go up from the SRAS₀ position to the SRAS_n position (Figure 3-10):

Figure 3-10. Shifts of short-term aggregate supply curves at
Increase in the prices of inputs



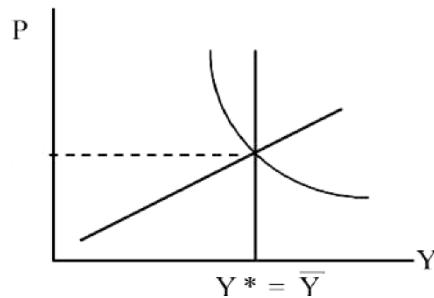
In contrast, lower costs per unit of output with the same GDP lead to a downward shift of short-term aggregate supply curves.

3. Macroeconomic equilibrium

A. Achieving macroeconomic equilibrium

In order to achieve macroeconomic equilibrium, aggregate demand must be equal to aggregate supply. Therefore, we connect the curves of aggregate demand and aggregate supply in one figure (Figure 3-11):

Figure 3-11. Long-term macroeconomic equilibrium

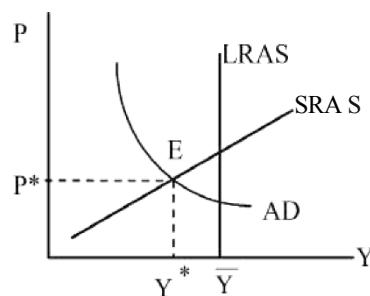


In the long run, macroeconomic equilibrium is reached at the intersection of the curves AD and LRAS. The equilibrium GDP (Y^*) is equal to the potential GDP (\bar{Y}). On the other hand, the intersection point of these curves sets the current price level in the economy (P'). The short-run aggregate supply curve (SRAS) passes through this point as well, which thus "adjusts" to the intersection point of the AD and LRAS curves.

An important conclusion: in the long run, the level of social production is determined by the size of potential GDP. The latter, in turn, depends on the amount of resources available in the economy (labor, material, natural resources) and the efficiency of their use, determined by technological progress. Therefore, the long-term policy of stimulating economic growth involves the creation of optimal conditions for population growth, capital accumulation and the introduction of scientific and technical innovations in production.

In the short run, macroeconomic equilibrium is reached at the intersection of the curves AD and SRAS. The equilibrium GDP may not coincide with the potential GDP (Figure 3-12):

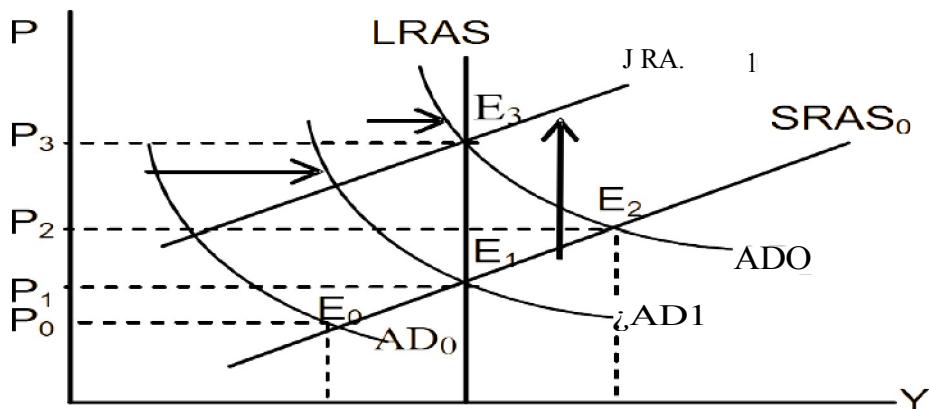
Figure 3-12. Short-term macroeconomic equilibrium



B. Equilibrium shifts

Assume, the economy is initially in a state of short-term equilibrium in E_0 . In this case equilibrium GDP (Y_0) was below the potential, i.e. the economy underutilizes the available resources - experiences a crisis (Fig. 3-13):

Figure 3-13. Changes in the equilibrium state of the economy



Let aggregate demand grow for one reason or another - the aggregate demand curve has shifted from the AD_0 position to the AD_1 position. As a result, the macroeconomic equilibrium corresponds to t. E_e , and equilibrium GDP reaches its potential level (Y_i) at a higher price level (P_i).

If aggregate demand continues to rise, the AD curve will shift to AD_1 . In the short run, prices will rise to the level of P_2 , but producers will respond to the increase in demand by increasing output (from Y_0 up to Y_2). The short-run equilibrium point will be E_2 .

However, this equilibrium will not be long-lasting. The fact is that now the equilibrium GDP exceeds the potential GDP, i.e. the economy is working with overload. This means that resources become scarce, their prices rise, producers' costs increase with the same amount of output, and the short-term curve of aggregate supply gradually begins to shift upward from the $SRAS_0$ position to the $SRASI$ position. Eventually, the economy arrives at the equilibrium point E_e , which means a return to potential GDP at a higher price level (P_i).

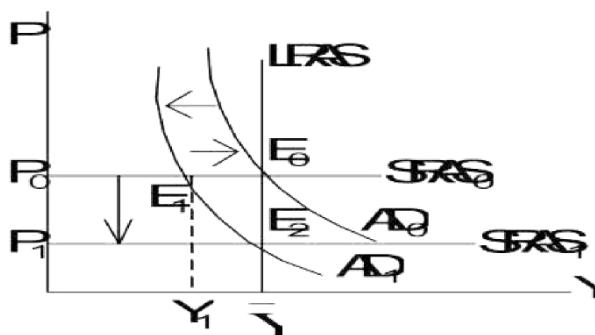
B. Economic Shocks and State Stabilization

ПОЛИТИКА

Economists call sharp shifts in aggregate demand and aggregate supply curves as a result of external shocks or economic shocks. Stabilization policy is a government policy to maintain production at the level of potential GDP.

Let the economy initially be in a state of long-term equilibrium. Suppose a crisis is expected in the economy, which means an increase in unemployment and a fall in the incomes of large segments of the population. Under such conditions, people tend to increase their savings by reducing current spending. As a result, the aggregate demand curve moves to the left from the AD₀ position to the AD_i position (Figure 3-14):

Figure 3-14. Stabilization policy in the context of falling aggregate demand



The short-run aggregate supply curve (SRAS) is assumed to be horizontal, i.e. we use the Keynesian aggregate supply curve. This is justified because prices of resources and, consequently, prices of finished goods are usually quite resistant to reduction. In particular, wage rates are determined by previously concluded contracts and cannot be lowered arbitrarily by entrepreneurs. But since costs per unit of output do not decrease, it is difficult for entrepreneurs to lower the prices of their products. As a result, firms respond to reduced demand for goods not by lowering prices, but by lowering GDP.

Thus, in Fig. 3-14 when aggregate demand decreases, short-term macroeconomic equilibrium is reached at t_1 . This means a fall in GDP (from i to Y_0) at constant prices (P_0), i.e. the expected crisis becomes a reality. Thus, in economics, expectations have material power: If everyone expects something, it is likely to happen.

How will events develop in the future? We have to take into account that in a crisis resources are not fully used. A surplus of unused resources will eventually lead to a fall in resource prices. High unemployment, in particular, will have a downward effect on the wages of the employed. A decline in resource prices will gradually lead to a decline in the price of finished goods. Thus, in the long run, prices will begin to decline, as reflected in a shift of the short-run aggregate supply curve downward from the SRAS position to the SRASI position. And eventually (very soon) the economy will return to potential GDP at lower prices (P_1), i.e. the long-run equilibrium will be reached in volume E_2 .

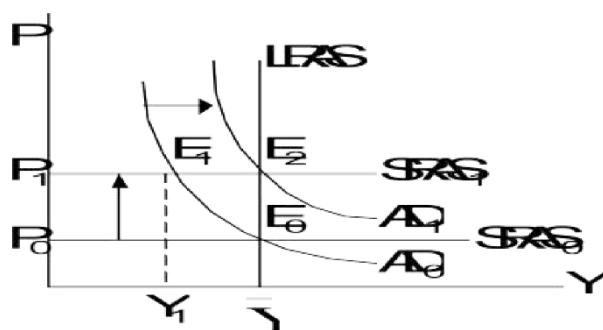
State stabilization policy consists of stimulating aggregate demand by means of monetary or fiscal policy without waiting for it. In particular, the state can increase its expenditures or reduce taxes or increase the money supply in the economy. All these measures will lead to an increase in aggregate demand. Consequently, the aggregate demand curve will shift back to the right and quickly return to its original position (AD), which will lead to maintaining production at the level of potential GDP at the same prices.

This is roughly the policy we have seen recently in the United States. In 2002 the U.S. economy was not in the best shape: GDP was not growing, and at times even declined. Under such conditions, the Bush administration cut taxes and increased government spending. At the same time, the Federal Reserve System (the equivalent of the Central Bank) supported

very low interest rates on loans. Low taxes and interest rates stimulated consumer spending and investment. Thus, all of these measures helped to increase aggregate demand through its components C, I and G. As a result, U.S. GDP grew by more than 3 percent in 2003 with little inflation.

Consider another situation. Suppose that firms' costs rise sharply with the same output, e.g. because of rising fuel and energy prices or rising wages. In response, firms raise prices, and the short-run aggregate supply curve moves up from the SRAS position to the SRASI position (Figure 3- 15):

Figure 3-15. Stabilization policy in the context of rising costs



The change in resource prices does not affect aggregate demand. Accordingly, the AD curve remains the same (AD_0). Thus, the short-run equilibrium shifts from E_e to E_i . In the short run, real GDP falls (from i to i') along with rising prices (from P_t to P_i), i.e. there is stagflation. Stagflation is a combination of falling GDP and inflation.

The government can respond by stimulating aggregate demand to shift the AD curve to the right from the AD position to the AD_i position. Then the macroeconomic equilibrium would move to E_e , i.e., production would quickly return to its potential level, but higher prices would have to be accepted.

Г. Problems of the Russian economy

After the August (1998) crisis in Russia, GDP began to grow at a moderate rate of inflation. All this happened strictly "according to theory. To begin with, in the middle of 1998 our economy worked in conditions of significant underutilization of resources: production facilities of enterprises were idle, there was considerable unemployment. In other words, Russia's actual GDP was noticeably lower than its potential level.

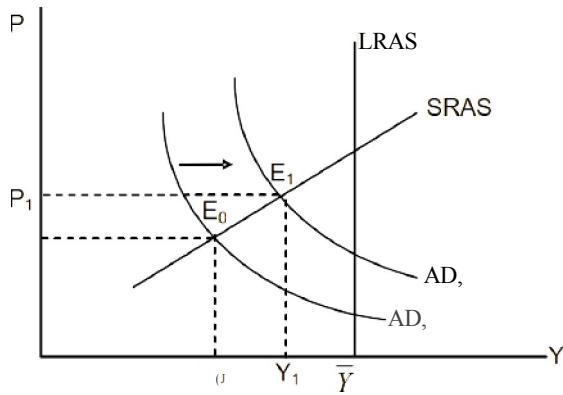
The August crisis led to a sharp decline in the nominal and real growth in net exports was primarily due to a sharp reduction of imports. The growth of net exports occurred primarily due to a sharp reduction of imports. Thereby the demand for the products of domestic enterprises, which produced import-substituting goods, increased. Thus, net exports served as a driving force behind the increase in aggregate demand and GDP in Russia at the end of 1998.

1-halve of 1999 rr.

Graphically, the above can be reflected by shifting the aggregate demand curve to the right from the ADO position to the ADO¹ position (Figure 3-16):

Figure 3-16. Changes in macroeconomic equilibrium in the Russian economy in late 1998 and the first half of 1999.

¹ The short-term aggregate supply curve was slightly shifting upwards, but this shift was relatively weak due to the restrained growth of prices of the main production resources - the products of natural monopolies (electricity, gas and railroad tariffs) and labor (wages). This model does not take into account the shift of short-term aggregate supply curve.



The figure shows that due to the increase in aggregate demand, the macroeconomic equilibrium point in the Russian economy shifted from E₀ to E₁. This led to an increase in prices (from P₀ to P₁) combined with an increase in real GDP (from Y₀ to Y₁). However, Russia's actual GDP still lagged behind its potential level (F).

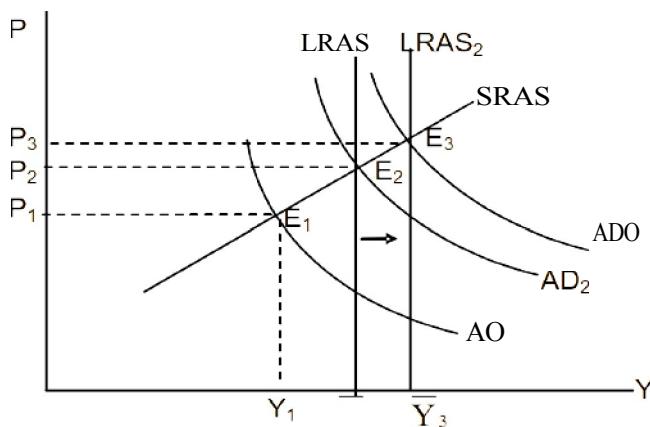
Since the second half of 1999 the growth of aggregate demand continued, contributing to an increase in Russia's GDP. However, the main driver of aggregate demand for Russian goods was now the demand of firms and households. Here the multiplier effect worked (topic 7, item 4): the growth of net exports, contributed to the growth of household incomes and profits of firms. Then both households and firms began to spend the extra money they had on the products of domestic producers. This led to a new increase in income, and consequently to an increase in expenditures. And so on.

In this regard, the beginning of the growth of firms' investment demand, expressed in their expenditures on engineering products, was very important. It should be taken into account that investment plays a special role in the macroeconomy. On the one hand, investment spending is a part of aggregate demand. Accordingly, their growth increases aggregate demand, which shifts the AD curve to the right. But at the same time, investment means the accumulation of fixed capital by firms, i.e. an increase in their production capacity. As a result, potential GDP increases, which shifts the long-run aggregate supply curve to the right. The simultaneous growth of aggregate demand and

of the aggregate supply creates the conditions for a constant increase in GDP.

All of the above can be displayed graphically (Figure 3-17):

Figure 3-17. Changes in macroeconomic equilibrium in the Russian economy in 2000-e.



Initially, the macroeconomic equilibrium corresponded to t. Er The increase in aggregate demand due to consumer spending by households and investment by firms shifted the AD curve from the AD_i position first to the AD position and then to the AD' position. At the same time, potential GDP increased (from Y_i to \bar{Y}) due to accumulation of fixed capital by firms: the long-run aggregate supply curve shifted to the right from the $LRAS_i$ position to the $LRAS_2$ position. Russian GDP grew markedly (from Y_i to \bar{Y}_3), although prices also rose (from P_i to P_3).

What are the future prospects for the Russian economy? As already mentioned, the main condition for long-term economic growth is an increase in potential GDP. This requires population growth, capital inflow and technological progress in the form of productivity growth. Unfortunately, Russia's population continues to shrink. Under these conditions, the growth of investment, which means an increase in capital and contributes to technical progress, is of paramount importance.

Thus, it is possible to achieve sustainable growth only in conditions of radical improvement of the investment climate in the economy through its debureaucratization, effective protection of property rights, increased transparency in the management of firms, etc.

SELF-STUDY ASSIGNMENTS

1. Are the statements true?

- A. An increase in the real interest rate stimulates investment growth;
- B. An increase in the price of basic inputs shifts the short-run aggregate supply curve upward;
- C. A decrease in the money supply in the economy shifts the aggregate demand curve to the left;
- D. If the economy is in short-term equilibrium, then all resources are necessarily fully utilized;
- E. According to the classical concept, the aggregate supply curve is represented by a vertical line, which in all circumstances cannot move either to the left or to the right;
- F. A shift of the aggregate demand curve to the right always leads to an increase in prices.

2. What effect would the following factors have on the aggregate demand and aggregate supply curves, holding all other factors constant? Use the graphs in your answer.

- A. Consumers' fear of a future crisis;
- B. Increased government spending on education;
- C. A sharp decline in oil prices;
- D. Strengthening of trade unions , which led to an increase in wages and salaries ;
- E. The fall of the ruble against the dollar and the euro;

Ж. Population aging;

3. Increasing customs duties on imports; I.

Reducing the money supply in the economy; C.

Scientific and technological discoveries;

І. The fall in the real interest rate.

3. The investment demand function of firms: $I=1000-2000r$, where r is the real interest rate. Calculate the value of investment, if the nominal interest rate is 7% per annum, a annual inflation rate is 4%.

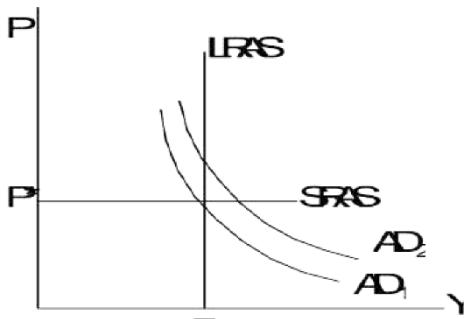
4. The nominal exchange rate of the ruble against the dollar declined by 5% over the year. At the same time, prices in Russia increased by 15%, and prices in the United States remained about the same. By how much did the real ruble exchange rate change? Has it gone up or down? How will this affect Russia's net exports?

5. The economy is in a state of long-term equilibrium. The policy of the Central Bank has led to an increase in the money supply.

A. How will this affect the aggregate demand curve?

B. How will real GDP and the price level change in the short and long term?

6. Suppose that in the graph, the aggregate demand curve shifts from AD_i to AD in a year, and returns to AD_O again in another year. Find the new equilibrium position in year 3, assuming that prices and wages do not trend downward.



7. Suppose that the long-run AS curve is vertical at $Y=3000$, and the short-run AS curve is horizontal at $P=1$. The curve

AD is given by the equation: $-p' + M = 1000$, where $M=1000$. Let there occur unfavorable supply shock, and prices rose to the 1.5 level, while the LRAS remained at the same level.

Find the new equilibrium values of U and P in the short run if the Central Bank does not intervene, i.e., the AD curve does not change. If the Central Bank pursues a stabilization policy to maintain the same amount of output in the short run, how much additional money must be put into circulation? If the Central Bank keeps the same amount of money in circulation over a long period, what will be the equilibrium values of U and P ?

8. Last year, potential GDP was 100 units, and the aggregate demand curve was given by the equation $Y=150-5P$. This year, potential GDP increased by 5%, and the aggregate demand curve took the form: $Y=160-5P$. By how much did prices increase if both last year and now the economy is operating at full employment.

9. The potential GDP is 150 units, the aggregate demand curve is given by the equation $Y=200-10P$.

A. What is the point that reflects long-term macroeconomic equilibrium?

B. If the price level were to increase by 20%, what would the short-run equilibrium be? How much must aggregate demand increase at a given price level for equilibrium GDP to equal potential GDP?

B. If the state ensures that aggregate demand grows by another 10 units, what will the short-term and long-term equilibrium be?

Illustrate the solution graphically.

TEMA 3. SUPPLY AND DEMAND. MARKET EQUILIBRIUM

1. Demand and its factors
2. Supply and its factors
3. Market equilibrium
4. Consumer gain and producer gain
5. State regulation of the market and its consequences

In a market economy, interactions between economic agents are carried out through the voluntary exchange of goods belonging to them. The rate of exchange of one good for another is called the price. In this regard, the importance of studying the mechanism of pricing in market conditions is obvious. The price is formed under the influence of demand for goods and their supply. It is therefore necessary to consider at first what the supply and demand of goods are determined, and then to show how their interaction forms the market price. This topic is devoted to these questions.

1. Demand and its factors

A. Construction of the demand curve

Demand is the quantity of a good that all buyers are able and willing to purchase during a given time and under certain conditions. These conditions are called demand factors.

Major Demand Factors:

- 1) the price of this product;
- 2) prices and the number of substitute products;
- 3) prices and quantity of complementary goods;
- 4) income and its distribution among different categories of consumers;
- 5) consumer habits and tastes;
- 6) number of consumers;
- 7) natural and climatic conditions;
- 8) consumer expectations.

It should be noted that the quality of goods is not mentioned among the factors of demand. The point here is that when the quality changes, we are dealing with *another good*, the demand for which is formed under the influence of the same listed factors. So meat of the first and second grade, fancy and unfashionable suits, "Zhiguli" of different models are different goods.

Let us first assume that all demand factors except the first (price of goods) are given (unchanged). This allows us to show how a change in the price of a commodity affects the amount of demand for it.

The law of demand: the lower the price of a given commodity, the greater the quantity buyers want to buy during a given time, all other conditions remaining unchanged.

This law can be expressed in different ways:

1. The first way is with the help of a table. Let's make a table of the dependence of the value of demand on price, using randomly taken conventional numbers (Table 3-1):

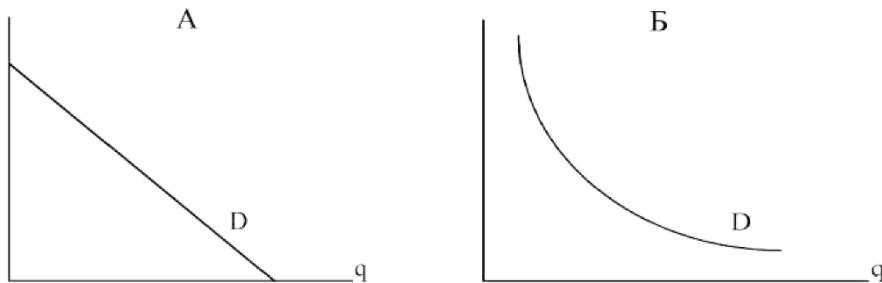
Table 3-1. The law of demand

P (price of goods)	10	9	8	7	6	5	4	3	2	1	0
q (demand value)	0	1	2	3	4	5	6	7	8	9	10

The table shows that at the highest price (10 rubles) the product is not bought at all, and as the price decreases the value of demand increases; the law of demand is thereby observed.

2. The second way is graphical. Let's plot the above figures on the graph by plotting the value of demand on the horizontal axis and the price on the vertical axis (Fig. 3-1A). We can see that the obtained demand line (D) has a negative slope, i.e. the price and the value of demand are changing in different directions: when the price falls, the demand grows, and vice versa. This again indicates that the law of demand is satisfied. The linear demand function shown in Fig. 3-1A is a special case. Often the graph of demand looks like a curve, as seen in Fig. 3-B, which does not invalidate the law of demand:

Figure 3-1. The law of demand



3. The third way is analytical, which allows us to show the demand function in the form of an equation. If the demand function is linear, its equation in general form is:

$$P = a - b \cdot q, \text{ where } a \text{ and } b \text{ are some given parameters.}$$

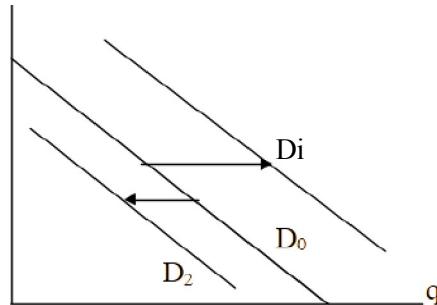
It is easy to see that parameter a determines the point of intersection of the demand line with the axis Y. The economic meaning of this parameter is the maximum price at which the demand becomes zero. At the same time, the parameter b is "responsible" for the slope of the demand curve relative to the X-axis; the higher it is, the steeper the slope is. Finally, the "minus" sign in the equation indicates a negative slope of the curve, which, as noted, is characteristic of the demand curve. Based on the above figures, the equation of the demand curve would be: $P = 10 - q$.

B. Shifts in the demand curve

The effect of all other factors on demand is manifested in the shift of the demand curve to the right - up when demand increases and to the left - down when demand decreases. Let's make sure of that.

Suppose that consumer income has increased. This means that at all possible prices they will buy more units of this product than before, and the demand curve will move in Fig. 3-2 from position Dov to position Di. On the contrary, if income falls, the demand line will shift to the left, taking viewD2.

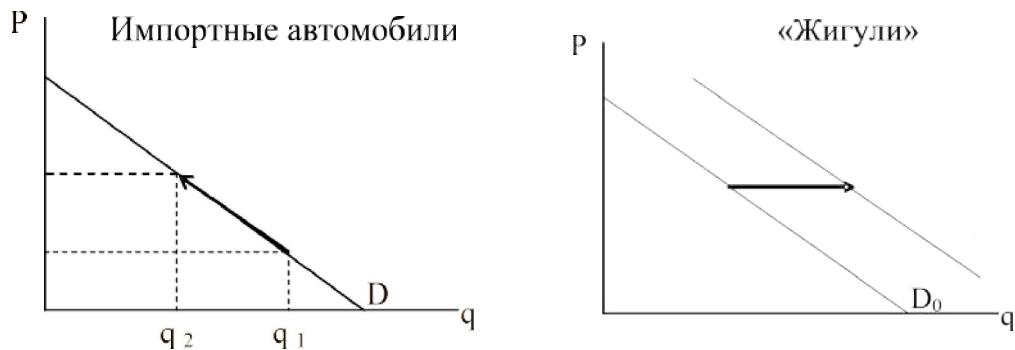
Figure 3-2. Shifts of the demand curve



Suppose now that consumers discover new useful (harmful) properties of a given good. In these cases, they will buy more (less) of this good at the same prices, i.e. the whole demand curve will again move to the right (left). Absolutely the same result will be in the case of certain consumer expectations. Thus, if consumers expect an increase (decrease) in the price of a good in the near future, they will try to buy more or less of it today, while the price is still the same, contributing to the same shifts in the demand curve.

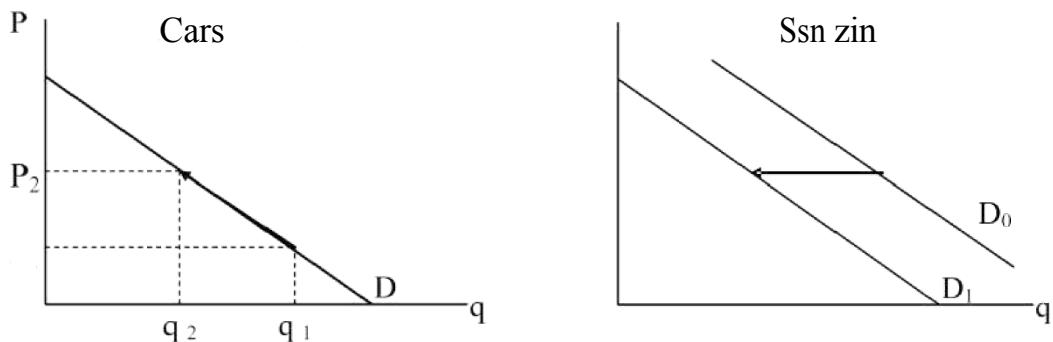
It is interesting to trace the impact of changes in the prices of substitute and complementary goods on the demand for a given product. For example, the price of imported cars increased. As a result, fewer of them were purchased, i.e. there was an upward movement *on the demand curve* for them. At the same time, however, the demand for "Zhiguli" increases at the same price. The curve of demand for Zhiguli, therefore, shifts to the right - upwards (fig. h-z):

Figure 3-3. Interaction of markets for substitute goods



The opposite situation arises in the case of complementary goods. Let the price of cars increase, the value of demand for them, therefore, falls. Therefore, the demand for gasoline at the same price decreases, i.e. the demand curve goes to the left - down (Fig. 3-4):

Figure 3-4. Interaction of complementary markets



Economists distinguish **between "demand" and "value of demand**. If consumers buy more or less of a good because of a change in its price, we speak of a change in *the magnitude of demand*. The graph shows this as a movement along the demand curve. If all other factors cause the change in purchases, we talk about the change in *demand*. On the graph it is reflected by a shift of the demand curve.

2. Supply and its factors

A. Construction of the supply curve

Supply is the amount of a good that all producers are able and willing to produce and sell during a given time and under certain conditions. These conditions are called **supply factors**.

Major supply factors:

- 1) the price of this product;
- 2) profitability of goods that are "competitive" with a given commodity in production (a farmer can grow potatoes and he can grow carrots);
- 3) profitability of goods that complement the given commodity in production (natural gas can be produced along with oil);
- 4) manufacturers' costs;
- 5) state taxes and subsidies;
- 6) number of manufacturers;
- 7) manufacturers' goals;
- 8) natural conditions;
- 9) manufacturers' expectations.

It is important to keep in mind that producers' costs, in turn, depend on the prices of resources used in production and on production technologies. Therefore, the fourth factor can be subdivided into 4a) - resource prices and 4б) - technology.

Let us first assume that all factors of supply except the first (price of goods) are given (unchanged). This allows us to show how a change in the price of a good affects the value of its supply.

The law of supply: the higher the price of a given commodity, the greater the quantity of that commodity producers want to sell during a given time, all other conditions remaining unchanged.

Like the law of demand, this law can be expressed in three ways:

1. The first way is with the help of a table. Let's make a table of the relationship between the value of supply and price, using randomly taken conventional numbers (Table 3-2):

Table 3-2. Law of supply

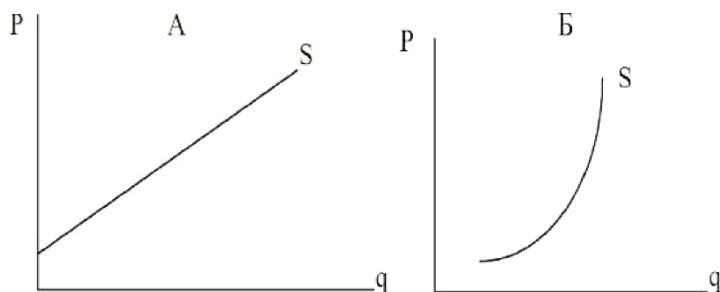
P (price of goods)	2	3	4	5	6	7	Etc.
q (supply value)	0	1	2	3	4	5	

The table shows that at the lowest price (2 rubles) no one wants to sell anything, and as the price rises, the value of supply increases; the law of supply is thus observed.

2. The second way is graphical. Let us plot the above figures on the graph by plotting the supply value on the horizontal axis and the price on the vertical axis (Fig. 3-5A). We see that the resulting supply line (S) has a positive slope, i.e., the price and the value of supply change in the same direction: when the price increases, the value of supply also increases, and vice versa. This again indicates that the law of supply is observed. The linear supply function shown in Figure 3-5A

- a special case. Often the graph of supply looks like a curve, as seen in Figures 3-5B, which does not invalidate the law of supply:

Figure 3-5. Law of supply



3. The third way is analytical, which allows us to show the supply function in the form of an equation. If the supply function is linear, its equation in general form is:

$$P = a + b \cdot q, \text{ where } a \text{ and } b \text{ are some given parameters.}$$

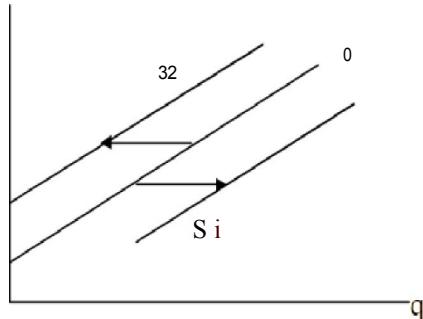
As always parameter a defines point intersection of the offer line c axis Y . The economic sense of a is the minimum price at which the supply becomes equal to zero. At the same time at the same time the parameter b "is responsible" for the slope of the curve. The higher it is, the steeper the slope is. Finally, the plus sign in equation indicates a positive slope curve, which is characteristically exactly for the supply curve. Based on the above figures, the equation of the demand curve is: $P = 2 + q$.

B. Shifts in the supply curve

The effect of all other factors on supply is manifested in the shift of the supply curve to the right - down when supply increases and to the left - up when it decreases. Let us make sure that this is the case.

An increase in supply means that producers offer more goods for sale than before at the same price, and a decrease in supply means the opposite. In the first case, the supply line shifts from the position S_0 to the position S_i , and in the second case it shifts to the position S_o (Figure 3-6).

Figure 3-6. Shifts of the supply curve



As in the case of demand, economists distinguish between the concepts of "**supply**" and "**amount of supply**". If more or less goods are offered for sale *because of a change in price*, we speak of a change in *the amount of supply*. The graph shows this as a movement along the supply curve. If the change in production and sales occurs *under the influence of all other factors*, we talk about a change in *supply*. *On the graph, this is reflected by a shift in the supply curve.*

The most important role in shifts in the supply curve is played by changes in producers' costs. The point here is that the supply curve itself is essentially a cost curve. Its positive slope is due to the fact that each additional unit of production requires more inputs than the previous one.

Let us explain it with a conditional example. Suppose there are three oil fields in the world. To simplify things, let us assume that at each of them

It is possible to produce only one barrel of oil - natural factors do not allow more. The costs, however, are different for all three fields. The cheapest production costs are in the Middle East, where the costs are equal to \$5 a barrel. Our costs are higher in Siberia: \$10. And finally, the most expensive oil is produced in Norway on the shelf of the North Sea: there the costs are \$15 per barrel. (Again, all figures are arbitrary).

In that case, if the world price of oil fell below \$5, no one would produce oil - the price does not cover the costs. If the price rose to \$5 per barrel, oil production would become minimally profitable only in the Middle East, and would therefore amount to 1 barrel (we must not forget that the full costs of production include normal profit as compensation for the costs of entrepreneurial activity - see Topic 1, item 3). At the price of \$10, oil production would have become profitable in Russia as well, which means that a total of 2 barrels would have been produced. Finally, at \$15 per barrel, the Norwegians would join the production and the total production would be 3 barrels. Connecting these three points on the graph, we get the supply curve of oil in the world market.

Now suppose for some reason the costs of all producers increase by \$5 per barrel of oil. Now the Arabs will only produce their oil at \$10, the Russians at \$15, and the Norwegians at \$20. This will cause the supply curve to shift upwards by \$5.

Conclusion: When producers' costs increase (decrease), the supply curve shifts up (down) by the amount of change in costs.

The results are exactly the same when producers are taxed or receive a government subsidy. Since a tax increases costs and a subsidy decreases them, in the first case the supply curve shifts upward to the left, and in the second case the supply curve shifts downward to the right.

CONSIDER - DOWNWARD.

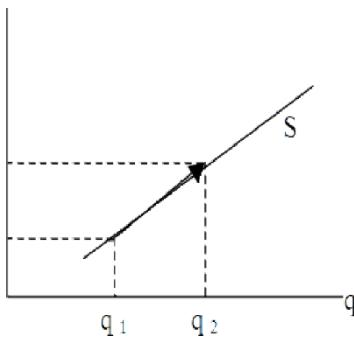
The same shifts will accompany changes in producers' expectations. Let them expect that their product prices will soon

will go up. Then today's producers will hold on to the commodity, selling it for less at whatever the current price is. The supply curve thus goes to the left - up. In the case of opposite expectations, it will be the opposite.

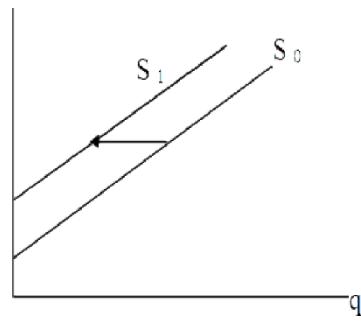
In conclusion, let us consider how changes in the profitability of one commodity affect the supply of the other. We have two markets: carrots and potatoes. Suppose the profitability of producing carrots has increased, for example, due to an increase in their price. But the profitability of potatoes remained the same. Most likely farmers will respond by producing more carrots (the value of their supply increases from q_1 to q_2 in Figure 3- 7A). But since land is limited, potato plantings will be reduced. As a result, potato production will decrease at the same price, i.e. the supply line will go to the left - up (Fig. 3-7B):

Figure 3-7. Interaction of different markets

A. Carrot market.



B. Potato market



This result is characteristic of the case when the goods are as if "compete" with each other for the resources they use (farmers can produce either potatoes or carrots). Things will be different, however, if the goods complement each other in production. Producing oil, for example, "Lukoil produces natural gas as well.

Suppose the profitability of oil production has increased due to an increase in its price. The supply of oil will consequently increase. But at the same time, the supply of gas will necessarily increase, even though its profitability has remained the same. Then the gas supply curve

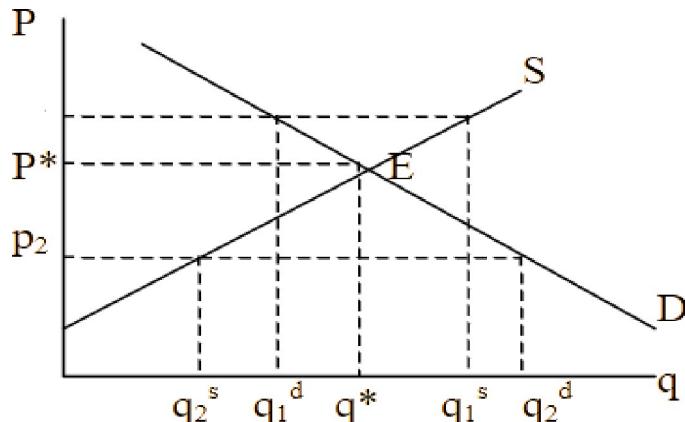
will go to the right - down. The reader can draw the corresponding graphs himself.

3. Market equilibrium A.

Achieving equilibrium

Let's combine the supply and demand curves in one figure (Figure 3-8). On the y-axis we still plot the price (P), and on the x-axis we plot the quantity of the good (the values of supply and demand):

Figure 3-8. Market equilibrium



Let the initial price be at the level of P_0 . In this case, the value of demand is q_1^d , and the value of supply is q_1^s . The supply is noticeably higher than the demand, because at such a high price many people would like to sell the product, but very few are willing to buy it. Overstocking ensues, and competition between producers drives the price down. As the price falls, some sellers refuse to sell, but new buyers appear, and the gap between supply and demand decreases.

Suppose now that the price is equal to P_2 . Now the buyers want to buy a lot of goods (q_2^d), but there are few sellers in the market because of the low price, and only q_2^s units of goods are for sale. There is a shortage ($q_2^d - q^s$). Now buyers are already competing with each other for the right to buy

product. The price goes up, and as the price goes up, the amount of demand decreases and the amount of supply increases.

There is only one price at which the values of supply and demand coincide. This price (p^*) is called **the equilibrium price**, and the quantity sold and bought at this price (q^*) is called **the equilibrium quantity**. The market is said to be in equilibrium because at this price, neither buyers nor sellers have any desire to change the current situation.

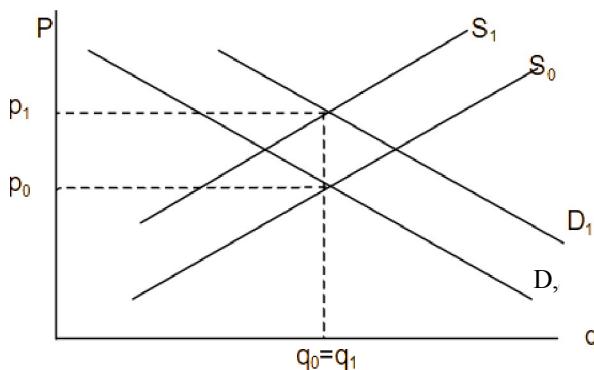
It should be emphasized: this model describes precisely the situation of a competitive market, when there are many buyers and sellers independent of each other in the market, each of which individually cannot influence the market price. There are other models for all monopolistic "impurities".

B. Equilibrium Shift

Suppose an equilibrium is reached in a given market. This situation will remain unchanged until the conditions that shift the supply and demand curves change.

Let the income of consumers of some commodity have increased, and the costs of producers have also increased. In this case, as was shown in paragraphs 1-2 of this topic, the demand curve will shift right - up from the position D_0 to position D_1 (demand will increase), whereas the supply curve will go to the left - upward position S_1 (supply will decrease see Fig. 3-9):

Figure 3-9. Equilibrium shift



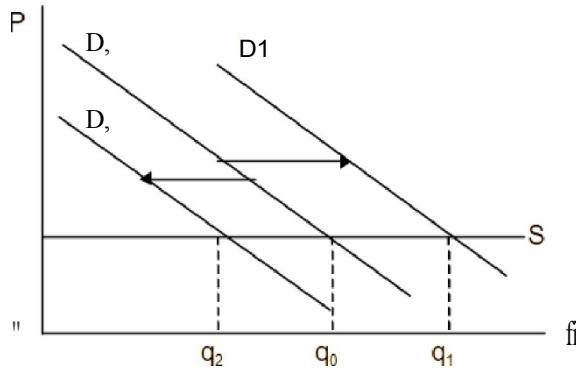
What happens as a result to the equilibrium price and quantity? In the picture, the price went up, but the quantity stayed the same. But are such results inevitable? Regarding the price, the answer to this question is positive: the price is bound to rise under such conditions. The fact is that both the increase in demand and the fall in supply, taken separately, lead to an increase in price; the factors in this sense complement each other. As for the equilibrium quantity, nothing can be said about it in advance: the quantity can either rise, fall, or remain the same. The reason here is that an increase in demand pushes the equilibrium quantity up, and a fall in supply pushes it down. Ultimately, therefore, everything will depend on which factor "pulls". To see this, assume, for example, that the demand curve has shifted a little more than is shown in the graph (the increase in income was greater). The equilibrium quantity will obviously increase. And vice versa. The same reasoning can be applied to the supply curve.

Here it is useful to dwell on two examples of bad logic constructions. First: "an increase in demand leads to an increase in the price of the commodity. In fact, an increase in demand means only an upward-right shift of the demand curve (just as an increase in supply means a downward-right shift of the corresponding curve). And what happens to the price - we'll see, it will depend on the slope of the supply curve. In Fig. 3-9, the supply curve has an upward slope, and the price really increases, but the supply curve can have, for example, a zero slope, i.e. run parallel to the axis X.¹ In this case, the rise (fall) in demand

¹ In paragraph 2 of this topic it was said that the supply curve is essentially a cost curve. Its classical (upward) slope is associated with an increase in costs for each subsequent unit of output as output increases. If such costs are constant, which is sometimes the case, then the supply curve will be horizontal.

will only lead to an increase (decrease) in the equilibrium quantity at an unchanged price, as can be seen in Fig. 3-10:

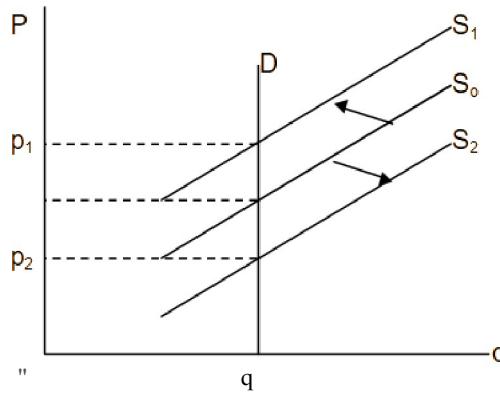
Figure 3-10. Stable price with changes in demand



This situation corresponds to the often observed practice, when despite the impoverishment of the inhabitants of a region (a fall in demand for goods in the region) prices in it remain practically unchanged. Using a "normal" supply curve, this phenomenon cannot be explained.

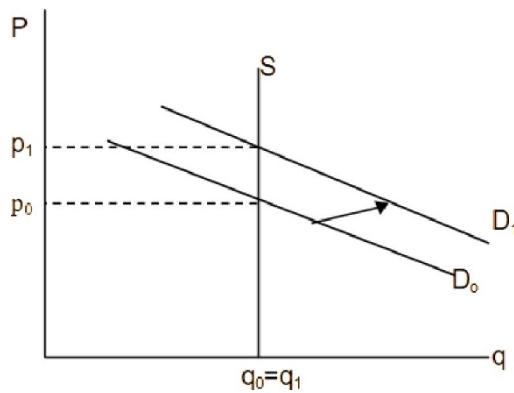
Similarly, the demand curve may in practice not be quite "standard." Suppose we have a product that consumers cannot do without (insulin for diabetics). Then the amount of demand for it, at least in a certain price range, will not decrease with the increase in price, i.e. the demand curve will be vertical (Fig. 3-11). In this case, any change in supply (shift of the supply curve) will only lead to a change in price at the same equilibrium quantity:

Figure 3-11. Stable output with changes in supply



Another example of bad logic: "an increase in demand generates an increase in supply. First of all, we should not confuse a change in supply with a change in supply itself (see paragraph 2 of this chapter). When we talk about an increase in supply, we are referring to a shift of the supply curve to the right and down. However, the supply curve does not shift anywhere because of an increase or decrease in demand; its position is caused by special factors that have nothing to do with the demand factors. On the other hand, if the demand curve shifts, for example, upward to the right (an increase in demand), then we follow the supply curve, and then the amount of supply can indeed increase. But even the latter is not necessarily the case if the supply curve is vertical (Figure 3-12). This happens when producers (sellers) are unable, at least for a certain time, to respond to an increase in demand with an increase in output due to limited resources. Let us assume that in the production of housing all resources are now fully used, and it is impossible to increase the capacity of house-building plants quickly. Then when the demand increases, only the price of a square meter will increase with the same equilibrium number of apartments.

Figure 3-12. Stable output with increasing demand



Hence the important conclusion: the demand-supply model does not contain ready answers to all the questions posed by life; like other economic models, it is only a tool for learning about reality, which must be properly applied.

B. Practical application of the theory: foreign exchange market The "supply-demand" model considered allows us to explain The functioning of very many real markets. It is best "works" in highly competitive markets, where there are many buyers and sellers who are independent of each other. Let's try to apply it to the analysis of the situation on the foreign exchange market.

The currency market sells and buys, in particular, U.S. dollars. Their quantity (in millions) will be put down on the X-axis. The Y-axis shows the price of goods, i.e., in our case, the price of one dollar in rubles - the dollar rate. The banks are involved in trading. They sell and buy currency: partly their own and for themselves, partly - on behalf of customers.

Let the values of demand and supply of currency at different rates be known (figures are notional):

R (dollar rate in rubles)	28	29	30	31
qd (the value of demand for dollars in millions)	120	110	100	90
q, (the value of the supply of dollars in millions)	80	90	100	110

As we see, at the exchange rate of 28 rubles per dollar demand today exceeded supply by 40 million dollars. There is no equilibrium - there is a shortage of currency. As a result, the exchange rate will grow. If the exchange rate is higher (29), demand

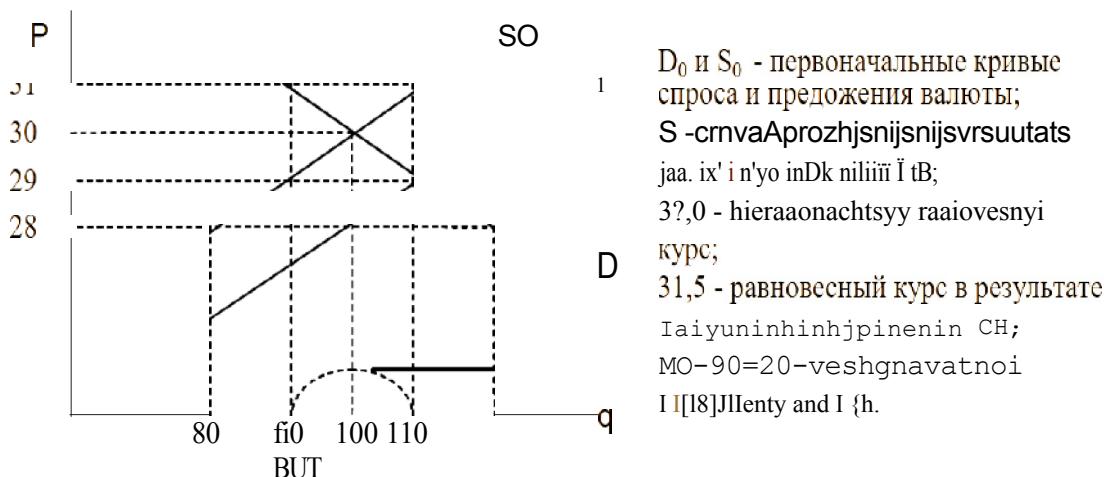
for dollars falls by the law of demand, and their supply rises by the law of supply. The deficit shrinks to \$20 million, but there is still no equilibrium. Kypc continues to rise to 30 rubles. The magnitudes of supply and demand finally coincide. Equilibrium is reached.

Note that if the exchange rate reached 31 rubles, the market would again leave the equilibrium state, but now the supply would exceed the demand, i.e. the sell orders would be more than buy orders.

Let's complicate the model by allowing the Bank of Russia to participate in trading. It has the largest currency and ruble assets, and therefore can significantly affect the dollar exchange rate.

Suppose the Central Bank has decided to prevent the exchange rate from rising above 29 rubles per dollar. To do this, it increases the supply of currency at the expense of its own reserves by \$20 million, i.e., just by the value of the currency deficit ($q_d - q_s$) at this exchange rate. As a result, the aggregate currency supply curve (commercial banks plus the Central Bank) shifts from the S_0 position to the right to the S_1 position, and the desired exchange rate becomes equilibrium. Such actions by the Central Bank are called currency intervention. All of the above is shown in Fig. 3-13:

Figure 3-13. Currency Exchange Trading and Currency Intervention by the Central Bank



The reader can simulate for himself the situation of ruble intervention, in which the Bank of Russia does not sell, but buys dollars.

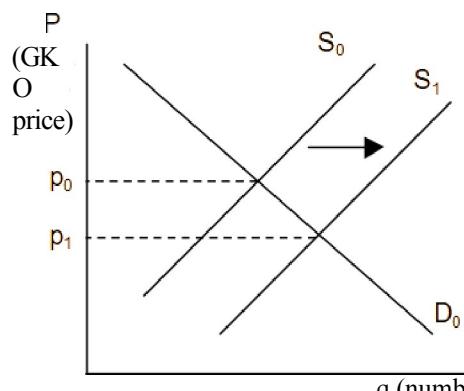
Г. Practical application of theory: the financial crisis in Russia

In the fall of 1997, there was a financial emergency in Russia. It began with the crisis on the Hong Kong stock exchange, which quickly spread to all of Southeast Asia, and then to Europe and America. The crisis manifested itself in the massive sale of securities, which led to a significant drop in their prices. At first, experts believed that Russia would not be affected by the crisis, but it turned out not to be so.

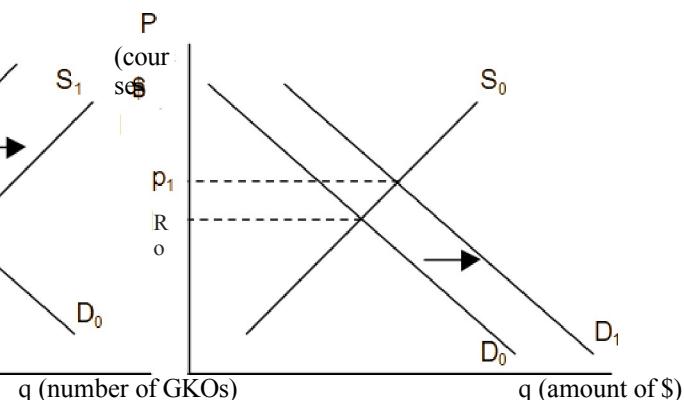
Having lost a lot of money in Southeast Asia, investors preferred not to take any more risks and began to leave almost all emerging markets, including Russia. As a result, a mass exodus of non-residents - foreign companies-investors admitted to work in Russia - began from our securities market. Companies hurriedly dumped government bonds (GKOs) they had on hand, and the rubles received for them were immediately converted into dollars in order to take them out of the country. Graphically, this situation can be modeled as follows (Figure 3- 14):

Figure 3-14. Financial crisis in Russia

A. GKO market



B. Dollar market



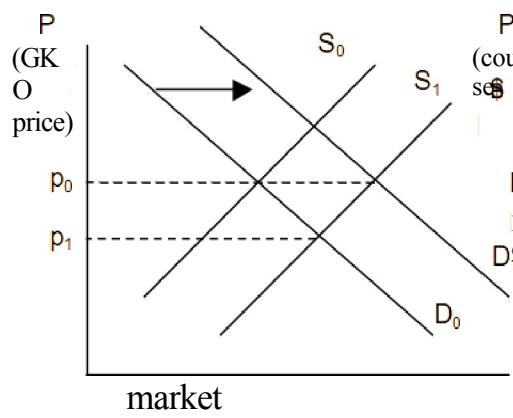
In Fig. 3-14A shows that as a result of the dumping of the GKO, the supply of these securities in the market increased, which was reflected in the shift of the supply curve from the S_0 position to the S_1 position. Thus, the price of GKO fell (from p_0 to p_1). The money received for the GKO was directed to the foreign exchange market (these markets are closely interconnected as communicating vessels), which increased the demand for dollars in Fig. 3-14B with the threat of an appreciation of the dollar (from D_0 to D_1).

Both of these consequences: the fall in the price of GKO and the rise in the dollar were extremely unpleasant for the Russian economy. Falling GKO increased interest rates and, consequently, the price of government borrowing. On the other hand, rising interest rates made credit more expensive for the real sector, which made investment prospects even more bleak. In turn, the growth of the dollar with the real threat of its going beyond the currency corridor was fraught with a sharp acceleration of inflation and the collapse of the banking system.

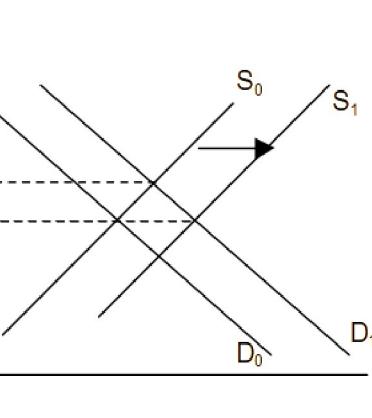
In connection with all this, at the beginning the Central Bank tried to support both markets: GKO and the foreign exchange market. On the one hand, it actively bought government bonds, trying to prevent their depreciation; on the other hand, it sold dollars in order to maintain the exchange rate. In Fig. 3-15 shows the shifts of the demand curve for GKO to the right - upwards to position D_0 (growth of demand at the expense of the Central Bank) and the curve of dollar supply to the right - downwards to position S_1 (growth of supply at the expense of the Central Bank):

Figure 3-15. Central Bank policy on the GKO and

dollar markets GKO market



US dollar



Such a policy of the Central Bank can be compared to an attempt to stay on two sprawling chairs: buying up GKOs, the Central Bank threw additional rubles into circulation, which immediately flowed into the foreign exchange market, increasing the demand for dollars. As a result, the Central Bank had to spend more and more of its foreign currency reserves to support the ruble. At the same time, non-residents - foreign companies - were very quickly joined by Russian banks, which also chose the tactic of "playing against the ruble" in anticipation of

OF THE RISE TO]ZSN\$\$ZZ.

In the end, for the sake of saving the ruble and the entire economy, the Central Bank stopped supporting the GKO market, letting it "free float". The price of GKO fell noticeably, but the speculative pressure on the ruble was significantly weakened.

During the year the ruble exchange rate managed to hold. But by August 1998, the constant pressure on the ruble had exhausted the Central Bank's reserves and resulted in devaluation.

4. Consumer gain and producer gain

Now we are interested in the question of who benefits from the market exchange and to what extent. We begin our analysis with consumers.

A. Consumer gains

Every consumer would like to buy a product as cheaply as possible, but for each of them there is a maximum price they are willing to pay for the product before they leave the market altogether. This price is called the demand price. The sum of all consumers' demand prices forms the market demand curve.

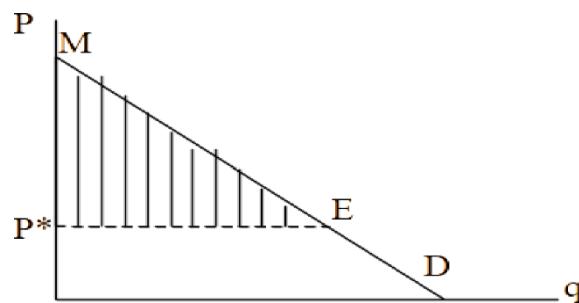
At the same time, all consumers, regardless of their demand prices, buy goods at the same market price. The difference between the individual demand price and the market price constitutes the consumer's gain (consumer surplus) in the purchase of a given unit of goods. This is a kind of consumer profit.

Let us explain this with an example. Suppose we have three beer drinkers, each of whom wants to drink one bottle per day. However, they have different incomes, so the first lover could pay a maximum of 15 rubles for beer. The second is a little poorer, and he would not pay more than 12 rubles. And the third's income doesn't allow him to buy beer for more than 10 rubles. Let's say the market price of beer is 10 rubles. Then the first amateur wins 5 rubles ($10 - 5$) on each bottle, the second - 2 rubles, and the third does not win, because

HE J3edJIHO PL tTiT T MHKCIMdJlyH YU S MM KOTO]ZU In the GOGOTOYAN 3 tPL tTiTiT.

Suppose now that there are a lot of consumers. Then geometrically the gain of all consumers is equal to the area of the triangle bounded by the demand curve, the market price line, and the price axis. In our example it is triangle P^*EM , where P^* is the market price (Figure 3-16):

Figure 3-16. Consumer gains



B. Producers' winnings

Now let's talk about manufacturers. Every producer would like to sell as expensive as possible, but for every producer there is a minimum price at which they will still agree to sell before they leave the market altogether. Such a price is called the supply price. The sum of all producers' bid prices forms the market supply curve.

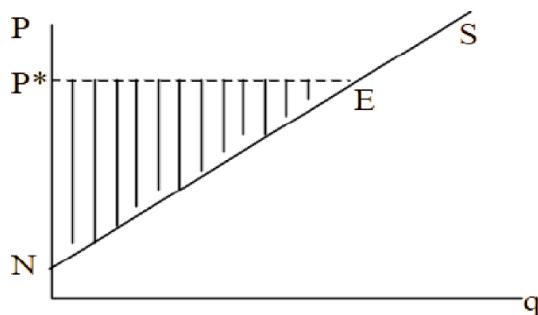
At the same time, all producers, regardless of their bid prices, sell the commodity at the same market price. The difference between the market price and the individual bid price is the producer's gain (producer's surplus) on the sale of a given unit

goods. Warning: the producer's gain is usually not equal to his profit, but a more meticulous analysis is needed to explain this.

Calculation of the producers' gain is carried out according to the same scheme as the calculation of the consumers' gain. Let three firms produce one unit of the same product, but with different costs. The costs of the first firm are 2 rubles, the second firm is 3 rubles, and the third firm is 4 rubles. Suppose also that it costs 4 rubles at the market. Then, selling their goods at this price, the first firm wins 2 rubles, the second firm wins 1 ruble, and the third firm does not win.

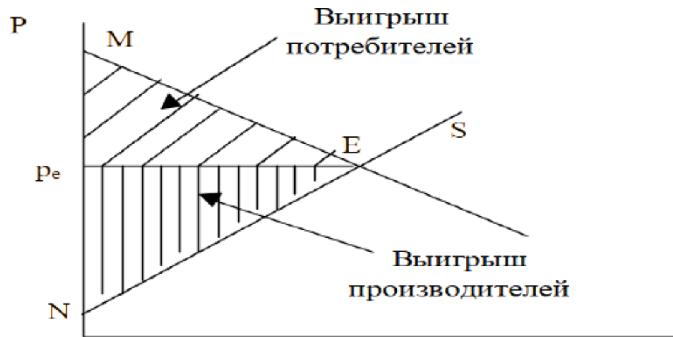
Suppose now that very many goods are produced. Then geometrically, the gain of all producers is equal to the area of the triangle bounded by the supply curve, the market price line, and the price axis. In our example it is triangle P^*EN , where P^* is the market price (Figure 3-17):

Figure 3-17. Producers' winnings



Consumers' gain and producers' gain can be shown in one figure (Figure 3-18):

Figure 3-18. Consumer gains and producer gains



Hence the conclusion: voluntary market exchange at an equilibrium price is beneficial to both buyers and sellers.

5. State regulation of the market and its consequences There are two main ways of state intervention

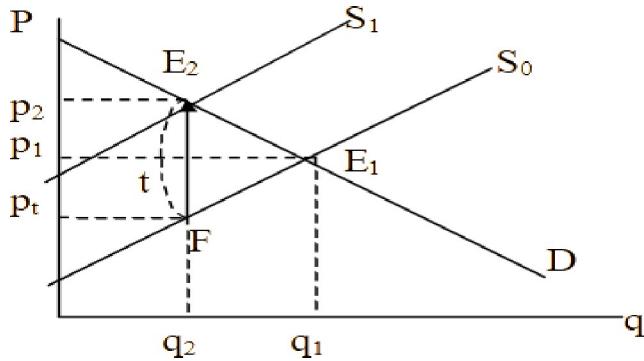
to market activities: through taxes and subsidies and by setting the maximum (maximum and minimum) prices for goods. Let us consider them in order.

A. Taxes and

subsidies a) Taxes

Suppose the government has imposed a commodity tax paid by producers. A commodity tax is a tax levied in a fixed amount on each unit of goods sold. Examples are customs duty or excise tax. The introduction of such a tax increases producers' costs and thus shifts the supply curve upward by the amount of the tax rate (t). Accordingly, the supply curve shifts from the position of SO to the position of Si (Figure 3-19):

Figure 3-19. Consequences of the commodity tax



The consequences of this shift are an increase in the equilibrium price (from P_i to P_i) and a decrease in the equilibrium quantity (from q_i to q). As a result, the consumers' gain decreases from the area of triangle P_iEiM to the area $P E M$. At the same time the producers' gain falls from the area $PiEiN$ to the area $PtFN$.

If the first is obvious, the second needs explanation. Before the introduction of the tax, producers put all the proceeds into their pockets. Now they sell more expensive goods, but they have to share with the state, and therefore they actually receive less from each unit of goods than before. The goods are sold at the price p_t , but the tax (t) is deducted, which is equal to the segment $E F = P_t - P_i$. Thus, the producers are left with P_t rubles, and it is this amount should be taken into account when calculating the producers' gain.

So, consumers' losses due to the tax amounted to the trapezoidal area $2EzEiPi$ (area $PiEiM - PpoSquareb 2E2M$), and producers' losses amounted to the area $Pi Ei FP$, ($PiE N - P, FN$). Part of these losses went to the state in the form of an aggregate tax levy (T), which is calculated as the product of the tax rate levied on each unit of production (t) by the amount of production sold after the introduction of the tax (q_2). $T=t*q_2$. In Figure. 3-19 this product is equal to the area of the rectangle

$$2EzFPi.$$

From the above, we can see that some of the losses of producers and consumers from the tax (the $E2EiF$ area) were not received by anyone. This is society's net loss from the tax - the so-called "dead weight loss. Losses

dead weight arise because the tax leads to a reduction in production.

Who pays the tax?

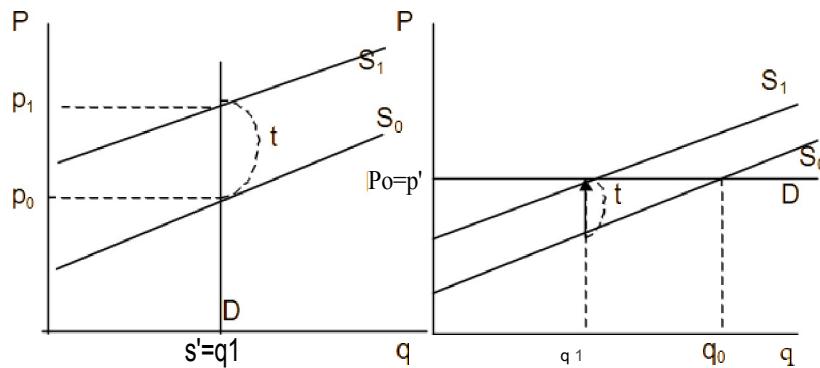
There is a widespread belief that taxes affect only consumers, but not producers, because the latter always have the opportunity to shift the tax to buyers by increasing the price of goods. All that has just been said quite proves this point wrong: producers do include the tax in their supply prices, so that the supply curve shifts upward by the amount of the tax. But consumers, for their part, refuse to buy the commodity at more than their demand prices. As a result, with the traditional sloping demand curve, the price of the good increases less than the amount of the tax (see Figure 3-19). In other words, the burden of the tax is usually shared between producers and consumers.

There are, however, exceptions. Suppose we have a commodity of prime necessity, which is very difficult to replace (a number of drugs, some medical and legal services, etc.). The demand curve for such goods is close to the vertical curve at least in a certain price range, i.e. the value of demand does not fall when the price increases. In this case, the equilibrium price will increase by exactly the value of the tax (Graph 3- 20A), which means that the entire tax will be paid by the consumer.

There are also counterexamples. A product is very easy to replace (Coca-Cola, for example, with Pepsi Cola). This means that none of the consumers will agree to buy it more expensive than at the current price, i.e. at the slightest increase in the price of such a product consumers will switch en masse to a substitute product (provided, of course, that the price of the latter remains the same). This is reflected in the graph by the horizontal demand curve (Fig. 3-20B). In this case, no tax would actually increase the price, and its burden would fall entirely on sellers:

Figure 3-20. Tax burden in special cases

A. The product is very difficult to replace.



B. The product is very easy to replace

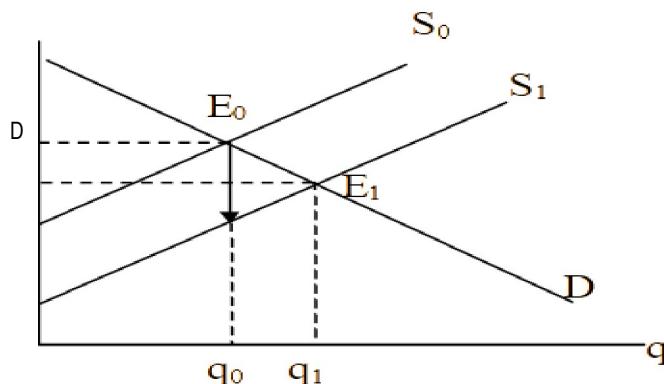
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The thoughtful reader can figure out for himself that the distribution of the tax burden also depends on the slope of the supply curve (with the horizontal curve, the price increases by the amount of the tax, and with the vertical curve, it does not increase at all). Ultimately, all this will lead him to the discovery: the lower the supply curve and the steeper the demand curve, the more tax the consumer pays. And vice versa.

6) Subsidies

Subsidies are the opposite of taxes. The commodity subsidy reduces producers' costs, and therefore shifts the supply line down by the value of the subsidy from the S_0 to the S_1 position (Figure 3-21). As a result, the equilibrium price decreases from P_t to P_i , and the equilibrium quantity increases from q to q_i .

Figure 3-21. Consequences of the commodity subsidy



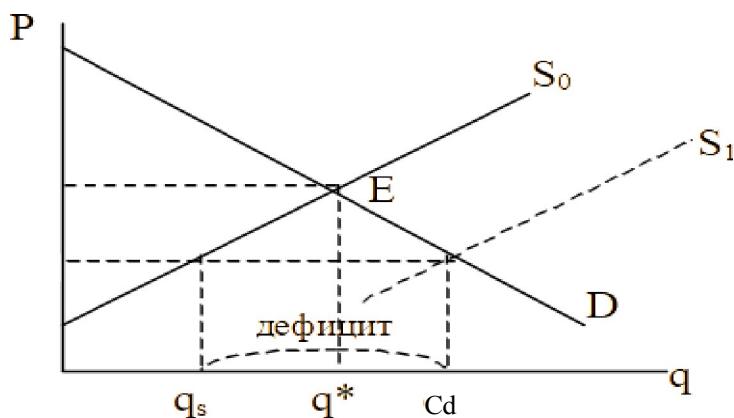
B. Price fixing

a) Maximum price

There is a certain equilibrium in the market for a certain consumer good (Figure 3-22). However, the government has decided that the existing price is too high and excludes low-income consumers. In good faith, the officials set the maximum price (P_m) below the equilibrium price, and forbid anyone to sell more than that.

But the reduced price quickly discourages producers from selling this product, as a result of which the value of its supply decreases from q^* to q_s . On the contrary, the value of demand increases from q^* to q_d . A deficit ($q_d - q_s$) is formed "as the first result of government policy:

Figure 3-22. State maximum price



There are usually three ways to react to such a situation:

1. Subsidies to producers. They move the supply line of the commodity to the right - down to position S_1 , and then perhaps the state price will become equilibrium. The only problem is that there is usually no money for subsidies. And if there were, then setting a maximum state price would become superfluous: the market price could be lowered simply by subsidizing producers.

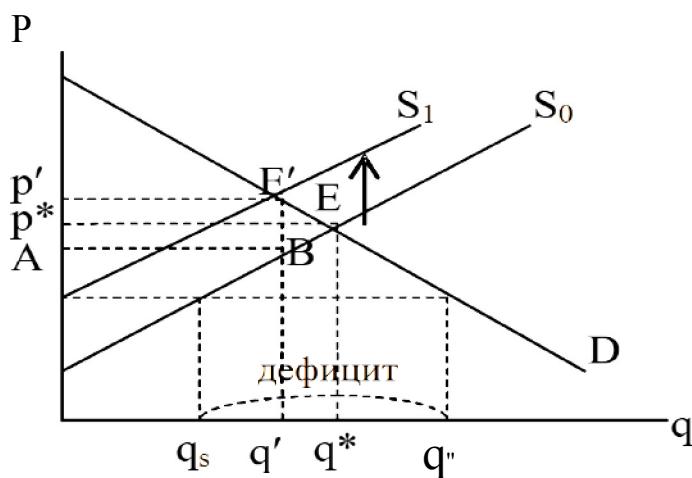
2. Everything remains as it is, and goods are distributed according to the queue principle: first come, first served. An interesting question arises here: who benefits from such a system? Well, the resellers, reselling goods on the black market - that's clear. But who else? For

To answer this question we must remember the theory of opportunity costs (topic 1, point 1). The fact is that, being forced to stand in line, the buyer pays for the goods not only with money, but also with his free time. This is why people whose time is cheap (the retired, the unemployed, the idle, etc.) stand in line in the first place. And people for whom standing in line means a noticeable loss in earnings (their opportunity cost of such a purchase is high) are likely to prefer either to refuse the product altogether, or to buy it on the black market.

3. Cards. "Let there not be enough goods for everyone," reasoned the government, "but everyone in need, at least a little, but will get some. All of the methods discussed above have been tested in many countries, especially in Russia.

The key problem is scarcity. Sellers see that many consumers would be happy to buy goods at a higher price, and therefore seek to sell them on the black market. There, however, their costs are higher than on the normal, "white market," because they include not only the usual costs of production and sale, but also compensation for the risk of exposure: fines, bribes, etc. As a result, the supply curve in the black market goes up compared to the "normal" curve, i.e. it takes the position of S_1 (Fig. 3-23):

Figure 3-23. Scarcity and the Black Market

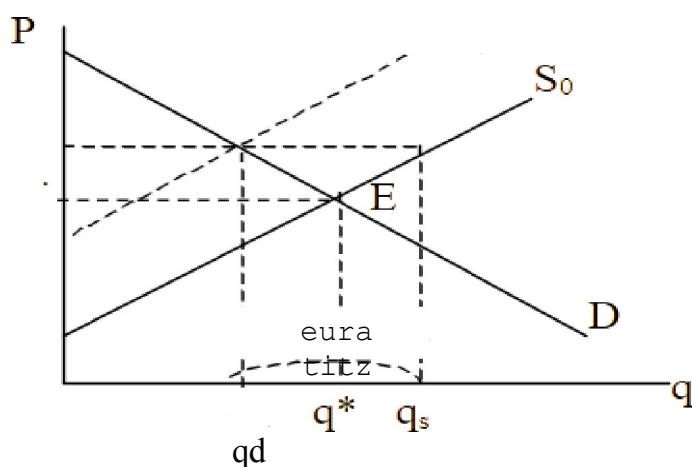


Now we can summarize: the state's concern for the poor in fact led to endless queues, ration cards, and the washout of goods from the open trade. On the other hand, on the black market, where the bulk of the goods moved, the price was even higher (P' vs. P^*) and the goods less (q' vs. q^*) than they were on the open market before the state experiments began. Come to think of it, the sellers were not the only ones who benefited from the black market. A considerable part of the proceeds of sales went to all sorts of controllers and bribes (area $P'E'BA$). At the same time, Area $E'EB$ accounts for the dead weight losses resulting from the transition from the normal market to the black market.

6) Minimum price

Sometimes the state does just the opposite: it forbids the sale of any good cheaper than the price it sets. An example is the minimum wage. Perhaps the worker and the employer would bargain for less, but the state forbids paying less. If this state price (P_g) is higher than the equilibrium price (P^*), there is a surplus of supply over demand in the market (Figure 3-24). In the labor market this excess means unemployment ($q - q_d$)

Figure 3-24. State minimum price



Usually such unemployment are dealt with by reducing the supply of labor by restricting the inflow of foreign

of the labor force. Indeed, if a state puts obstacles in the way of hiring foreigners, then the supply curve in the relevant labor market goes left-upward to the S_1 position, and then perhaps the state minimum wage becomes the equilibrium price of labor. Unemployment would then disappear.

SELF-STUDY ASSIGNMENTS

1. There are three goods in front of us: beer, cyxoe wine, and Emelya bread crumbs. Explain what would happen to the demand for each of these goods if beer became more expensive. Illustrate your reasoning with the help of graphs.

2. Assume that the demand for a certain product and its supply are increasing:
 - A. Can we predict whether the equilibrium price of a good will rise, fall, or remain the same as a result of these changes?
 - B. Will the equilibrium volume of goods increase, decrease, or remain unchanged?
 - C. Is it possible to predict whether the total income of producers of this commodity (the product of the equilibrium price and volume) will increase, decrease, or remain unchanged.

Illustrate the solutions graphically.

3. Consumers' incomes have fallen and the prices of the resources used in production have risen. Draw a graph showing the change in market equilibrium; indicate the new market price and the equilibrium quantity of the good sold and bought.

4. There is a certain equilibrium price in the market for this good. Show on the graph how it could change if the producers of the good

expect an increase in the future, while consumers expect a decrease in its price.

5. Assume that both oranges and tangerines are sold by their producers at competitive national markets. Draw graphs and answer the following questions pertaining to this case: A. If the supply of tangerines increases, increases or decreases revenue (product of price to volume sales) orange growers?

B. Assume that the tangerine groves are damaged by pests, which will reduce the supply of tangerines but will not affect the supply of oranges. How would this affect the equilibrium prices and production of mandarins and oranges?

6. Due to very favorable weather conditions, the country has a record grain harvest. Explain how this will affect the market equilibrium in the grain market. What would change if, under such conditions, the government decided to make additional purchases of grain into the state fund? Illustrate your reasoning with the help of graphs.

7. Oil prices have risen (fallen) sharply on the world market. Explain how this might affect the foreign exchange market in Russia. What should the Central Bank do if it wants the foreign exchange market to return to its previous equilibrium state? Illustrate your reasoning with the help of graphs.

8. A table of supply and demand for a commodity is given:

Price	Amount of demand	Size of supply
15000	1000	400
16000	900	600
17000	800	800
18000	700	1000
19000	600	1200
20000	500	1400

Suppose, demand values increased by 300 units at each value of the price. How will the equilibrium price and the equilibrium quantity of the good change? Justify the solution graphically.

9. Demand and supply of the product are given by functions:

$$q = -3 + \frac{P}{4}$$

$P=28-4q$ and Calculate equilibrium price and equilibrium quantity

of a given product. Show them on the graph.

10. The market demand function of the product is $P = 20 - 2q$, and the supply function is $P = 5 + q$. What will be the equilibrium price and the equilibrium quantity of the product? Calculate the consumer's gain and the producer's gain in this case. Illustrate the solution graphically.

11. At the currency exchange, the demand for dollars is expressed by the function: $P = 60 - 0.25q$, and the supply: $P = 20 + 0.15q$, where P - the dollar rate in rubles, and q - the number of dollars (in millions). What will be the equilibrium exchange rate and how much currency will be will be bought at this rate? Illustrate the solution graphically.

12. Using the conditions of the previous problem, what should be the currency intervention of the Central Bank to make the exchange rate 32 rubles/dollar? Present the situation graphically, assuming that the Central Bank agrees to sell its currency at any rate.

13. The functions of supply and demand are given: $P=80-5q$, $P=32+q$. If the state forbids the sale of goods more expensive than 35 rubles, what will be the deficit? Illustrate the solution with the help of a graph.

14. The market demand function for the product is $P= 12-2q$, and the supply function is $P=4+2q$. The state has imposed a commodity tax of 2 rubles per unit of product. Calculate the new equilibrium price and the new equilibrium quantity of the product. What will be the total value of the tax? Illustrate the solution with the help of a graph.

TEMA 4. LABOR MARKET. EMPLOYMENT AND UNEMPLOYMENT

1. The labor market in macroeconomics
2. The concept and forms of unemployment
3. The economic consequences of unemployment. Oaken's Law.
4. State regulation of the labor market and its consequences

1. The labor market in macroeconomics

A. The importance of the labor market

The labor market plays a special role in the macroeconomy. First of all, wages, employment, and working conditions, which are shaped by market forces, crucially determine the well-being of workers and their families. Second, the value of wages directly affects household expenditures and, consequently, aggregate demand. Finally, entrepreneurs' labor costs constitute the most important element of the cost of producing finished goods. If an increase in wages outstrips productivity growth, costs (expenditures) per unit of output increase, which leads to a rise in prices.

The main point, however, is that the labor market determines the level of employment, respectively the size of GDP in the short run. The fact is that in macroeconomics, as well as in microeconomics, there is a production function showing the dependence of real GDP (Y) on the amount of labor (L) and capital (K): $Y=F(K,L)$. In this case, in the short run the amount of capital and production technology are given, and, therefore, GDP depends only on the amount of labor used: the more it is used, the higher is the output.

The level of employment, in turn, depends on the demand for labor and its supply. Constructing a "supply and demand" model of the labor market, we plot the quantity of labor on the X-axis, and the price of labor - the wage - on the Y-axis. A distinction is made between nominal wages, which are the amount of money that wage earners workers receive for their labor and

real wages - the amount of goods and services that workers are able to buy with their nominal wages. Thus, the real wage is determined by dividing the nominal wage (W) by the price level

(P) on consumer goods and services:

Similarly, the real wage index is calculated by dividing the nominal wage index by the price index. Let us assume that over a period of time, the nominal wage in the country increased by 80% or 1.8 times. At the same time, prices increased by 50% (1.5 times). Consequently, the real wage index was: $1,8:1,5 = 1,2$. This means an increase in real wages of 1.2 times or 20%.

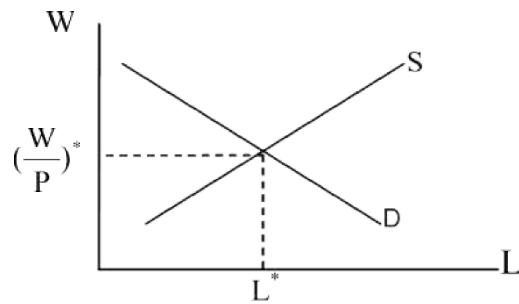
The labor market situation determines not only employment, but also unemployment, which means the excess of labor supply over labor demand. Neoclassics and Keynesians explain the functioning of the labor market and the existence of unemployment in different ways.

B. The neoclassical concept of the labor market

The neoclassical concept assumes that both the demand for labor and its supply depend on real wages. Therefore, in the neoclassical labor market model, the real wage is plotted along the y-axis.

wages (). The lower it is, the more workers are willing to hire entrepreneurs. Wage earners also focus on the real wage, determining the supply of their labor: the higher the real wage, the greater the labor supply. By combining the functions of demand (D) and supply (S) in one figure, we obtain an equilibrium in the labor market (Figure 4-1):

Figure 4-1. Neoclassical equilibrium in the labor market



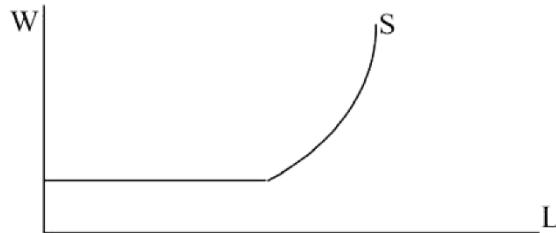
The point of intersection of the supply and demand curves determines the equilibrium real wage ($\frac{W}{P}$)' as well as the equilibrium level of employment (L^*). There is no unemployment in the strict sense of the word, because the demand for labor coincides with its supply: everyone willing to work for a given wage has a job. We can only talk about some voluntary unemployment among those who are not satisfied with the current labor market price. Thus, according to neoclassics, the market mechanism automatically provides full employment in the labor market, respectively, the achievement of potential GDP.

B. The Keynesian concept of the labor market

Unlike the neoclassicals, Keynesians assume that in offering their labor, workers are guided by nominal (W), but not to the real wage ($\frac{W}{P}$). It follows that if

nominal wages rise along with rising prices, the labor supply does increase (Figure 4-2):

Figure 4-2. Keynesian labor supply curve

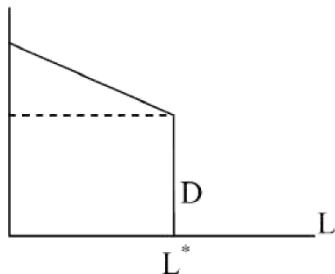


In doing so, Keynesians believe that until full employment is reached, the labor supply curve is horizontal, for the unemployed offer their labor at an established price. Finally, Keynesians believe that the rates of

nominal wages can rise, but are resistant to decline: openly lowering wages is met with stubborn resistance by wage earners.

As for the demand for labor, Keynesian demand for labor is determined entirely by the aggregate demand for finished goods. If aggregate demand is known, then entrepreneurs, relying on the production function, determine the number of workers needed to produce the corresponding GDP. A given level of employment (L^*) corresponds to the maximum nominal wage rate (W') at which entrepreneurs are willing to hire this number of workers (Figure 4-3):

Figure 4-3. Keynesian labor demand curve

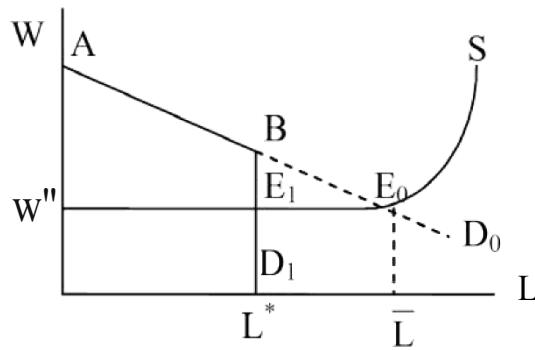


As wages rise, the amount of demand for labor decreases. At the same time, lower wages do not increase the demand for labor, because at this level of aggregate demand for finished goods, businesses simply do not need additional workers. Therefore, the Keynesian labor demand curve (D in Figure 4-3) looks like a broken line.

It remains to connect the supply and demand functions in one figure to obtain a Keynesian model of the labor market that explains the existence of unemployment (Figure 4-4):

Figure 4-4. Keynesian model of the labor market

The value of this wage rate is equal to the product of the marginal product of labor (MP) by the price level (P): $MP \cdot P = W$. See "Resource Market" in Microeconomics.



Initially, let the demand curve in the labor market be ABD . The equilibrium is reached at E_0 with employment level L and nominal wage W' . There is no unemployment, because the demand for labor is equal to its supply. There is full employment in the labor market, and actual GDP is equal to its potential level.

Suppose now that aggregate demand for finished goods (real GDP) falls for some reason. In response, firms begin to reduce production and lay off workers. Suppose that, given the fall in demand, firms do not need more than L^* workers. As a result, the labor demand curve takes the form ABD_i . In turn, the labor supply curve is horizontal up to full employment (L). The latter is due to the fact that workers resist the reduction of the nominal wage in comparison to its current level.

Thus, the equilibrium on the labor market is now reached at point E , i.e., with the same wages (W') and markedly less employment (L'). This leads to unemployment. Its value is equal to the segment $L^* - L$, because at this wage workers would like to work as before.

It is important to keep in mind that even if all workers agreed to a wage cut, it would not lead to an increase in employment and a decrease in unemployment, because according to the Keynesian model, firms are now unwilling to hire more L' workers at any wage. Only an increase in aggregate demand for firms' products, which would lead to an increase in demand for labor, could solve the employment problem. As a result.

the labor demand curve will return to the ABD position , and full employment will be reached.

Based on this reasoning, Keynesians advocate the stimulation of aggregate demand through government economic policy.

2. The concept and forms of unemployment

A. Economically Active Population and Unemployment

The entire population of a country is divided into economically active and inactive population. The **economically active population** is the part of the population that offers its labor to produce goods and services. The **economically inactive population** is the population that is not part of the labor force. It includes:

- children under the age of 16;
- retirees;
- students;
- persons engaged in housekeeping;
- Persons who have stopped looking for work after exhausting all job opportunities;
- persons who do not want to work.

The economically active population includes two categories: employed and unemployed. The **employed** are those persons who during the period under consideration:

- performed work for remuneration;
- were temporarily absent from work due to vacations, holidays, sickness, strikes, etc;
- did unpaid work for the family business.

In turn, people 16 years and older who during the period in question are recognized **as unemployed**:

- did not have a job (profitable occupation);
- were actively looking for work;

- were ready to get to work.

Thus, in order to be considered unemployed, it is not enough for a person not to work, but he must also meet the other two criteria mentioned above. In particular, an active search for work implies applying to employment services, the administration of enterprises, placing advertisements in the press, trying to start one's own business, etc. Students, pensioners, and people with disabilities are counted as unemployed if they are actively looking for work and

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In the previous paragraph we discussed the possibility of voluntary unemployment: workers who are not satisfied with the current market price of labor simply do not offer their labor for sale, preferring leisure time. Such unemployed people are not counted as unemployed by official statistics. The focus of economists and government agencies is involuntary unemployment, when workers are willing to work, looking for work, but cannot find it.

The percentage of the unemployed in the entire economically active population is called the unemployment rate.

In Russia, as in other countries, regular sample surveys are organized to collect data on employment, unemployment, wages, etc. The disadvantage of this method of assessing unemployment is its overestimation. Thus, many people who do not really want to work, and therefore do not actively seek work, may classify themselves as unemployed in the hope of receiving benefits. On the other hand, those employed in the shadow economy often describe themselves as unemployed.

According to the results of surveys the number of economically active population in our country by the end of January 2006 amounted to 74.1 million people or about 51% of the total population. Of these, 5.7 million people, or 7.7% of the economically active population, were classified as unemployed. At the same time in the bodies of state employment service in

1.8 million people, or 2.4% of the economically active population, were registered as unemployed.

At the same time, economic growth since 1999 has gradually improved the employment situation in our country. In particular, from November 2000 to January 2006, the number of unemployed fell by about 19%. The share of the unemployed in the economically active population is also decreasing

- unemployment rate (Table 4-1):

Table 4-1. Number of unemployed (thousand people) and unemployment rate (in %) in Russia

Years	1992, October	1995, October	2000, November	2001, November	2002, November	2003, November	2004, November	2006, January
Number unemployed	3877	6712	6999	6303	6153	5683	5775	5665
Level unemployment	5,2	9,5	9,8	8,9	8,6	7,8	7,9	7,7

At the same time in Russia, as in a number of other countries, the problem of hidden unemployment is very acute. We are talking about employees of enterprises who are sent on administrative leave with partial pay or without pay. These individuals are not considered unemployed, since they have not severed formal ties with their employers. However, many of them are looking for another job and are willing to take it, i.e. they are essentially unemployed.

B. Forms of unemployment

World experience shows that in market economies there is always a certain level of unemployment, even in periods of rapid economic growth. To explain the reasons for this situation, let us consider the forms of unemployment.

Unemployment exists in three main forms:

- friction;
- structural;
- cyclic.

Frictional unemployment occurs because a certain number of people are as if in a position "between jobs": they have lost a job in one place and have not yet found one in another. The frictional unemployed also include young people looking for work for the first time after graduation.

The existence of frictional unemployment is due to the fact that the market economy is a living, constantly evolving organism. Some enterprises close, while others, often located in other regions, expand and recruit personnel. However, a person who has lost his or her job needs some time to look around and find something worthwhile.

Thus, frictional unemployment is relatively short-term and usually does not exceed a period of 0.5 years to 1 year. At the same time, the duration of such unemployment tends to increase, as the terms of unemployment benefits are lengthened. This allows job seekers to be more finicky when looking for a new job.

In general, frictional unemployment is not a serious social problem.

Structural unemployment is a different matter. It arises as a result of a mismatch in the structure of supply and demand on the labor market. Employers need workers in professions and levels of qualification that job seekers do not possess.

For example, scientific and technological progress makes many representatives of traditional working professions - fitters, miners, metallurgists - redundant. On the contrary, there is an acute shortage of adjusters of automated equipment, programmers, etc. In Russia, the transition to a market economy has reduced the need, for example, for military personnel, but has created a demand for economists, managers and lawyers of a new profile.

Obviously, however, a former officer is most often unable to perform the functions required under the new conditions without retraining. This condemns him to rather long structural unemployment. The structural unemployed in Russia are also residents of entire regions, where enterprises whose products are either not needed by the market at all, or are needed, but not in the previous volumes.

Cyclical unemployment results from fluctuations in business activity. It arises during economic recessions and dissipates during upswings.

Hence the fundamental difference between structural and cyclical unemployment: the cyclical unemployed, who have lost their jobs because of the crisis, will return to them during the boom; the structural unemployed will not find their former jobs under any circumstances, because these jobs no longer exist.

Together, frictional and structural unemployment constitute the so-called **"natural rate of unemployment.** The term "natural" does not mean that such unemployment does not interest society. Structural unemployment causes considerable suffering to individuals, and also evidence of inconsistency of the structure of the economy to modern requirements. At the same time, if the actual unemployment does not exceed the natural level, the actual GDP is equal to potential GDP, i.e. occurs "full employment." The point here is that frictional unemployment is a necessary prerequisite for economic development, while the structural unemployed do not need the economy anyway: they need to be retrained. Possible cases, when actual unemployment is temporarily less than the natural level. This means that the economy works with overload: actual GDP exceeds potential GDP. As a result, the price of labor begins to rise, and so do the prices of finished goods. That is why economists, instead of the term "natural level

The concept of **NAIRU** (inflation-indexing unemployment rate) is often used in the context of "unemployment".

On the other hand, the excess of actual unemployment over its natural level indicates the existence of cyclical unemployment associated with the economic downturn.

In practice, the natural rate of unemployment (NAIRU) is defined as the average of the actual unemployment rate for the last 10 years or more and its forecast for the next 10 years. Thus, the natural rate of unemployment is not once and for all set. It increases as, as noted, the duration of frictional unemployment increases. In addition, structural unemployment increases during periods of rapid technological progress and radical social transformations.

In economies in transition, such as Russia's, the official unemployment rate is influenced by the presence of a significant shadow sector (overstated, because workers in the shadow sector are sometimes registered as unemployed), as well as the existence of considerable hidden unemployment (understated). In addition, such economies are characterized by high structural unemployment.

3. The economic consequences of unemployment. Oaken's Law.

The economic consequences of unemployment are manifold. First of all, long-term unemployment contributes to dequalification, making it difficult to use the unemployed in the future. Falling living standards in the families of the unemployed reduce the chances of children receiving acceptable vocational training. As a result, unemployment begins to reproduce itself: the current unemployment is caused by the unemployment of previous periods. Stagnant unemployment impedes economic development. Families of the unemployed are unable to provide sufficient solvent demand for many types of products, which leads to a further decline in production and, consequently, to a new

unemployment. All of this is fraught with the eventual decline of the country's economic potential.

On the other hand, unemployment benefits place a burden on national and regional budgets. Rising budget expenditures force taxes to rise, thereby undermining production incentives. If the government does not want to go down this path, it has to either print more money to finance the budget deficit, increasing inflation, or borrow on the financial markets. The latter leads to an increase in the interest rate and, consequently, a decrease in investment.

The most important macroeconomic consequence of unemployment is that if it exceeds its natural level, actual GDP is lower than potential GDP. In other words, the social cost of unemployment is expressed in the form of a loss of potentially possible, but missed (due to unemployment of part of the able-bodied population) national production. As the American economist, Nobel Prize winner W. Leontief:

"Unemployment is surplus, underutilized labor."

In 1961 another American economist, A. Oaken, established a relationship between the rate of unemployment and the lag of GDP. Oaken's law states that each percentage point of excess of actual unemployment over its natural rate leads to a 3% lag of actual GDP behind potential GDP.

Mathematically it can be expressed as follows:

$$\frac{Y - Y'}{Y} \cdot 100\% = -\beta(u - u'), \text{ где:}$$

u - actual GDP; i - potential GDP; u - actual unemployment rate (in %); " - natural unemployment rate (in %); § - coefficient deviation coefficient, κ expressing sensitivity of the change in unemployment (equal to 3 according to Oaken's calculations).

Left part of the above of the formula is . the deviation (in %) of actual GDP from its potential level, and its right part the deviation of of the actual unemployment from its natural multiplied by by coefficient sensitivity coefficient κ to changes in unemployment.

For the modern economy, the Oaken coefficient of D is usually between 2 and 3. At the same time, it is not invariable and is set empirically in each country.

Sometimes the Oaken formula is written as follows:

$$\frac{Y_t - Y_{t-1}}{Y_{t-1}} \cdot 100\% = 3\% - 2(u - u_{t-1}), \text{ где:}$$

Y - GDP of the given year; Y_{t-1} - GDP of the previous year; u - unemployment rate in the given year (in %); u_{t-1} - unemployment rate in the previous year (in %); 3% and 2 - empirical calculated parameters.

In this case, the left part of the formula reflects the growth (in %) of GDP of a given year compared to the previous year, and the right part reflects the annual change in the unemployment rate.

The above formula emphasizes that in order to keep unemployment constant ($u=u_{t-1}$) the annual growth rate of real GDP should be 3%. This minimum required rate of GDP growth is due to population growth and an increase in labor productivity. If GDP actually grows more slowly, each "shortfall" in GDP growth will lead to an increase in unemployment of 0.5 percentage points. On the other hand, each successive percent increase in GDP (beyond the minimum required 3%) would reduce unemployment by the same half percentage point.

Here is a conditional example. In some country, unemployment is 8%. The government wants to reduce it to 6% by the end of the year. What should be the annual growth of GDP to achieve this goal?

First of all, we should not forget that a 30-percent ^{increase} in GDP is only necessary to keep unemployment at the same level. And in order to

The unemployment rate should be reduced by two percentage points, and production should increase by another 4%. Total GDP growth should thus amount to 7%.

4. State regulation of the labor market and its consequences In all all countries state takes active participation in regulating Labor market, because it is considered that unregulated market does not provide effective use of labor resources. The reasons are the inequality of power of workers and employers in the conclusion of labor contracts, discrimination of certain categories of workers in wages and working conditions, lack of awareness of workers o specifics of work places.

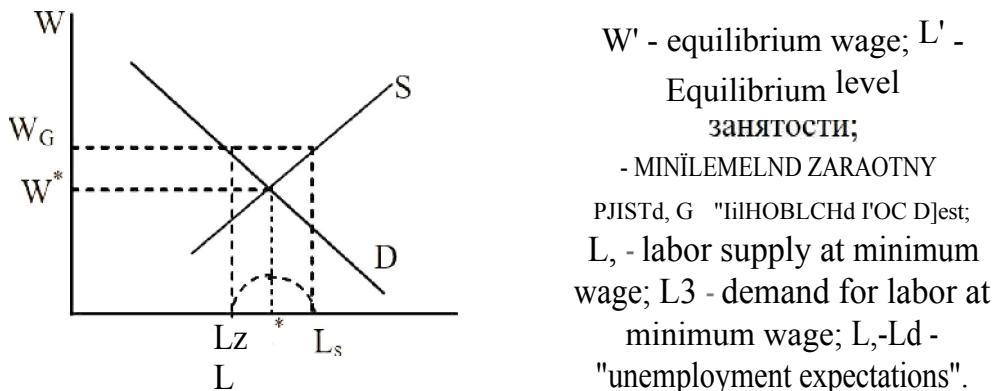
Spheres state regulation are:

- Legislating and protecting workers' rights;
- Protection of vulnerable groups (national minorities, migrants, people with disabilities, etc.);
- Training and retraining of workers;
- Ensuring minimum wages;
- Guaranteeing acceptable working conditions;
- Providing a stable income and social insurance for employees.

Government measures to combat inflation, create new jobs, and tax policy have a significant impact on the functioning of the labor market.

However, one should not be overconfident about the effectiveness of state regulation of labor relations. For example, in developed market economies the minimum wage set by the state is often higher than the equilibrium wage. This leads to "waiting unemployment," as the supply of labor increases while the demand for it falls (Figure 4-5):

Figure 4-5. Minimum Wage and "Unemployment Expectancy"



The impact of unions on the labor market can have the same effect when unions succeed in getting wages to exceed their equilibrium level.

Sometimes the state, by stimulating aggregate demand, tries to ensure that unemployment is below its natural level. This is usually done on the eve of elections for political purposes. But such attempts have only a short-term effect. At the beginning, however, production usually rises and unemployment falls. But at the same time, actual GDP begins to exceed potential GDP, i.e., the economy works with overload. Therefore, very soon the economy is confronted with rising prices, the increased production decreases again (theme 3, point 3), and unemployment returns to its natural level.

Often state regulation of labor relations protects only the relatively prosperous category of workers in the "formal" sector by limiting employment in it and developing underground forms of employment. This happens whenever the standards set by the state are noticeably ahead of the real capabilities of the economy, or become an obstacle to the flexibility of the labor market.

In Russia, state regulation of the labor market has special features and plays an important role in building a market economy.

The joint actions of the government and the State Duma ensured the adoption of a number of important laws directly affecting the social sphere and designed to lay the legal foundation for an efficient market and ensure the complete and final dismantling of the socialist legacy. In particular, the adoption in December 2001 of a new Labor Code leads to the abandonment of guarantees that are unrealizable in modern conditions, the pension reform is aimed at ensuring that pensions are not the same for everyone, but depend on the wages received during the working life.

On the other hand, the Russian authorities have recently increased administrative pressure on business, which does not fit in the mainstream of liberal market reforms. At the same time, it is the liberal policy, increasing the efficiency of the economy, leading to an increase in incomes of workers in both market and budget spheres, allows us to simultaneously solve acute social problems of protection of vulnerable members of society, helping those who are willing and able to work.

SELF-STUDY ASSIGNMENTS

1. Over a given period, nominal wages in a given country increased by 15%, while prices increased by 20%. By how much did real wages change? Did it go up or down? What does the change in real wages tell us?

2. The country has a population of 10 million. Among them: 2 million are children under 16, 50,000 are vagrants, unemployed or with odd jobs. - The country has 10 million people, including two million under 16 year olds, 50,000 vagrants who do not work or have casual jobs, two million 900,000 pensioners, 150,000 high school students and 400,000 schoolchildren. - The main reason for this is that the majority of these people are pensioners, 150,000 students and high school students, and 400,000 housewives who may be working on their own or as part of a wage-earning group. - The survey was conducted by the National Statistics Committee of the Kyrgyz Republic (according to the data of the survey). - Part-time workers and job seekers, 250,000 - unemployed. All the rest are full-time workers.

working day. At Based on these data calculate the economically active population and the unemployment rate.

3. The unemployment rate in the economy is 9%. Frictional unemployment is 5%, and cyclical unemployment is 3%. Calculate the natural rate of unemployment.

4. The economy is characterized by the following data:

Years	1st	2nd	3rd
Unemployment rate	8%	6%	4,5%
Potential GDP	100	100	100

The natural rate of unemployment is 5% at all times. Using the law
Oaken's law and taking the coefficient of
of deviation,

equal to 2, calculate the real GDP for all years.

5. Using the conditions of the previous problem and assuming that real GNP in the second year was 150, determine the potential GDP of this year.

6. Real GNP is less than potential GNP by 5%, and the natural rate of unemployment is 6%. Using Oaken's law and assuming a coefficient of variation of 2, calculate the actual unemployment rate.

7. Unemployment in the country is 10%, and GDP is growing annually by 4%. In the run-up to the elections, the government wants to reduce unemployment to 7% in one year. Is this goal achievable under these conditions? What is the actual unemployment rate a year from now? What would the annual GDP growth rate have to be in order to reach this goal?

8. The labor demand function is: $P=20-0.002L$, and the labor supply function is: $P=11+0.001L$, where P is the price of labor (wages) and L – the number of people employed. Calculate the equilibrium levels of wages and employment. What would the rate of unemployment be if the government set the minimum wage at 15 monetary units?

TEMA 4. ELASTICITY THEORY

1. Direct price elasticity of demand
2. Cross price elasticity of demand
3. Income elasticity of demand
4. Price elasticity of supply

1. Direct price elasticity of demand A. The concept and measurement of elasticity

In economics, many variables are interrelated: a change in one entails a change in the other. For example, a change in the price of a commodity leads to a change in the amount of demand for that commodity. This raises the problem of quantifying these relationships. In particular, it is not enough for us to simply state that the value of demand for a good is likely to increase as its price falls; we need to determine as accurately as possible the extent to which demand increases for a given decrease in price.

The theory of elasticity helps us in solving such problems. Elasticity reflects the degree to which one variable (e.g., demand) reacts to changes in another variable (e.g., price). In this regard, we first need to decide in what units we should calculate changes in price and demand. The first thing that comes to mind here is to measure the price in rubles, and the demand in physical units (pieces, kilograms, etc.). This will allow us to see by how many units the demand changes when the price changes by X rubles.

Suppose we know that a decrease in price by 5 rubles leads to an increase in demand by 10 pieces. However, such information in itself is absolutely meaningless, because we do not know what were the values of the price and demand before the changes took place. If we are talking about a bus ticket, the decrease in price will be very significant, and the increase in demand on a city scale will be negligible. If we are talking about a Zhiguli sold during the day in a store, it is the opposite. In this regard, it is advisable to

to calculate changes in both price and demand not in absolute values, but in percentages. Percentage changes make comparable demand values for all goods, from pins to nuclear submarines.

The direct price elasticity of demand ("") shows by how much the demand for a good (d) changes when its price (P) changes by 1%.

The formula for calculating the coefficient of elasticity:

$$E_d^P = \frac{\text{Изменение спроса (в \%)} }{\text{Изменение цены (в \%)} }$$

For example, the price of a good fell by 10%, resulting in a 20% increase in demand. Then:

$$E_d^P = \frac{20\%}{-10\%} = -2$$

Suppose the price of a good increased by 10%, resulting in a 20% drop in demand. Then:

$$E_d^P = \frac{-20\%}{10\%} = -2$$

Conclusion: the coefficient of direct elasticity is always negative, because the price and the value of the demand for the product change in different directions: when the price decreases, the demand increases, and vice versa.

Three cases are possible:

1. If a percentage change in price changes the amount of demand for a product more than the price, then demand is price elastic.

In this case:

$$|E_d^P| > 1$$

The examples just given refer to this case. Thus:

$$E_d^P = \frac{-20\%}{10\%} = -2 = |2|$$

2. If a percentage change in price causes the demand for a product to change less than the price, then demand is price inelastic.

In this case: $R'' < 1$

For example, the price of a good fell by 10%, resulting in a 5% increase in demand. Then:

$$E_d^P = \frac{5\%}{-10\%} = -\frac{1}{2} = \left| \frac{1}{2} \right|$$

3. If a percentage change in price changes the demand for a product to the same extent as the price, then demand is characterized by unit price elasticity.

In this case: $R'' - I$

For example, the price of a product increased by 10%, resulting in a 10% drop in demand.

$$\left| \frac{\Delta P}{P} \right| = 1$$

B. Point and arc elasticity

As mentioned above, the coefficient of direct price elasticity of demand is calculated by the formula:

$$E_d^P = \frac{\text{Изменение спроса (в \%)} }{\text{Изменение цены (в \%)} }$$

Since the percentage change in demand is calculated using the formula:

$$\frac{\Delta q}{q} * 100\%$$

where q is the initial value of demand, Δq is the change in demand in units, and the percentage change in price according to the formula:

where P - the initial value of the price, ΔP - price change in rubles,

TO'

$$E_d^P = \frac{\Delta q}{q} * 100\% : \frac{\Delta P}{P} * 100\% = \frac{\Delta q}{\Delta P} * \frac{P}{q}$$

Elasticity at the point

The last formula shows that the elasticity depends both on the initial values of price (P) and demand (q) and on their changes (ΔP and Δq). Taking as a basis certain values of price and demand, we obtain the elasticity at a given point (point elasticity).

Let there be two pairs of price and demand values at two points on the demand curve:

		q
T. A	10	50
T. B	5	100

If we assume that the initial values of price and demand are: P=10, q=50, then the elasticity at point A is:

$$\text{\$} \quad Aq \quad P \quad 5(1) = -2$$

This result means that every percent decrease in price will lead to an increase in demand of 2%.

If we assume that the initial values of price and demand: P=5, q=100, then the elasticity at point B:

$$E_d^p = \frac{\Delta q}{\Delta P} * \frac{P}{q} = \frac{-50}{5} * \frac{5}{100} = -0,5$$

This result means that every percent increase in price will result in a 0.5% decrease in demand.

Arc elasticity

Thus, the elasticity coefficient depends on which point is taken as the basis for the calculation. To avoid this difficulty, sometimes the average values of price (\bar{P}) and demand (\bar{q}) are taken as the basis, i.e., the elasticity coefficient is calculated at the transition from one point to another

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Arc elasticity formula: $E' = \frac{\Delta q}{\Delta P} * \frac{P}{q}$

Accordingly, in our example, the arc elasticity of demand for price in the transition from t. A to t. B is:

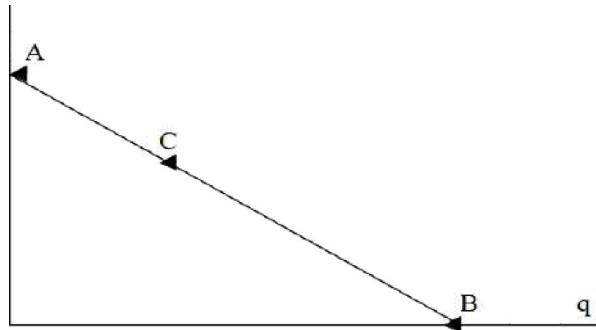
$$E_d^p = \frac{\Delta q}{\Delta P} * \frac{P}{q} = -\frac{50}{5} * \frac{7,5}{75} = -1$$

In other words, as we move from one point to another, each percentage change in price leads to an inverse change in demand, also by 1%.

B. Geometric interpretation of the direct price elasticity of demand

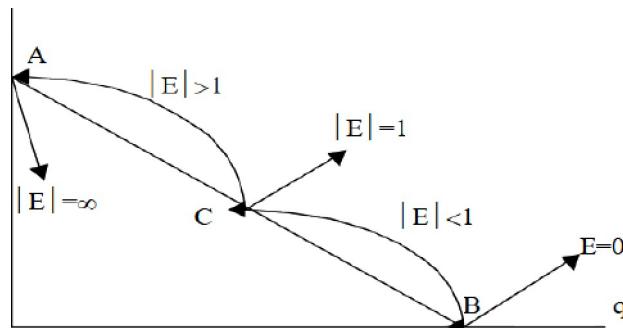
Here is the following statement without proof. If the demand function is linear, then the coefficient of price elasticity of demand at point C is modulo equal to the ratio of segments BC and AC: $|E| = \frac{BC}{AC}$ (Fig. 4-1).

Figure 4-1. Geometric interpretation of the price elasticity of demand



Hence (Fig. 4-2):

Figure 4-2. Price elasticity of demand at different points



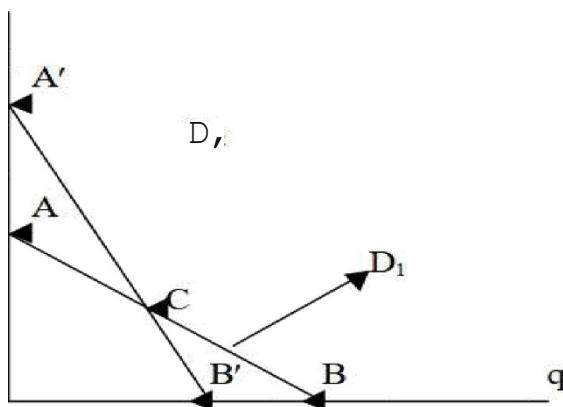
- 1) The central point elasticity is modulo equal to one (unit elasticity);
- 2) The elasticity at all points above the central point (the interval from t. A to t. C) is modulo greater than unity (demand is price elastic);
- 3) The elasticity at all points located below the central point (the interval from C to B) is modulo less than unity (demand is not price elastic);
- 4) The modulo elasticity at point A is infinitely large (demand is infinitely price elastic);

5) Elasticity in B is equal to zero (zero elasticity of demand for price).

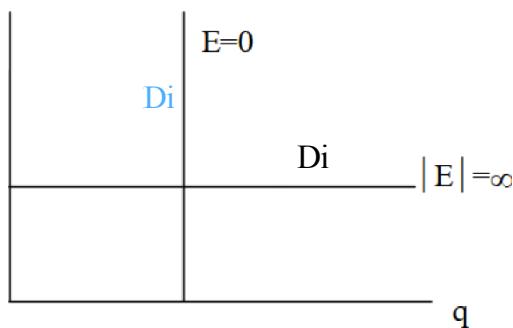
It follows from the above that the lower the slope of the demand curve in the point C, the more elastic is the demand for price.

Thus, at point C of the demand curve D_i (Figure 4-3), the price elasticity of demand is higher than at the same point of the demand curve D_o , because $|BC/AC| > |B'C/A'C|$.

Figure 4-3. Price elasticity of demand and slope of the demand curve



Accordingly, there are also extreme cases (Fig. 4-4): Figure 4-4. Extreme cases of price elasticity of demand



The elasticity at all points on the demand curve D_i is infinitely large modulo. The elasticity at all points on the demand curve D_2 is zero.

Γ. Factors of direct price elasticity of demand

1. The more substitutes a good has, the more price elastic the demand for it is. For example, if a product has many substitutes, even if its price rises slightly, consumers will sharply reduce their purchases of the product,

switching to substitutes, and vice versa. The price elasticity will thus be high.

It should be borne in mind that substitute goods can be different. First, goods that satisfy different needs can replace each other. The consumer can, for example, go on vacation abroad, or he can stay at home, but buy a new fur coat. A fur coat, therefore, replaces a vacation.

Second, close substitutes are goods that satisfy the same need. In particular, Coca-Cola can be replaced by Pepsi-Cola and vice versa.

Finally, there are also perfect substitutes. These are the same products that can be purchased from different vendors. For example, Coca-Cola sold in our store can easily be replaced by Coca-Cola from the store across the street.

And from all this is an important conclusion. A commodity as such may have few substitutes. Accordingly, demand for it has little price elasticity. However, the same product produced by our firm can easily be replaced by the products of our competitors. This means that for the firm the demand for its product is highly elastic.

For example, it is not easy for Russians to give up vodka. Consequently, even if the price of all vodka brands rises markedly at the same time, demand for vodka will fall weakly - the elasticity of demand is low. But vodka factory "Krystall" is easily replaceable by any other vodka, whether domestic or foreign. Therefore, even if the price of Kristall vodka goes up slightly, the demand for it may fall sharply. This suggests

The high level of elasticity of the SPEoSport.

2. The lower the share of spending on a given product in the consumer's budget, the less price elastic the demand for it is. You are accustomed, for example, to buying a certain commodity that is cheap to you. If it becomes markedly more expensive while still being inexpensive to you, you are likely to reduce your consumption weakly.

3. The longer the time interval from the moment of price change, the more price elastic the demand is. For example, if the price of a certain product increases, consumers usually do not have time to switch to other products in a short period of time. As a result, the consumption of this product decreases insignificantly, i.e. the elasticity of demand in a short period is small. On the contrary, in the long run consumers adjust to the price increase by starting to buy more substitute goods, so the elasticity of demand increases.

A classic example is the change in demand for gasoline resulting from its sharp rise in price in the mid-1970s, when OPEC member countries concertedly cut oil production. The latter led to an increase in the price of oil, and consequently in the price of gasoline. At first, gasoline consumption in the West fell very slightly, since motorists still needed to go to work. But a little later the West responded by introducing energy-saving technologies (motorists, for example, moved to small cars). As a result, the demand for gasoline proved to be much more elastic in the long run.

Important note! When we study the price elasticity of demand, we need to keep all other demand factors constant. Without taking this into account, you can make a mistake. Here is an example. In Russia over a period of time the price of gasoline went up from 3 to almost 15 rubles. At the same time gasoline consumption has not decreased, but even increased. Does this mean that in our country's demand for gasoline is not at all price elastic? No, of course not, because the change in demand, in addition to the price, was influenced by many other factors: the money incomes of the population increased, the number of motorists increased, etc. To calculate the price elasticity of demand, we have to exclude the effects of all factors other than price on demand. This is not easy and requires a special economic and statistical analysis. In my opinion, this is an interesting and practically important work.

Д. Practical Application of the Theory: Maximizing Producer Revenue

A firm usually seeks to maximize profit. Profit (P) is the difference between revenue (TR) and the firm's total costs (TC):

$$P = (TR - TC) - \max.$$

But if costs are given (constant), then to maximize profit we must maximize revenue. Revenue is the product of price by sales volume: $TR = P \cdot q$. However, sales volume (demand) depends on price: the higher the price, the lower the demand, and vice versa. Consequently, the firm must set a price at which the product of the price by the amount of demand will be maximum ($TR - \max.$).

Let us give a conditional example. A firm trades in vegetables brought from the south. A shipment of goods has arrived in Moscow. Thus, the costs of purchase and transportation have already been incurred and cannot be changed: they have become sunk costs (theme 1, item 1). In this situation the firm seeks to maximize sales revenue.

1. Let the firm initially set the price of 50 rubles per kilogram, and she manages to sell 1000 kg of vegetables, raising 50,000 rubles. However, the managers are wondering whether they were too greedy by asking for such a price. Therefore, the next batch they sell for only 40 rubles. The result does not make you wait: sold 1500 kg, the proceeds reached 60000 rubles. Let's summarize the data in the table:

P	q	TR
50	1000	50000
40	1500	60000

Let's analyze the situation in terms of price elasticity of demand. A decrease in price by 20% led to an increase in demand by 50%. Demand turned out to be price elastic, i.e. when the price decreased, it increased to a greater extent than the price decreased. This led to an increase in revenue: the firm lost 20% of its value on each product, but it won back 50% on sales volume.

Now suppose that the experiment with a price reduction failed: the drop in price from 50 to 40 rubles (20%) led to an increase in demand only from 1000 to 1100 kg (10%). In this case

demand was not price elastic: when the price decreased, it increased to a lesser extent than the price decreased. Therefore, the revenue decreased: the firm lost 20% of the value on each product, and only 10% on the sales volume. This can be seen from the table:

P	q	TR
50	1000	50000
40	1100	44000

It follows that it is profitable to reduce the price when demand is price elastic. If demand is not price elastic, a reduction in price will lead to a reduction in revenue.

2. Let us now assume that our firm is experimenting not with a decrease but an increase in price: the price increased from 50 to 60 rubles, i.e. 20%. This entailed, let us assume, a drop in demand from 1000 to 700 kg or 30%:

P	q	TR
50	1000	50000
60	700	42000

In this case, demand is price elastic: when the price went up, it fell more than the price went up. As a result, revenue declined, because the firm lost more on sales volume than it gained on price.

Consider the more favorable case for the firm, when with the same The increase in price (by 20%) reduced demand to 900 kg (by 10%):

P	q	TR
50	1000	50000
60	900	54000

Now demand was not price elastic: when the price went up, it went down less than the price went up. This led to an increase in revenue.

The last example shows that it is profitable to raise the price only when demand is not elastic. On the contrary, an increase in price when demand is elastic leads to a decrease in revenue.

An important caveat:

All of the above is true only for relatively small changes in price.

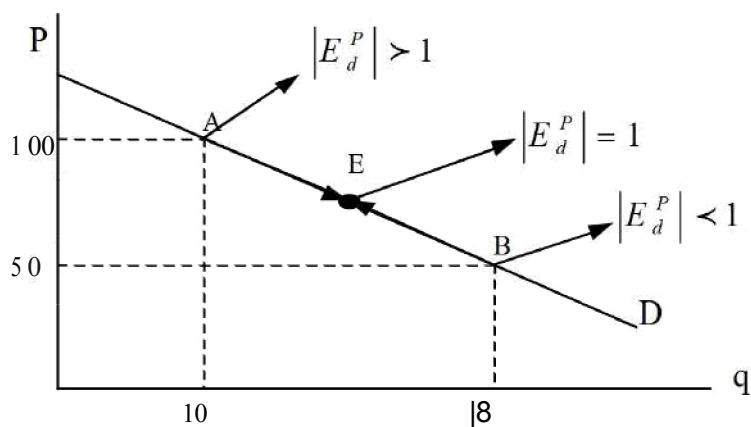
Suppose we know two points on the demand curve:

	P	q	TR
t. A	100	10	1000
t. B	50	18	900

Let us first take as the basis t. A, where the price is 100 rubles, and the demand is equal to 10 units. The price was reduced by 50%, i.e. to 50 rubles, and as a result demand increased to 18 units (80%). It would seem that demand is price elastic, i.e., the revenue due to lower prices should increase. However, the revenue has fallen: was 1000 rubles, became 900 rubles. The point here is that in this example such a significant drop in price led to the transition to the point B on the demand curve ($P=50$, $q=18$), where demand became inelastic.

To see this, let's take the price and demand values in a given point as a basis. Let's increase the price from 50 to 100 rubles, i.e. 100%. The demand will fall from 18 to 10 units, i.e. by about 44%. Consequently, in point B demand is not price elastic, and it is profitable not to reduce the price, but to increase it (Fig. 4-5):

Figure 4-5. Elasticity at different points on a given demand curve



Thus, if the firm is in point A, it is really profitable for the firm to lower the price, but not to point B. If the firm is in point B, then it is profitable to increase the price, but not to point A. The price should be changed in "small steps" in order to find t. E, where demand is uniquely price elastic, and therefore revenue is maximal.

Conclusions:

1. If demand is price elastic at a given point, then to maximize revenue, it is profitable to lower the price and not profitable to raise it;

2. If demand is not price elastic at this point, it is profitable to raise the price and not profitable to lower it to maximize revenue.

3. If demand is uniquely price elastic at this point, it is not profitable to remove or increase the price to maximize revenue: it is already optimal.

In the form of a table, the change in revenue with small changes in price and different values of elasticity can be shown as follows (Table 4-1):

Table 4-1. Elasticity and revenue

	Demand is elastic	Demand is singularly elastic	Demand is not elastic
Price Increased	Revenues are down	Revenue does not change	Revenue grows
The price is reduced	Revenue grows	Revenue does not change	Revenues are down

The table shows that with elastic demand, an increase in price will lead to a decrease in revenue, and a decrease in price will lead to an increase in revenue. In inelastic demand, the opposite will be true. Finally, with single elastic demand, the price should not be increased or decreased because the revenue will not change as a result.

E. Practical application of the theory: price increases

With the beginning of market reforms, the prices of all goods in Russia rose, but not uniformly:

	1987 г.	2003 г.	Price Increase
The price of travel in the Moscow subway	5 kop.	10 rubles.	200 times
The price of "crystal" vodka	5 rubles.	100 rubles.	20 times

The reason is that it is much more difficult to replace Metro than a given brand of vodka. Thus, in the event of an increase in the price of "Kristall" vodka, consumers can easily switch to any other brand of domestic or imported vodka, while the Washington metro is not imported to Moscow. Consequently, the elasticity of demand for the price of metro fare is noticeably lower. The lower elasticity of demand makes it advisable to raise the price. Therefore, the price of the fare rises faster, all other things being equal.

Ж. Mathematical Application.

Let us return to the formula for calculating the coefficient of price elasticity of demand at a given point:

$$E_d^P = \frac{\Delta q * P}{\Delta P * q}$$

It shows that the point elasticity depends not only on the initial values of price (P) and demand (q), but also on how big the changes in price and demand (ΔP and Δq) are. The point elasticity can be most accurately calculated by assuming that the change in price is infinitesimal (AR-+0).

In this case, the ratio is the derivative of the demand function by $\frac{\Delta q}{\Delta P}$

цене: $q_p = \lim_{\Delta P \rightarrow 0} \frac{\Delta q}{\Delta P} = \frac{dq}{dP}$

Accordingly, the formula is used to calculate the point elasticity:

$$E_d^P = \lim_{\Delta P \rightarrow 0} \frac{\Delta q * P}{\Delta P * q} = \frac{dq * P}{qdP * q}$$

The first factor in the last formula is the derivative of the demand function over price. It follows that the formula can be used only if a continuous demand function is known.

Let us consider two examples of calculating point elasticity:

A. Let the demand function be given: $q=10-p$. Then:

$$E_d^P = \frac{dq * P}{dP * q} = -1 * \frac{1}{10-p}$$

From this we can see that at different points of this function the price elasticity of demand is different and depends on the price. For example, at a price of 5, the elasticity is -1. This means that if the price decreases (increases) by N%, the demand will increase (decrease) by the same N%, which is easy to check.

B. Suppose we are given a stepped demand function: $q=p^0$. Then:

$$E_d^p = \frac{dq}{dP} * \frac{P}{q} = -\alpha P^{-\alpha-1} * \frac{P}{P^{-\alpha}} = -\alpha$$

Conclusion: The elasticity of the power function is constant at all points and is equal to the exponent.

In Section E of this question we discussed the relationship between the elasticity and the producer's revenue. Let us consider this relationship more strictly.

Let a function of demand for a good on its price be given: $q=f(P)$. Since the revenue (TR) is the product of the price (P) by the sales volume (q), then:

$$TR = P \cdot q = P \cdot f(P)$$

By differentiating revenue by price, we get:

$$\frac{dTR}{dP} = f(P) + \frac{df(P)}{dP} \cdot P = f(P) + P \cdot [1 + \frac{d}{dP} f(P)]$$

Since the second summand is the price elasticity of demand, then:

$$\frac{dTR}{dP} = f(P) + \epsilon \cdot f(P) \cdot P$$

$$dTR = f(P) \cdot dP + \epsilon \cdot f(P) \cdot P \cdot dP$$

The left part of the last equation is the change in revenue. The right side of dP is the change in price. Hence:

1. If price decreases ($dP < 0$) and demand is price elastic ($\epsilon > 1$), then revenue increases ($dTR > 0$).

The expression $dR > 0$ means that the price of the good has increased, and the expression $EY < 0$ - that it has decreased. Let demand be price elastic: $|\epsilon| > 1$. Then an increase in price will lead to a decrease in revenue ($ATR < 0$), and a decrease in price will lead to an increase in revenue ($ATR > 0$). With inelastic demand ($|\epsilon| < 1$) it will be the opposite. Finally, the table shows that when demand is uniquely elastic ($|\epsilon| = 1$), there is no need to increase or decrease the price, because revenue will not change as a result ($ATR = 0$).

2. Cross price elasticity of demand

Demand for a given commodity depends not only on its own price, but also on the prices of other goods. For example, demand for Zhiguli depends not only on the price of Zhiguli, but also on the prices of foreign cars of a similar class, spare parts, gasoline, etc.

The cross price elasticity of demand (F') shows by how much the demand for product A (da) changes and the price of product B (Pt) changes by 1%.

The formula for calculating the coefficient of elasticity:

$$E_{da}^{Pb} = \frac{\text{Изменение спроса на товар А (в \%)} }{\text{Изменение цены товара В (в \%)} }$$

Three cases are possible:

1. If, when the price of good B increases (decreases), the demand for good A increases (decreases), then such goods are called interchangeable.

In this case: $/'$

For example, Coca-Cola went up in price by 10%, which reduced demand for it, but demand for Pepsi-Cola increased by, say, 15%. Consequently, the cross-elasticity of demand for Pepsi by price

"Coca-Cola is equal:

$$E_{da}^{Pb} = \frac{15\%}{10\%} = 1,5 \rightarrow E_{da}^{Pb} > 0$$

If Coca-Cola, on the other hand, becomes cheaper (the percentage change in price is negative), the demand for Pepsi will fall (the percentage change in demand is negative). Then both the numerator and the denominator will have numbers with negative signs, but the result will still be positive.

2. If, when the price of commodity B increases (decreases), the demand for commodity A is removed (increases), then such goods are called complementary.

In this case: $/' < 0$

For example, the price of car parts went up by 10%, which caused the demand for cars to fall by 5%. Consequently, the cross elasticity of demand for cars on the price of parts is equal:

$$\frac{\beta_{da}^{pb}}{10\%} = \frac{-5\%}{10\%} = -0,5 \rightarrow E_{da}^{pb} < 0$$

In turn, when the price of spare parts becomes cheaper, the demand for cars will increase, but the elasticity of demand for cars on the price of spare parts will remain negative.

3. If, when the price of good B increases (decreases), the demand for good A does not change, then such goods are called independent.

In this case: " -)

Let the price of cement go up (down). Most likely, it will not have any effect on the demand for bread. Therefore, the elasticity of demand for bread on the price of cement will be zero.

3. income elasticity of demand

Demand for goods also depends on the income of consumers.

Elasticity demand on income elasticity (F' ,)
 shows at how much the demand for the product (d)

changes when the consumer's income changes

(I) by 1%.

The formula for calculating the coefficient of elasticity:

$$E_d^I = \frac{\text{Изменение спроса (в \%)} }{\text{Изменение дохода (в \%)} }$$

Two cases are possible:

1. If the demand for a good increases (decreases) when income increases (decreases), then such goods are called normal.

In this case: b! *)

The term "normal commodity" is used insofar as it is natural (normal) that the richer (poorer) the consumer, the more (less) variety of goods he buys.

Suppose the consumer's income increased (decreased) by 10%. At the same time his demand for some product has increased (decreased), for example, by 20%. Then:

$$10\% \quad " \quad . \quad \text{Или:} \quad " \quad -10\%$$

2. If the demand for a commodity is removed (grows) when income increases (decreases), then such goods are called low-value goods.

In this case: $b! < -d$

Here we should keep in mind that there are a number of goods, the consumption of which does not grow, but decreases with increasing income. For example, a poor consumer is forced to wear felt boots, nicknamed "goodbye youth. If he gets rich, he most likely does not start buying two pairs of these shoes instead of one, but gives up "goodbye youth" altogether, switching to branded leather shoes. When luck turns away from him, the opposite happens.

So let's assume that if income falls by 10%, demand for this product increases by 8%. Then:

$$\frac{1.1}{1.08} = 1.08 \cdot F' < 1$$

The first case (when the product is normal) allows for two options:

la. If the demand for a commodity increases (decreases) when income increases (decreases), but to a lesser extent than income, such goods are called necessities of prime necessity.

In this case: $F < I$

Suppose that a consumer's income increased (decreased) by 10%. At the same time his demand for some product has increased (decreased), for example, by 5%. Then:

$$E_d^I = \frac{5\%}{10\%} = 0.5 \rightarrow 0 < E_d^I < 1. \text{ Или: } E_d^I = \frac{5\%}{10\%} = 0.5 \rightarrow 0 < E_d^I < 1.$$

lb. If the demand for a good increases (decreases) when income increases (is removed), but to a greater extent than income, then such goods are called luxury goods.

In this case: P, I

The above example (income increased or decreased by 10% and demand decreased by 20%) is exactly the case when a normal commodity is at the same time a luxury item.

It follows from the above that it would be wrong to label a commodity in advance as "low-value," "basic necessity," or "luxury item. First we should look at how its consumption changes in connection with changes in income. The same product can be a luxury item for a non-wealthy consumer and a low-value good for a rich consumer.

For example, a man who eats mostly pearl barley, becomes rich and sharply increases his consumption of buckwheat - it is a luxury item for him. On the contrary, his wealthy friend, as his income grows, finally gives up buckwheat in favor of black caviar - buckwheat is a low-value commodity for him.

At the same time, there are goods that are basic necessities for most people (food, ordinary clothes), luxury goods (cars, cell phones, foreign trips), and low-value goods (low-quality goods).

Thus, back in the last century, the German statistician E. Engel, who studied family budgets, empirically deduced a number of regularities. One of them is that as a family's income grows, the share of its expenditures on food decreases. This confirms the thesis that food is a basic necessity, because it means that the increase in spending on food lags behind the growth of income.

This pattern can be used to compare living standards in different countries: the richer the country, the lower the percentage of spending on food in the budget of the average family. Of course, people in rich countries spend considerably more on food in absolute terms than in poor ones, but in the poorest countries people have to eat up to 70 percent of their income to avoid starvation. At the same time, in the United States and Western Europe, the share of spending on food ranges around 10%.

One last thing. For the practical division of goods into necessities, luxuries, etc. to be valid, it is necessary not to

to take into account the impact on consumption of other factors unrelated to income. It has become known, for example, that in July the income of our city's residents was higher than in January, while the purchase of fur coats decreased. However, one can hardly claim on this basis that a fur coat is a low-value good, because in this case its consumption was influenced by climatic conditions.

4. price elasticity of supply

As we remember, not only demand depends on price, but also supply of a given commodity. The price elasticity of supply (E) shows by how many percent the supply of a good (s) changes when the price of that good (p) changes by 1%.

The formula for calculating the coefficient of elasticity:

$$E_s^P = \frac{\text{Изменение предложения (в \%)}_s}{\text{Изменение цены (в \%)}_P}$$

Accordingly, the price elasticity of supply at this point is calculated by the formula:

$$E_s^P = \frac{\Delta q}{\Delta P} * \frac{P}{q}$$

where P and q are the values of price and supply at a given point, AP and Aq are the absolute changes in price and supply.

If you don't understand where this formula came from, you should go back to item B of the first question of this thread.

If a supply function of price is given, then the formula is used to find the exact elasticity coefficient at a given point:

The justification for the formula can be found in item G of the first question of this thread.

Since the supply curve usually has a positive slope (the value of supply increases as the price rises and is removed as the price falls), the elasticity of supply to price is positive:

Like the elasticity of demand, the elasticity of supply to price is not only direct, but also cross-elastic. The latter shows by how much the supply of one commodity changes when the price of another commodity changes by 1%. For example, how much the supply of natural gas (produced with oil) will increase if the price of oil increases by 1 percent.

With respect to the direct price elasticity of supply, three cases are possible:

1. If for some percentage change in price, the value of the supply of a good changes more than the price, then

supply is price elastic. In this case: $\Gamma > 1$.

2. If for some percentage change in price, the value of the supply of a good changes less than the price, then

supply is price inelastic. In this case: $0 < \Gamma < 1$.

3. If for some percentage change in price, the supply of a good changes to the same extent as the price, then supply is characterized by unit price elasticity. In this

case: $\Gamma = 1$.

Let the supply function be linear: $q = a + bp$. Calculate the price elasticity of supply:

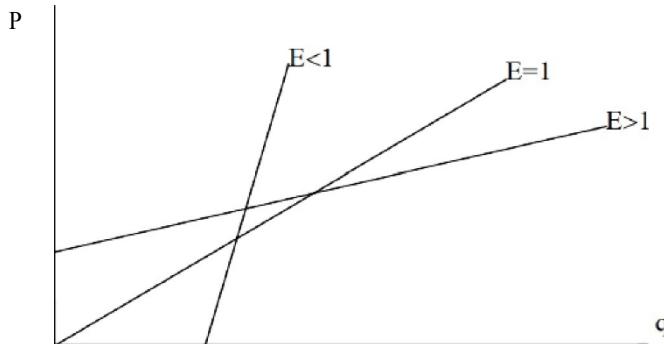
$$\frac{\Delta q}{q} = \frac{\Delta p}{p}$$

Conclusions:

- If parameter "a" is zero, then the elasticity at all points of the function is 1.
- If parameter "a" is greater than zero, then the elasticity at all points of the function is less than 1.
- If parameter "a" is less than zero, then the elasticity at all points of the function is greater than 1.

Graphically it looks like this (Fig. 4-6):

Figure 4-6. Price elasticity of supply



Factors of direct price elasticity of supply:

1. Product holding capacity. The worse they are, the lower the elasticity is, because sellers do not have the ability to hold on to the product in response to a decrease in its price. An example is strawberries.
2. The time factor. The shorter the time interval from the moment the price changes, the lower the elasticity of supply. In this regard, a distinction is made between instantaneous, short and long periods.

In the instantaneous period, all production resources are constant. As a result, producers have no way to respond to an increase in output to a rise in price, and the elasticity of supply is zero.

In the short run, some resources are constant and others are variable. The possibility of attracting additional resources allows output to increase as the price rises, and the elasticity of supply increases.

In the long run, the use of all resources can be revised. Therefore, the price elasticity of supply is maximal.

SELF-STUDY ASSIGNMENTS

1. The elasticity of demand for product X at its price is $-1/4$. It follows from this:
 - A. The price should be raised to increase revenue;
 - B. The price should be lowered to increase revenue;

- B. As the price rises, demand falls more than the price rises;
 Г. When price rises, demand falls less than price rises;
 Д. When the price goes down, demand increases less than the price goes down;
 Е. When decreases the demand increases more than the price decreases.

Justify the correct answers.

2. A reduction in oil production by OPEC countries led to an increase in oil revenues. Explain this in terms of the price elasticity of demand for oil. Illustrate the situation graphically.

3. A moderate increase in demand for oil led to a sharp rise in its price. Explain. Illustrate the situation graphically.

4. The owner of the amusement park wants to increase the monthly revenue from the sale of amusement park tickets. To achieve his goal, he has increased the price of the tickets. Under what conditions would this increase revenue? Under what conditions would the revenue decrease?

5. The original price of the product was 20 rubles. At the same time its daily sales were 500 pieces. After increasing the price to 30 rubles, the demand for the product fell to 400 pcs. Calculate the price elasticity of demand. Make conclusions about the expediency of increasing the price in terms of increasing the revenues of producers of this commodity.

6. There is data on prices and demand values at two points on the demand curve:

q	
400	10

200 25

Calculate the elasticities of demand at either price. Do
VYIVODY.

7. The price of the product increased from 50 to 60. After it was increased, the demand was 2,400. Calculate the initial demand if the elasticity of demand at the starting point was -2.

8. At the price of 25 rubles the demand was 100 units. The price was reduced to 20 rubles. What should be the minimum value of demand if it is price elastic? (Use arc elasticity).

9. The demand function for the product is $P=50-q/2$. Calculate the price and magnitude of demand at the point where the modulo price elasticity of demand is 4.

10. Product A is low-value. Consumers' incomes have increased. In turn, producers expect prices to rise in the future. Draw a graph showing the change in market equilibrium; indicate the new market price as well as the equilibrium quantity of the good sold and bought.

11. The income elasticity of demand is $1/3$. Hence:

- A. We have a low-value commodity in front of us;
- B. This product is normal; C. It is an item of basic necessity;
- Г. If the consumer's income decreases, the demand for the product will increase; D. If the consumer's income increases, the demand for the product will increase. Justify the correct answers.

12. You, as the chief economist of Avtovaz, are asked to predict the change in revenue from the sale of Zhiguli. For each of the changes outlined below, show briefly whether revenue will increase, decrease, or remain the same. Use the different types of elasticities of demand to support your answers:

- A. Reducing the price when demand is elastic;
- B. The increase in price when the elasticity of demand is -1;
- C. The increase in income of consumers;
- Г. Price reductions on Daewoo (a substitute for your model).

13. In city A the average per capita income is 1000 rubles per month, and in city B - 1100 rubles per month. Residents of A drink an average of 10 liters of beer a month, while residents of B drink 9 liters. On the basis of these data, can we say that beer is of low value? Justify your answer.

14. Using elasticity theory, explain why a cab ride from the airport to the city is more expensive at night than during the day.

15. A certain store sells at a discounted price at night. Can we use the data on prices and sales volumes during the day and night to draw conclusions about the price elasticity of demand for a particular product? Justify your answer.

16. There are 10 firms in the industry whose supply functions are the same. At price 5, each firm produces 20 units, and its elasticity of supply is 2. What is the market price elasticity of supply (the total elasticity of supply of all firms)?

CASE STUDY

t the university's usually 60 percent the same	athletic club, the tennis full. The use of equal use	courts are them is about
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teachers and students. Teachers pay \$20 per hour and students pay \$10 per hour. We know that faculty demand is completely inelastic, and student demand is price elastic.

The director of the club wants to increase attendance courts, as well as the revenue of the club. To do this, he is considering two possibilities:

- Set the same price for everyone at \$15 per hour;
- Raise fees for teachers to \$25 an hour and lower them for students to \$5.

Explain which of these options can bring the desired result.

Offer your best solution to the problem, if necessary.

TEMA 5. INFLATION

1. The concept and measurement of inflation
2. Causes of inflation
3. The economic consequences of inflation
4. Inflation and Unemployment. The Phillips Curve
5. Inflation and Anti-Inflationary Policy in Russia

1. The concept and measurement of inflation

Inflation is the depreciation of money. It can occur in overt and covert forms. Open inflation means an increase in prices. With hidden inflation, prices are controlled by the state and formally do not increase; the depreciation of money is expressed here in the growth of the deficit. Open inflation is characteristic of a market economy.

The annual inflation rate (I) can be calculated using the formula:

$$\pi = \frac{R - R_{-1}}{P} * 100\%$$

where P is the price level in the given year, P_{-1} is the price level in the previous year.

For example, let's assume that the price level of some year is taken as 100. At the same time, last year the price index was 185, and this year it reached 198. It follows that prices have risen by about 7% this year. The calculation is as follows:

$$\pi = \frac{198 - 185}{185} * 100\% = 7\%$$

The question arises, however, as to how price indices are calculated. Everything would be easy and simple if the economy produced and consumed only one commodity. Suppose we are talking about bread. Let a loaf of bread cost 1 ruble at first, then it went up in price to 2 rubles, and after some time it became worth 3 rubles. Taking the original price as 100, we determine the subsequent indices, which are 200 and 300.

The task is considerably more complicated because in the real economy we are dealing with many commodities. In this case, in order to calculate the price

indexes we have to look at how the prices of the same goods change. If, for example, many residents of our city used to went to "The first time they were in a \$5,000 Zhiguli, and then they moved to a Mercedes, which was worth

It does not follow from this that cars have become 10 times more expensive.

But in practice, some goods rise in price quickly, others slowly, and others become cheaper altogether. Therefore, to calculate changes in prices, economists take as a basis a set of goods (a basket of goods), and then compare the previous value of this set with its current value.

Unfortunately, the problems do not end there, because the consumption pattern changes (for example, last year people bought more bread and groceries, and this year they prefer fruits and vegetables), and it is not at all clear which basket to consider when calculating.

In this regard, two basic approaches are possible:

The first approach is to look at how much a certain consumer basket cost in the base year and compare it to the cost of the same basket in the reference year. The result is the Laspeyres Price Index (PL) Its formula:

$$P_L = \frac{\sum p_i q_0}{\sum p_0 q_i}$$

where
 p_i - price of the i-th good in the set of goods of the base year;
 q_i - quantity of the i-th product in the reporting year.

The second approach is to look at how much a certain consumer basket cost in the reporting year, and compare it with the cost of the same basket in the base year. The result is the Paasche price index (Pp). Its formula is:

$$P_p = \frac{\sum g_i^* q_i}{\sum p_0 q_i}$$

g_i^* - quantity of the i-th product in the set of goods of the reporting year;

pt - price of the i-th product in the base year; pt - price of the i-th product in the reporting year.

Let's take a conditional example. Consumers buy two goods: meat and fish. In a certain base year meat cost 5 rubles, and fish - 3 rubles per kg. In this case 10 kg of meat and 8 kg of fish were bought. In the reporting year the price of meat increased to 10 rubles, and fish - to 4 rubles. As a result, the consumption of meat decreased to 9 kg, and the consumption of fish increased to 11 kg. Let us make a table:

	Reference year	Reporting year
The price of meat	5 rubles.	10 rubles.
The price of fish	3 rubles.	4 rubles.
Meat consumption	10 kg.	9 kg.
Fish consumption	8 kg.	11 kg.

Let us first calculate the Laspeyres price index. The goods basket of the base year included 10 kg of meat and 8 kg of fish. It cost 74 rubles (5 rubles - 10 kg. +3 rubles. 8 kg. =74 rubles.). In the reporting year the same basket cost 132 rbl. (10rub.-10kg.+4rub.-8kg.=132 rbl.). Consequently, the Laspeyres index is:

$$P_L = \frac{10 * 10 + 4 * 8}{5 * 10 + 3 * 8} = \frac{132}{74} = 1.78$$

In other words, according to Laspeyres, prices increased 1.78 times, or 78%.

Now let's calculate the Paasche price index. The goods basket of the reporting year includes 9 kg of meat and 11 kg of fish. In the base year it would cost 78 rubles (5 rubles -9 kg +3 rubles -11 kg = 78 rubles). In the accounting year the same basket would cost 132 rubles (10 rubles -9 kg +4 rubles -11 kg=134 rubles). Thus, the Paasche index equals:

$$P_P = \frac{10 * 9 + 4 * 11}{5 * 9 + 3 * 11} = \frac{134}{78} = 1.72$$

Consequently, according to Paasch, prices have risen 1.72 times, or 72%. Which of the two indices is "correct"? It is impossible to say for sure.

The Laspeyres index is thought to overestimate price growth, while the Paasche index, on the contrary, takes it. Therefore,

sometimes to calculate changes prices

use index Fisher index (PF), which is the the geometric mean of the Laspeyres and Paasche indices:

In Russia, the consumer price index, i.e., the price of goods purchased by households for non-productive consumption, is usually used to measure inflation. It is calculated by the Laspeyres formula.

Russian inflation is discussed in detail in paragraph 6 of this topic. In terms of the rate of inflation are distinguished:

- (a) creeping inflation (prices rise by less than 10% a year);
- 6) galloping inflation (does not has strictly quantitative framework);
- c) hyperinflation (price increases of more than 50% per month for at least three consecutive months).

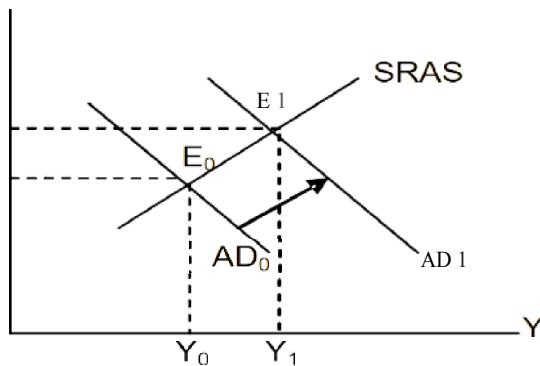
Hyperinflation is especially dangerous for the economy. Its consequences will be discussed in section 3 of this paper.

2. Causes of inflation

There are three main causes of inflation, respectively three types of inflation: demand-pull inflation, cost-pull inflation, and inflationary expectations inflation.

With demand-pull inflation, prices rise because aggregate demand increases in the economy (Figure 5-1):

Figure 5-1. Inflation caused by an increase in demand

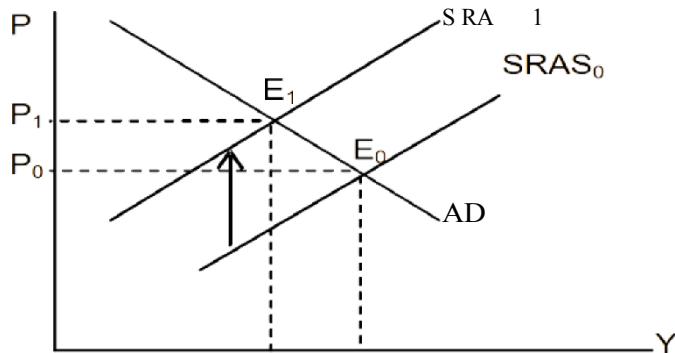


Initially, the economy is in short-run equilibrium at E_0 . An increase in aggregate demand shifts the AD curve to the right to the AD_1 position, resulting in short-run equilibrium at E_1 . GDP increases (from Y_0 to Y_1) but so do prices (the price level increases from P_0 to P_1).

Usually the root cause of demand inflation is an increase in government spending and printing money to cover it. As a result, the growth of the money supply outpaces the increase in the stock of goods - real GDP - and inflation begins.

In cost-push inflation, prices rise because producers' costs increase (Figure 5-2):

Figure 5-2. Inflation caused by rising costs



The primary cause of such inflation is a rise in the price of basic inputs. Suppose wage rates or energy and transportation tariffs rise. Costs per unit of output increase for all firms, firms increase

prices, and the short-run aggregate supply curve moves up from the SRAS position to the SRASI position. As a result, the macroeconomic equilibrium moves from t. E₀ to t. E_i. The economy experiences **stagflation** - a combination of falling output (GDP fell from Y₀ to Y_i) and inflation (the price level rose from P_t to P_i).

In **inflation-induced inflation**, prices rise because both producers and consumers expect them to rise. This is a variant of cost-push inflation. As in the previous case, the inflationary process occurs due to an upward shift of the aggregate supply curve. However, the reason for this shift is rising inflation expectations caused by the recent experience of inflation. The fact is that when prices rose last year, firms and their employees form stable expectations of price increases this year as well. Therefore, firms raise their prices in advance so as not to lose out in the inflationary race. Workers, for their part, demand higher wages in advance, so that their real incomes do not fall due to higher prices. As a result, inflationary expectations become a reality: prices do rise.

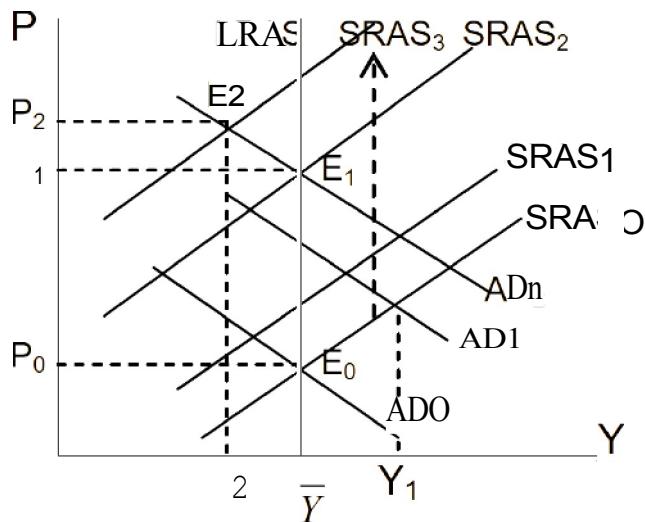
The famous American economist R. Solow wrote on this subject:
 "Maybe inflation is indestructible because we expect it, and we expect it because it has been."

At the same time, inflationary expectations do not arise out of nothing, but amplify objectively occurring processes: inflation caused by an increase in demand or inflation caused by rising costs. For example, the government stimulates aggregate demand, which causes prices to rise. The government, frightened by inflation, decides to fight it by restraining aggregate demand. However, firms and their workers are already used to inflation and expect it to continue. They raise prices and wages in advance, which leads to further inflation.

Graphically, this can be shown as follows. Let at first the long-term initial equilibrium be established at t. E₀ in Fig. 5-3. Then the state

stimulates aggregate demand, which shifts curve AD to the right from the position AD to the position AD_i:

Figure 5-3. Inflation caused by inflation expectations



At first, it is possible to increase GDP from \bar{Y} to Y_1 . But now the economy is overstretched, and the short-term aggregate supply curve begins to shift upward from the SRAS₁ position to the SRAS₃ position. The state, however, continues to increase aggregate demand in order to prevent GDP from falling, and the AD curve shifts to the AD_n position. Eventually, the equilibrium is established at E₂, which means that prices rise to the level of P_2 . The government decides to fight inflation by restraining the growth of aggregate demand. However, firms and their workers are already used to inflation and expect it to continue. They raise prices and wages in advance. Then the aggregate supply curve shifts to SRAS₂, while the AD curve no longer shifts. A temporary equilibrium is established at point E₁ with GDP Y_1 and the price level P_1 . Stagflation arises.

All three of these causes of inflation can be seen using the quantitative money theory equation: $MV=PY$ (topic 3, item 1).

$$\text{Hence: } - \frac{MV}{Y}$$

In other words, the higher the price level, the higher the: a) greater the money supply in the economy (M), b) higher the velocity of money (V), c) less GDP (Y).

An increase in the money supply means inflation caused by an increase in demand (more money means higher aggregate demand), while a fall in GDP means inflation caused by an increase in costs (more costs means less output). Finally, an increase in the velocity of money can mean both inflation caused by an increase in demand and inflation caused by inflationary expectations. The latter is explained as follows: when people expect prices to rise, they tend to get rid of money as quickly as possible by spending it on goods or currency. The circulation of money accelerates, and prices rise.

One of the leading schools of modern economic thought is the monetarist school. When analyzing the causes of inflation, monetarists bring to the forefront a change in the amount of money in the economy. The conclusion made by the leader of this school M. Friedman is as follows:

"Inflation is everywhere and everywhere a monetary phenomenon. Usually it starts with the issuance of money to cover increased government spending (the government seeks to support domestic production, increase salaries to state employees, pay social benefits, etc.). Soon prices begin to rise, which devalues the payments. The state, giving in to the demands of budget recipients, continues to emit, etc. As a result, economic agents form stable inflationary expectations, based on past experience, and inflation "begins to feed itself."

3. The economic consequences of inflation

We often attribute to the effects of inflation something that is not inflation. We hear, for example, that inflation makes people poorer because they can buy fewer goods with the same salary. In fact, this is not entirely true, because higher prices translate into profits for producers and sellers. It should not be forgotten that if someone has paid

If someone else has received more money for a product than before, then someone else has received that money. In other words, income also increases because of inflation, although, of course, not for everyone equally.

In reality, the consequences of inflation depend on whether it is predictable (economic agents know in advance approximately how prices will rise) or unexpected. In the first case, the damage from inflation will be less because decisions are made under conditions of certainty. Even then, however, there are certain societal losses from inflation.

A. **The cost of predictable inflation**

1. First of all, inflation leads to a special **inflation tax**. This tax is paid by those who keep money in their hands and current accounts, because the purchasing power of money decreases. On the other hand, the state, by printing money, receives additional income, called "**senorage**". In countries experiencing hyperinflation, senorages are a major source of government revenue.

2. Trying to avoid the inflation tax, people begin to open interest-bearing time accounts in banks or buy foreign currency. But then they have to visit a bank or exchange office more often to complete transactions. The resulting cost in time and effort is known as **the "cost of stepping on shoes**.

3. The next type of inflation cost is related to the fact that inflation forces firms to change price lists, price tags, etc. more often. All this costs money, and this kind of cost is called "**menu cost**". It is the desire to avoid menu costs that prompts Russian firms to set prices for expensive goods not in rubles, but in "conventional units".

4. Another type of loss from inflation is related to the peculiarities of the tax law. Additional profits received

due to inflation, is taxed at the same rate as ordinary profits. As a result, firms actually incur increased tax liabilities. Suppose the firm's costs are 100 rubles, and the proceeds from sales are 200 rubles. Then our profit is 100 rubles. Suppose the profit tax rate is 50%. Consequently, profit after tax is 50 rubles. Suppose prices have doubled since we incurred the costs, and now the revenue is 400 rubles. Then the firm's profit will be 300 rubles (400-100), and after-tax profit will be 150 rubles. At first glance, the net profit increased. But the firm to continue business necessary to re-purchase raw materials, supplies, labor, etc., and all this now also costs twice as much. Consequently, from the net profit to take 100 rubles only to maintain production at the same level. The firm has 50 rubles at its disposal, as before, but taking into account the growth of

The purchasing power of this money has fallen by exactly half.

5. The next type of cost is simply the inconvenience of living with changing prices, because all calculations and comparisons are difficult. It is constantly necessary to clarify in what year prices this or that calculation is made.

B. The cost of unanticipated inflation

Under the conditions of expected inflation, economic agents have the opportunity to reduce their losses by adapting to it in advance. Firms can, for example, raise the prices of their products, and employees can demand wage increases proportional to inflation expectations. Unanticipated inflation offers no such opportunities. Thus, unanticipated inflation undermines the market mechanism for allocating resources and products, and therefore the cost of inflation is markedly higher than that of expected inflation. Among its costs are:

1. A sharp depreciation of the monetary savings of firms and the population. In particular, enterprises have depreciated depreciation funds, which undermines the reproduction process.

2. The redistribution of wealth from creditors to debtors. The point is that when lenders lend money, lenders are guided by the real interest rate they want to receive. As we remember (topic 3, item 1), the real interest rate (d) is obtained by subtracting the rate of inflation (n) from the nominal interest rate (i):

It follows that the nominal interest rate is the sum of the real interest rate and the inflation rate:

$$i = d + n$$

The latter notation is known as the Fisher equation. It implies that the nominal interest rate depends on the real interest rate and the rate of inflation: if prices rise by 1%, the nominal rate also rises by 1%. This relationship between the inflation rate and the nominal interest rate is called "the Fisher effect."

At the same time, when entering into a loan agreement, the parties do not yet know what the price increase will be, and therefore, when negotiating the nominal interest rate, they are guided by their inflation expectations. Thus, Fisher's equation takes the form of:

+ unit

where he LIVELY inflation.

As a result, if the nominal interest rate is fixed in the contract, and actual inflation was higher than expected due to unforeseen inflation, the real interest rate is reduced in comparison with the estimated rate. The latter means that the borrowers win at the expense of the lenders - the loans were taken with "expensive money" and given back "cheap ." The gap between expected and actual real

' So one of the sources of the rapid enrichment of the so-called 'new Russians' was that in those years, when prices increased manifold, they received government loans, for example, at 20% per annum.

interest rate, arising from unexpected inflation, destroys the credit system.

3. Redistribution of wealth from people with fixed incomes (pensioners, workers with wages fixed by contract, etc.) to those whose incomes are flexible in response to price changes.

4. The increase in investment risks, respectively, a reduction in investment.

The costs of hyperinflation are especially high. Such inflation completely destroys the economy, making any business planning impossible. Firms stop investing because they do not know what the prices of goods and resources will be even in a few months. Consumer demand is distorted by the population's desire to invest in durable goods, bought "for keeps," and in currency. Production is displaced by speculation. Worst of all, in hyperinflation, money ceases to fulfill its role as a means of payment. Nobody wants to sell anything for money, depreciating every day.¹ Normal monetary settlements are displaced by barter transactions, making exchange many times more difficult. The flight from money begins, further fueling inflation. As economists say, 'inflation begins to feed itself.'

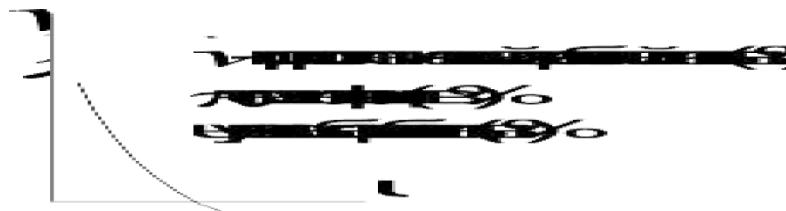
It is very difficult to stop hyperinflation. It requires drastic restraints on government spending and tight control of the money supply, carried out with determination and without regard for the complaints of those who feel they suffer more from such policies than their neighbors.

4. Inflation and Unemployment. The Phillips Curve

The famous American economist M. Friedman gave his own, very witty definition of hyperinflation: "If a man, going to the store, carries a bag of money on a cart, then forgets the cart with the money at the entrance to the store, and when he returns, finds that the cart is there, but the money is gone, it is inflation. If he discovers the money is there and the cart is gone, that's hyperinflation."

In 1958 the English economist O. Phillips drew a curve showing the inverse relationship between the unemployment rate and the rate of annual growth of nominal wages in Great Britain (Fig. 5-4):

Figure 5-4. Phillips curve



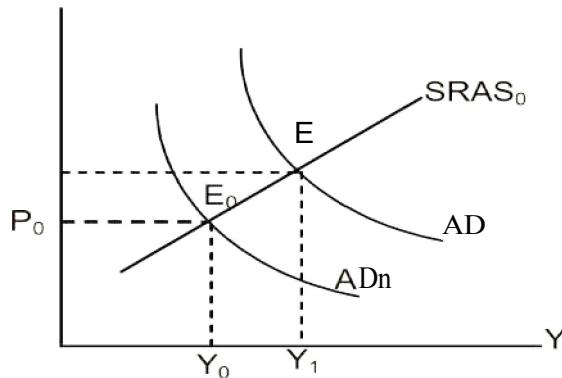
Later, in order to analyze this relationship, the inflation rate began to be plotted along the Y-axis. This distinction is not of fundamental importance, because the growth rates of nominal wages and inflation are closely

RELATED.

So the Phillips curve suggests that unemployment can be reduced in the short run by increasing the rate of inflation. Something similar we have repeatedly observed in the post-Soviet history of Russia in the 1990s, when increasing government spending and printing more money temporarily contributed to the growth of production and reduction of unemployment, while spurring inflation. Conversely, tight fiscal and monetary policy allowed to slow inflation, but at the expense of rising unemployment.

We can theoretically justify the Phillips curve by relying on an ascending aggregate supply curve. Suppose the economy is in short-term equilibrium at E_0 with GDP Y_0 and the price level P_t (Figure 5-5):

Figure 5-5. Changes in prices and GDP



The state wants to reduce unemployment by stimulating aggregate demand, which leads to a rightward shift of the AD curve to the AD_i position. In the short run, the equilibrium is set at E_i, which means an increase in GDP accompanied by an increase in prices. An increase in GDP with a given production function means an increase in employment, hence a decrease in unemployment. In other words, a reduction in unemployment is combined with inflation.

The modern interpretation of the Phillips curve states that the rise in prices DEFINITELY ABOUT:

- expected inflation;
- the deviation of unemployment from its natural level, i.e. cyclical unemployment;
- supply shocks (changes in the prices of fuel and energy resources, changes by the state in the minimum wage, the introduction of state control over prices, etc.).

This can be expressed by an equation:

$$\pi = \pi^e - \beta(u - u^*) + \varepsilon,$$

where π - Inflation rate, π^e - Expected rate of inflation, β - parameter showing the sensitivity of inflation to a decrease in unemployment, u

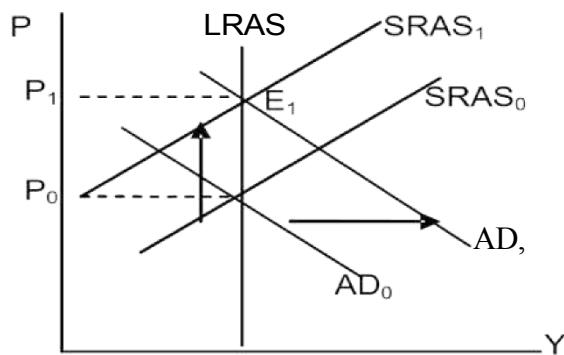
- actual unemployment rate, u - natural rate of unemployment, e - parameter reflecting the impact of supply shocks on inflation.

This equation shows that the inflation rate will be the lower the greater the excess of unemployment over its natural level and vice versa.

In other words, it is possible to fight unemployment in the short run by allowing inflation to increase by stimulating aggregate demand. To do this, however, it is necessary that actual price growth always outpaces expected inflation. Such a condition is difficult to enforce over the long run, because expectations adjust to reality.

If inflation expectations correspond to actual price increases, however, the unemployment rate does not decrease. In the AD-AS model, this corresponds to a situation where the short-term aggregate supply curve shifts upward to the same extent as the aggregate demand curve (Figure 5-6):

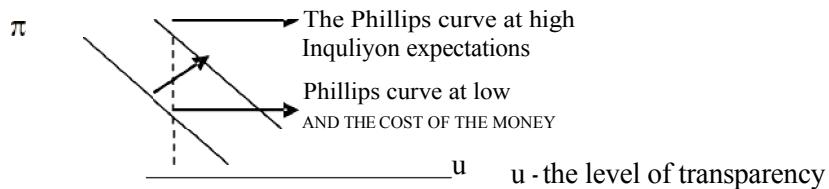
Figure 5-6. Price growth with constant GDP



Let the initial equilibrium GDP be equal to the potential GDP at t. E₀. Rising aggregate demand shifts the AD curve to the right. However, workers expect inflation in advance, and therefore demand a corresponding wage increase in advance. Firms increase their costs per unit of output, and the short-run aggregate supply curve shifts upward simultaneously with the shift of the aggregate demand curve. As a result, the macroeconomic equilibrium shifts from t. E₀ to t. E₁, and we have only higher prices with the same level of production and unemployment.

Thus, in the presence of inflationary expectations, the Phillips curve shifts to the right upwards (Fig. 5-7):

Figure 5-7. Phillips curve shift



This shift in the Phillips curve means that for every percentage drop in unemployment, society has to pay the price of higher and higher rates of inflation.

In the long run, there is no "inflation-unemployment" alternative: unemployment returns to its natural level at any price. At the same time, many countries have long faced the problem **of stagflation** - a combination of high unemployment and high inflation.

One of the theoretical foundations for combating it is the concept of **"supply-side economics.** Its proponents believe that state economic policy should be aimed not at maintaining aggregate demand according to Keynesian recipes, but at stimulating aggregate supply. Measures of such a policy include tax cuts, maintaining competition, programs of retraining workers to meet the requirements of technological progress, etc. In Russia, in addition to the above, some economists propose to support the most technologically advanced and promising industries, while others propose further liberalization of the economy, development of market mechanisms, and creation of favorable conditions for investors, both domestic and foreign.

Successful policies to stimulate aggregate supply increase the productive capacity of the economy with a shift of the long-run AS curve to the right. This, in turn, stimulates employment without an increase in prices or with a moderate increase in prices. The problems of inflation and unemployment are thus solved simultaneously.

5. Inflation and Anti-Inflationary Policy in Russia

One widespread legend has it that the democratic reformers Ye.Gaidar, A.Chubais and their ilk robbed the people by introducing free market prices and not bothering to saturate the market with necessary goods. As a result, the sharply increased prices very quickly "ate" the many years of savings of the masses.

The conditional accusatory speech goes something like this: "I had 20 thousand rubles in my savings account, and I could buy two cars and a furniture set with it. But the Gaidar price reform led to the fact that now (in 1996-97) with this money you can't buy a kilogram of meat"!

Here is a good time to ask this accuser: If you could buy, then why didn't you? After all, the start date of the reform - January 2, 1992 - was announced in advance, and everyone was aware of the coming price increases.

The answer is simple: long before Gaidar and his team came to the government, people could not buy cars, headsets or anything like that with their savings, because these goods in the required quantities were simply not available in the Soviet trade. Let us give the following conditional example: there are 10 people, each of whom has 1000 rubles in their pockets, the product of interest to all of them costs the same amount, and each of them thinks that he can buy it. But this is only an illusion, because only one such product is produced and there is no way it will be enough for everybody. Thus, Gaidar did not take anything away from anyone, his free prices simply made explicit what has actually existed for a long time.

In the Soviet economy, the imbalance between the money supply and the commodity supply at state prices began to grow around the 1960s. In the 1970s it became significant, in the 1980s it became very significant, and the Gorbachev reforms of the late 1980s and early 1990s made it so large that it threatened the very existence of the economy. Thus, state control over the bulk of prices led to the fact that inflation was mostly hidden, manifesting itself primarily in ever-increasing deficits.

It is important to keep in mind that the adoption of Gaidar's radical reform was only possible when all attempts by previous Soviet governments to overcome latent inflation by saturating the market with necessary goods had failed. By mid-1991, the economy of the CCCP had become virtually unmanageable and was in a state of free fall with no sign of stabilization. The administrative control machine had broken down, and market mechanisms had not been launched.

The first step of reform - price liberalization in January 1992 - was, in fact, a step of desperation by a government that had no choice,

The leading role in the economy was played by the following people

The universal barterization of exchange. Enterprises did not want to sell anything at state prices. It was necessary to give money back its purchasing power and thus be able to control the economy.

The presence of a gigantic "monetary overhang" over the economy under the conditions of price liberalization naturally led to a one-time jump in prices: retail prices in January 1992 increased by 3.5 times, and wholesale prices - 5 times.

Thus, the roots of Russian reinflation were due to two deep economic disproportions. The first disproportion between monetary and the mass of goods, inherited from the Soviet era, which has already been mentioned. The second is the disproportion between the established Soviet non-market system and the structure of production and the needs of society in the new market conditions. During the transition to the market, it is discovered that a significant part of the production, to the production of which the national economy is adapted, is no longer needed, and all the solvent demand is directed to other products, which, naturally, is in short supply and the prices of which are therefore increasing.

In addition, inflation depends on the government's economic policy. A successful anti-inflationary policy implies the elimination of all three direct causes of inflation:

increase in aggregate demand, increase in producers' costs and formation of inflationary expectations. Thus, the choice of specific methods of anti-inflationary regulation is determined by the type and level of inflation. It should be taken into account that a decrease in inflation may be accompanied by the emergence of other serious macroeconomic problems - a drop in GDP, an increase in unemployment, etc. Nevertheless, in case of high inflation, such as the one that took place in Russia in the first half of the 90-x years of the last century, as well as after the crisis of 1998, anti-inflationary policy objectively becomes a priority. Such inflation in itself is a factor of production decline and unemployment.

The main directions of anti-inflationary policy are:

1. Control over aggregate demand. Here, first of all, it seems important to limit public expenditures - a tight fiscal policy. The latter should be accompanied by an appropriate monetary policy aimed at limiting the money supply and conducted by the Central Bank.

In particular, the beginning of the Gaidar price reform was fraught with great danger: rising prices could lead to a mass flight from money - a sharp increase in the speed of their circulation. And its consequence would be a further acceleration of inflation with its outgrowth into hyperinflation and, ultimately, the same economic paralysis. Therefore, the main priority of the initial stage of the reform was to strengthen the ruble by limiting the issue of money and government spending.

These actions made it possible to avoid hyperinflation: the rate of price growth began to decline rapidly. Subsequently, the anti-inflationary policy of the Russian governments was not always consistent: from time to time a noticeable increase in the money supply was allowed to overcome the crisis of non-payment by enterprises to each other and to stimulate aggregate demand. As a result, the rise in prices again intensified, at times reaching 30% per month.

At the same time, a very important instrument of anti-inflationary policy was the cessation of lending to the government by the Bank of Russia since 1995 to cover the state budget deficit. It was envisaged to cover the deficit by means of internal and external borrowings, i.e. without additional issue of money. Even earlier, the Bank of Russia had refused to issue "technical loans" to the republics of the former CCCP to pay for the products they bought from us. This "monetary compression" policy reduced price growth by counteracting demand-driven inflation. At the same time, it led to a rise in non-payments, causing higher costs for enterprises, hence

- to cost-induced inflation.

2. Another direction of anti-inflationary policy is to stimulate aggregate supply. In the West supporters of the theory "supply-side economics" advocate tax cuts for

STEAM LEADERSHIP OF B U S I N E S S , WHAT SHOULD BE DONE

the aggregate supply curve to the right. In addition, a policy of price and income regulation is used to deal directly with cost-induced inflation. Under this policy, the government, in consultation with labor unions and entrepreneurs, sets limits on price and wage increases in a given year. The aim is to prevent the development of uncontrolled

"inflationary spiral": price increases - wage increases - new price increases - wage increases again, etc.

In Russia, a permanent "anti-inflationary anchor" aimed at limiting inflation caused by rising costs is the state regulation of prices for products of natural monopolies

- tariffs of OAO Russian Railways, prices for electricity, gas, utilities, etc. In addition, after the August (1998) crisis an agreement between the largest enterprises to freeze prices for their products was in effect for some time.

3. The most important means of anti-inflationary policy is to overcome inflationary expectations. Here it is necessary for economic agents to really believe in the seriousness of the state's intentions to curb inflation by reconstructing their own behavior accordingly. In the absence of inflationary expectations people do not want to get rid of their money as quickly as possible, and the speed of money slows down. Under such conditions, even an appreciable increase in the money supply does not lead to the growth of prices' at all or is accompanied by a very moderate inflation, as we observe in Russia, for example, in the early 2000s.

In our country in the second half of the 1990s, the role of the "In the fight against inflation caused by inflation expectations, the so-called "currency corridor" was quite good, when the Central Bank announced for the year ahead the limits of the dollar's exchange rate increase. This gave the economy a sense of certain inflationary stability, at least for the short term. And the situation of the early 2000s, when the ruble strengthened against the dollar, also contributes to overcoming inflationary expectations.

Sufficiently successful anti-inflationary policy led to the fact that up to the second half of 1998 the annual inflation rate in our country, calculated through the consumer price index, steadily decreased (Table 5-1):

Table 5-1. Consumer price growth in Russia (in relation to the previous year)

Years	1992	1993	1994	1995	1996	1997	1998	1999
Growth prices	by 26,1 times	by 9,4 times	by 3,2 times	by 2,3 times	at 21,8%	at 11,7%	at 84,4%	at 36,5%

Recall the formula $= \frac{MV}{Y}$ derived from the quantitative equation of the theory of money. It shows that if the growth of the parameter M is neutralized by a decrease in the parameter U , the price level can remain the same.

Years	2000	2001	2002	2003	2004	2005
Growth prices	at 20,1%	at 18,8%	at 15,1%	at 12,0%	at 11,7%	at 10,9%

The sharp depreciation of the ruble after August 1998 led to a significant increase in prices. On the one hand it was inflation caused by rising costs, as imported raw materials, components, etc. became more expensive. On the other hand, inflation caused by an increase in demand, as imports fell, international competition weakened, and demand for products of import-substituting industries increased. As always, inflation expectations also played their role: firms raised their prices in advance, aiming for their higher level in the future.

In 1999-2003, the government and the Central Bank managed to bring inflation under control and achieve a gradual slowdown. This was facilitated by limiting government spending and the Bank of Russia's moderately tight monetary policy.

Since 2003, however, the decline in inflation has practically stopped. One reason is that because of high world oil prices Russia has a large trade surplus (an excess of exports over imports), which causes an inflow of foreign currency into the country. In such a situation, the Central Bank faced a dilemma: to remove the dollar exchange rate, undermining our net exports,¹ or to buy foreign currency, increasing our gold and currency reserves. The Central Bank took the second path. By buying currency, the Bank of Russia issues additional rubles into circulation. This issue leads to a high rate of growth of the money supply in the economy, respectively, to demand-driven inflation.

Another source of such inflation is not the activity of the Central Bank, but the government itself, which receives super profits from high oil prices and partially transforms these revenues into its own

¹ The higher the ruble's exchange rate against the dollar, the more expensive our goods compared to foreign ones, the lower our exports and the higher our imports (Topic 3, item 1)

additional expenditures - mainly on defense, increases in salaries and pensions, monetization of benefits, and a number of others.

At the same time, the government does not direct the bulk of its super incomes to the economy, but accumulates them in the state stabilization fund. Thus, the Stabilization Fund is now the most important instrument of anti-inflationary policy.

Other factors play no less of a role in modern inflation. The Bank of Russia constantly emphasizes that it can only influence the core inflation or inflation that depends on the money supply in the economy. Meanwhile, such inflation was responsible for about half of the total price growth in 2005. The rest of the price increase was due to other causes, primarily cost-push inflation. The latter is closely linked to the increased tariffs of natural monopolies - PAO UES of Russia, Gazprom and OAO Russian Railways, as well as tariffs for public utilities. According to the calculations of government experts, each percentage increase in the tariffs of natural monopolies leads to an increase in prices by 0.1% on an annualized basis.

At the same time, we should not forget that inflation in Russia has deep roots due to the peculiarities of the transition period. These are, first of all, the imbalances accumulated in the economy for many years, the lack of effective owners in many enterprises, as well as the lack of a competitive market environment. Therefore, long-term anti-inflationary policy in our country implies structural reforms aimed at creating a banking system capable of providing affordable credit, overcoming monopolism and corruption at all levels, improving bankruptcy procedures to cull bad enterprises, and protecting property rights.

SELF-STUDY ASSIGNMENTS

1. The price level in this country in 1995 was taken as 100. In 1999 the price index was 342, and in 2000 it reached 411. By how much did prices increase in 2000 compared to 1999?

2. There is data on the growth of consumer prices in Russia in each year compared to the previous year:

Years	1998	1999	2000	2001
Price Increase	84.4%	At 36.5%.	by 20.1%	18.8%

Calculate by how much the prices have risen in those four years.

3. The economy produces three goods. There is data on their prices and consumption in the base year and the reporting year:

	Product A		Product B		Merchandise Q	
	Price	Consumption	Price	Consumption	Price	Consumption
Baseline year	6	100	8	150	16	200
Reporting	5	120	10	140	18	180

Calculate the rate of inflation using the Laspeyres and Paasche indices, and explain the differences in the results.

4. Consumers spend their income on goods (60% of income) and services (40% of income). During the past year, goods increased in price by 20%, and services became 15% cheaper. What is the total consumer price index?

5. In the past year, the money supply in the economy grew by 10%. At the same time, the velocity of money fell by 2%, and GDP increased by 3%. Using the quantitative money theory equation, calculate the annual rate of inflation.

6. The aggregate demand curve is given by the function: $\frac{5M}{P}$, where M money supply equal to 1,000. The potential GDP is 5,500. The short-term aggregate supply curve is horizontal and the price level is 1.

Explain whether the economy is in long-term equilibrium. If the money supply is increased to 1200, what will GDP and the price level be in the short run and long run? What will the inflation rate be?

7. Explain what effect an unexpected 10% inflation would have on the economic situation of the following individuals:

- (a) A pensioner;
- 6) shopkeeper;
- c) a person living on the interest on government bonds; d) a farmer with substantial debts in rubles;
- e) an employee who is a member of a strong trade union.

8. Phillips curve equation: $n = n' - b(u - 1) + e$, where

$$n^e = 9\%, b = 2, t^e = 6\%, e = 0.$$

Struggling c inflation, the government reduced its spending,

which brought unemployment to 9%. What was the resulting inflation rate?

9. The national economy is described by functions:

$$n = p' + 0.8(Y - Y_0)/Y \text{ and } U = t^e - 0.33(Y - Y_0)/Y,$$

where n is the actual inflation rate, n' is the expected inflation rate, U is the actual GDP, Y_0 is the potential GDP, U is the actual unemployment rate, t^e is the natural rate of unemployment.

- 1) Explain the economic meaning of these functions;

- 2) Derive a function from here that is a mathematical description of Oaken's law, define the parameter § and explain its economic meaning;
- 3) Derive the Phillips curve equation and explain that it expresses.

10. The Phillips curve is given by the equation: $n=n.i-2(u-0.05)$, where $n.i$ is last year's inflation rate.

- 1) How much should unemployment increase from its natural level for inflation to fall by 2 percentage points compared to the previous year?
- 2) What would happen to GDP according to Oaken's law if the coefficient of deviation is 2.5?
- 3) By how many percentage points would inflation increase if the government succeeded in reducing unemployment by 2 percentage points over the natural rate?

TEMA 5. FIRM

1. The Firm in a Market Economy
2. Types of firms
3. Joint-stock companies and peculiarities of their functioning

1. The Firm in a Market Economy

Beginning with this topic, we begin our study of issues related to production. In any economic system, production is carried out by a multitude of enterprises. Under market conditions, the enterprise (firm) is the primary, independent subject of economic activity.

To produce anything, you need resources. Resources belong to people. Some people own their labor, others own the means of production (capital), others own natural resources, and still others have the gift of enterprise. People combine their resources in a single firm for joint production activities. The enterprise (firm) is an institutional formation of the market economy, designed to coordinate the decisions of the owners of the factors of production.

This raises the question of why firms that pool resources belonging to many people are needed at all. The question is not as naive as it may seem at first sight. This question was first raised and answered in 1937 by the American economist R. Coase, who later became a Nobel Prize winner.

In a market economy, the market coordinates the relationships between firms by means of voluntary agreements between buyers and sellers based on the mechanism of supply and demand. As early as A. Smith showed (theme 2, clause 1) that the market forces individual economic agents to act in the interests of the general welfare. But if the mechanism of market interrelationships is so effective, then why can't the economy exist in the form of a "continuous" market, where each person represented

would be a mini-firm? For example, an employee of a machine factory, performing some operation on an assembly line. But why can't he become a separate independent firm, buying the workpiece from his neighbor on the conveyor belt (or anyone else on the side), paying consulting engineers, and selling the product to the next worker-firm after the operation is completed?

P. Coase explained that market coordination does not come at no cost to society, but requires certain transactional costs - the costs associated with market transactions. These include:

- (a) The cost of finding information about suppliers and buyers, goods, prices, etc;
- b) the cost of negotiating and concluding contracts;
- c) the cost of contract enforcement and legal protection.

Obviously, in an economy where each worker is a separate firm, the burden of transactional costs will be exorbitant because of the huge number of microtransactions: any promotion of a product from one producer to another will have to be accompanied by negotiations on price, quantity and quality, contracting, etc.

To reduce transactional costs, firms are created that bring together many workers, owners of capital and natural resources. Of course, when a worker is hired, he is contracted on the basis of market relations. However, inside the firm, the coordination of interrelations between its constituent plants, workshops, brigades, individual workers is carried out not by the market, but by the administration on the basis of commands and orders. "The invisible hand of the market" (A. Smith) is here replaced by the quite visible hand of managers.

Thus, firms emerge in response to the costliness of market coordination; administrative coordination within small entities is cheaper. But transactional costs also exist within firms. These are the costs associated with intrafirm

planning, incentives, and controls. As the firm enlarges, such costs increase, and the firm begins to lose control.

One can also imagine such an extreme: the entire national economy is one giant, Soviet-style firm. There is no market coordination at all, the economy works on orders sent down from above. But now administrative coordination is more expensive than market coordination.

Conclusion: The optimal size of the firm is determined by the point at which transaction costs are minimal. If it is not reached (the firm is too small), then administrative coordination is preferable to market coordination, i.e. it is reasonable to merge several firms into one. If the optimal point is passed - the opposite is true.

Of course, in each industry the optimal size of the firm will be different, depending on the specific technological conditions.

2. Types of firms

The way the firm will act in the market, what will be the results of its activities depends not only on the size of the firm (the number of resources used), but also on who makes decisions in the firm, what goals it pursues and what responsibility in this case. In this regard, all businesses in a market economy can be divided into:

- a) private for-profit enterprises; b) private non-profit enterprises; c) public enterprises;
- d) mixed (private-public) enterprises.

Private commercial enterprises (organizations) are firms that pursue profit as the main goal of their activities. The activities of such enterprises are determined by the market.

Private non-profit (non-profit) enterprises (organizations) - enterprises that do not pursue as the main goal of their activity making profit. The latter does not mean that such

enterprises cannot make a profit at all. They are created to meet any public needs, and the extraction of profits by them is interpreted by law not as the main, but as a concomitant goal. At the same time, unlike commercial firms, non-commercial enterprises do not have the right to distribute profits among their founders. Private non-commercial enterprises are consumer cooperatives, public and religious organizations, charitable foundations, etc. Often, educational and medical institutions, recreation centers, etc. operate in the form of such enterprises.

State-owned enterprises can be either for-profit or non-profit. Usually the activities of such enterprises are determined by political decisions, not by the market.

In a market economy, most goods and services are produced by private commercial enterprises.

Private commercial enterprises may have the following organizational and legal forms: individual enterprise, general partnership, limited partnership, limited liability company, additional liability company, joint-stock company, production cooperative. Let us consider their peculiarities.

A sole proprietorship is created by a citizen who performs entrepreneurial activity without forming a legal entity as an individual entrepreneur. Such an entrepreneur is liable for his obligations with all the property belonging to him, with the exception of property that cannot be foreclosed on by law.

A general partnership is a partnership in which the partners engage in business activities on behalf of the partnership and are jointly and severally liable for its obligations with their property.

Limited Partnership partnership (partnership on fiduciary)

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The partnership has one or more investors (limited partners) who are jointly and severally liable for the partnership's obligations with their property. The latter do not engage in entrepreneurial activities and bear the risk of loss only to the extent of their contributions.

A limited liability company is a company, the authorized fund of which is divided into shares. Members of the company are not liable for its obligations and bear the risk of losses only to the extent of the value of their contributions.

Additional Liability Company - differs from the previous one by the fact that the liability of the participants is not limited to the value of their contributions, but extends to the rest of the property of the members of the company.

A joint stock company (AO) is a company whose share capital is divided into a certain number of shares. AO members (shareholders) are not liable for its obligations and bear the risk of losses only to the extent of their contributions.

A production cooperative is an association of citizens on the basis of membership for the joint conduct of any economic activity based on their personal labor participation and the pooling of property contributions.

3. Joint-stock companies and peculiarities of their functioning

Joint-stock companies can be of open and closed type.

A joint-stock company whose shareholders may alienate their shares without the consent of other shareholders shall be deemed an open joint-stock company. Such a company has the right to conduct an open subscription to the shares issued by it and their free sale. The law does not limit the number of shareholders of an open joint-stock company.

A joint-stock company whose shares are distributed only among its founders or other predetermined circle of persons shall be recognized as a closed joint-stock company. Such company has no right to conduct an open subscription for its shares or otherwise offer them for purchase to an unlimited circle of persons. The number of shareholders of a closed joint stock company according to the law of the Russian Federation "On Joint Stock Companies" shall not exceed fifty.

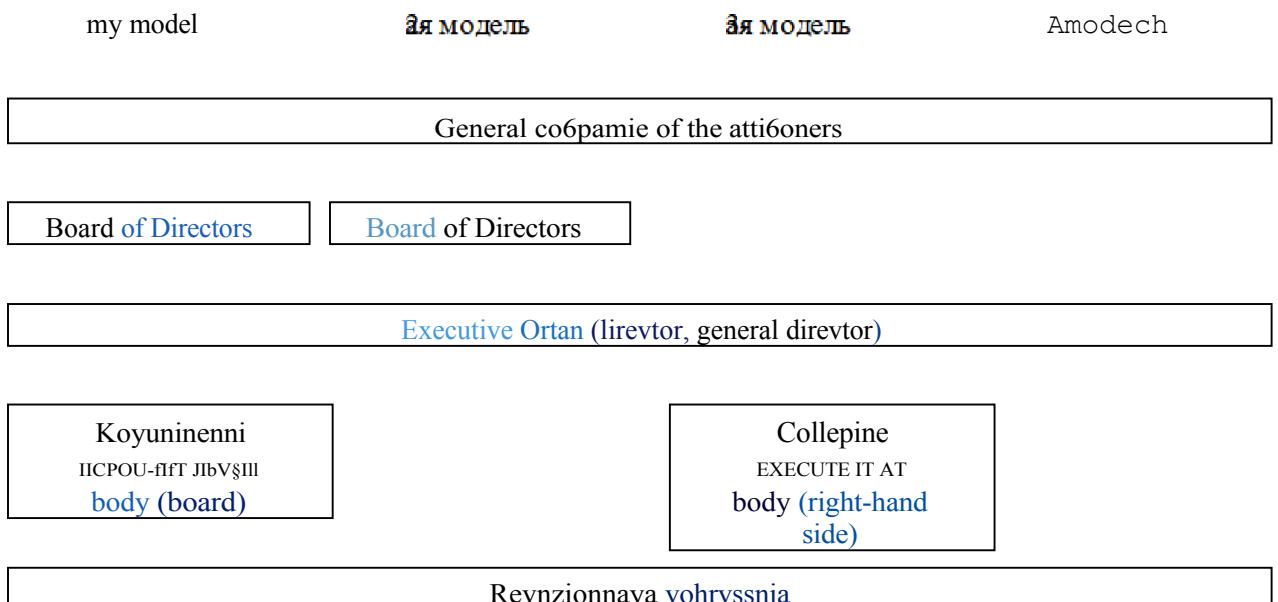
Shareholders of a closed JSC have a pre-emptive right to purchase shares sold by other shareholders. However, the implementation of this right is not regulated by the law. In practice, the charters of some companies stipulate the following norm: a shareholder wishing to sell shares, assigns his "offer price", at which a third party can buy them only in case of refusal of other shareholders or the AO itself. If the shares are not sold at the original price and the selling shareholder lowers the price, the AO's shareholders and the company itself can exercise their pre-emptive right again. And so on, up to the conclusion of the transaction.

The minimum amount of assets of an AO determines the authorized capital, which cannot be less than the amount stipulated by the law on joint-stock companies. The authorized capital is made up of the nominal value of the company's shares acquired by the shareholders.

The highest governing body of the AO is the general meeting of shareholders, where all decisions are made on the principle of one share - one vote. To supervise and control the activities of managers, the meeting elects the board of directors (supervisory board). Executive body of the company can be both collegial (board, directorate), and sole (director, general director). It manages the day-to-day operations of the company and is accountable to the board of directors and the general shareholders meeting. To control the financial and economic activities of the company, the general meeting elects the auditing committee.

In Russia four models of joint-stock company management are used (Scheme 5-1):

Figure 5-1. AO control models



As we can see, in the third and fourth models there is no board of directors (supervisory board). The sole executive body here is directly subordinated to the general meeting of shareholders, which performs the functions of the board of directors. If the first and second models can be used in all AOs, the third and fourth models can be used only in companies with the number of shareholders (owners of voting shares) less than fifty.

The first model strengthens the position of the chairman of the board of directors by weakening the influence of the sole executive body represented by the director (general director). The fact is that by law the director cannot be the chairman of the board of directors, and the members of the collegial executive body must not make up the majority of the board of directors.

On the contrary, in the second model there is no collegial executive body at all. As a result, this model does not impose any restrictions on the presence of the "management team" on the board of directors, which makes it possible to strengthen the influence of the executive branch.

The choice of the management model is a very important stage in the creation of the AO. Often the founders, without going into the peculiarities of this or that model, lose the opportunity to influence the decisions made by the company, even if they have a large block of shares.

From all of the above comes a number of features that distinguish AO from other forms of business organization:

- The shareholders are the legal owners of the company, to whom all profits belong. At the same time, the shareholders' liability is limited to the value of the shares they own;
- Limited liability allows the joint-stock company to attract the capital of a large number of persons who do not participate in the current management of the company. Thus, the joint-stock company is characterized by a separation of ownership from current management. The latter is carried out by hired managers;
- Property in a joint stock company easily changes hands through the alienation of shares.

For the reasons mentioned above, AO is the form of business organization that makes it possible to mobilize significant capital easily and in a short period of time. It corresponds most closely to large-scale production. That is why the bulk of production in a market economy is produced by joint-stock companies.

At the same time, a large joint-stock company also has its weaknesses. The larger the firm, the more difficult it is for the administration to subordinate the actions of individual employees and labor collectives to the interests of the firm. This requires an increasingly complex system of incentives and control. This problem does not exist in enterprises where the owner himself is the only employee, and any failure or success directly affects his financial situation.

There are also often problems in the relationship between shareholders and hired managers. Shareholders as owners of a firm are interested in a high and stable market value of their

shares, respectively, in maximizing long-term profits. Managers, on the other hand, seek to increase their salaries and enhance their prestige in the firm. Therefore, they may be interested in the growth of sales, bloating the staff of subordinates to the detriment of the profitability of the firm. Hence the problem of owners' control over managers.

In developed market economies, the best controller of managers' actions is the securities market (the stock market). If current or potential shareholders consider management to be poor, some begin to sell the firm's shares, while others refuse to buy them. As a result, the stock price begins to fall, which leads to the deterioration of the firm's financial position and usually brings a verdict of ineffective management.

The situation in Russia is different. Here the situation of enterprises is still much less dependent on the stock market, since the shares of most firms are not the object of transactions at all. On the other hand, legal protection of private property is still very weak: the existing laws allow managers or other persons to deprive owners of their property. And very often the conflict between managers and shareholders is only a form of manifestation of contradictions between majority (i.e. controlling the firm) and minority shareholders. Majority shareholders control the activities of managers or are top managers themselves and use their power to appropriate the property of small shareholders.

The ways of expropriation of property of both small and, in some cases, large shareholders are the conclusion of unprofitable for the enterprise deals with firms under the control of dishonest managers, withdrawal of assets from the AO in favor of subsidiary firms, artificial bankruptcy of quite viable enterprises. Therefore, the reform of the enterprise is very relevant today in our country,

designed to provide genuine protection investors,
to promote the formation of the institution of effective owners.

B this in this regard very poignant came to a head the question o of improving corporate management. You can't to say, that this exclusively Russian problem. In particular, a serious shock to world stock markets wasthe announcement ofthe bankruptcy

Enron, the largest в U.S. trader gasи electricity. K The collapse of the energy giant was caused by the machinations of its managers, which affected not only its shareholders, but entire sectors of the economy: energy, banking, insurance, and telecommunications.

In the most recent years, countries with developed market economies have adopted many corporate governance codes. Essentially, corporate governance is a set of rules and mechanisms governing the relationship between shareholders, the board of directors and managers of a company. The Organization for Economic Cooperation and Development formulated the basic principles of corporate governance in 1999. The principles are simple: fair treatment of shareholders, transparency of the company activities, accountability of directors and management and their responsibility to the shareholders. Transparency of business means timely provision of necessary information on the company's activities, its financial standing, the methods of managing the company, measures to protect the rights and interests of its shareholders and other investors.

Firms that behave honestly toward their shareholders now enjoy significant strategic advantages. For example, a study conducted by the well-known consulting firm McKinsey showed that investors are willing to pay more for the shares of companies that are characterized by transparent management and maintain reporting in accordance with global standards. The premium varies from country to country, ranging from 10-15% in Western Europe and the United States to 40% in Russia.

In July 2002, U.S. President D. Bush signed the Corporate Responsibility Act. According to this law, the heads of all companies whose shares are listed on stock exchanges are obliged to certify financial reports under oath. If a director refuses to swear to correctness of the accounting data, he can go to prison for 5 years and pay a fine of \$500 thousand. If the director is found guilty of deliberate certification of false information, the term of imprisonment increases to 10 years, and the fine - up to \$1 million.

In our country back in the 90s of the last century there was almost no talk about corporate governance. Today this problem is gradually coming to the forefront.

In April 2002, the Federal Commission for the Securities Market introduced the Code of Corporate Conduct for domestic joint-stock companies. The Code contains a set of rules to be followed by large joint-stock companies with more than a thousand shareholders. This voluminous document prescribes basic management principles and key points of AO activity, such as rules of meetings of shareholders, rights and obligations of the board of directors, rules of information provision, etc. At the same time, amendments to the Criminal Code of the Russian Federation were adopted, which introduced responsibility of company managers for providing shareholders and other investors with unreliable information.

In March 2003 the National Council on Corporate Governance was established. It is designed to analyze the corporate governance situation, improve the relevant legislation, apply it in practice, and compile corporate governance quality ratings.

At present, a limited number of Russian firms, mostly the largest and best-known ones, are engaged in improving the quality of corporate governance to achieve greater transparency. But they are not without fault either. For example, according to international estimates

The average level of disclosure in our business was 34%. 42 leading Russian companies, the average level of information disclosure in our business was 34%. In other words, firm managers provide shareholders with only one-third of the information they need. This is significantly lower than in leading companies in developing Asia, not to mention Japanese, American and European firms.

Nevertheless, positive shifts are evident here: the levels of management, financial planning, etc., have increased significantly in recent years. The attitude of managers to investors is also improving: openness of management is becoming fashionable. This process is very controversial. For the majority of Russian companies transparency remains a fashionable game to cover up misinformation of both investors and society. Nevertheless, for a number of businessmen an open information policy becomes a necessary condition for attracting new shareholders, especially foreign ones, and, consequently, a means for increasing the market value of their companies.

SELF-STUDY ASSIGNMENTS

1. What is the relationship between optimal firm size and the presence of transaction costs? Explain.

2. Let's say you have decided to start your own business. What form of business would you choose? Why?

3. Analyze the different models of managing a joint stock company. How is power distributed in the AO when they are used?

4. Why do conflicts between shareholders and managers of AOs arise and what are their manifestations? What are the Russian specifics of conflicts within AOs?

5. What does transparency in corporate governance mean? Justify its necessity from the perspective of micro- and macroeconomics.

TEMA 6. THEORY OF PRODUCTION

1. Production function
2. Production in a short period of time
3. Production in the long term

1. Production function

Production is any human activity to transform limited resources - material, labor, natural resources - into finished products. The production function characterizes the relationship between the amount of resources used (factors of production) and the maximum possible amount of output, which can be achieved provided that all available resources are used fully and in the most efficient way.

The production function has the following properties:

- 1) There is a limit to the increase in production that can be achieved by increasing one factor and holding other resources constant. If, for example, in agriculture we increase the amount of labor with constant amounts of capital and land, sooner or later there comes a point when output ceases to grow;
- 2) Resources are complementary, but within certain limits they can be interchanged without reducing output. Manual labor, for example, can be replaced by the use of more machines, and vice versa;
- 3) The longer the time period, the more resources can be reviewed. In this regard, a distinction is made between instantaneous, short, and long periods. **An instantaneous** period is a period when all resources are fixed. Short period - a period when at least one factor is fixed. Long period - a period when all resources are variable.

Usually in microeconomics we analyze a two-factor production function reflecting the dependence of output (q) on

the amount of labor (L) and capital (K) used. Recall that capital refers to the means of production, i.e., the amount of machinery and equipment used in production and measured in machine-hours (topic 1, item 3). In turn, the amount of labor is measured in man-hours.

As a rule, the production function in question looks like

So:

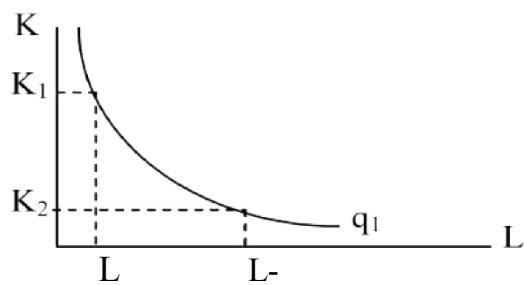
$$q = AK^n L^{\alpha} K^{1-\alpha},$$

where

A , n and α are given parameters. Parameter A reflects the influence of technical progress on production: if a producer introduces advanced technology, the value of A increases, i.e. the output increases with the same amounts of labor and capital. The parameters p and b are coefficients of output elasticity for capital and labor, respectively. In other words, they show by how much output changes when capital (labor) changes by one percent. These coefficients are positive, but less than one. The latter means that if labor increases with constant capital (or capital with constant labor) by one percent, output increases less.

On the other hand, the production function above suggests that a producer can substitute labor for capital and capital for labor, leaving output unchanged. For example, in agriculture in developed countries, labor is highly mechanized, i.e., there are many machines (capital) per worker. In contrast, in developing countries, the same output is achieved by a lot of labor with little capital. This allows us to construct an isocvant (Figure 6-1):

Figure 6-1. Isocvant

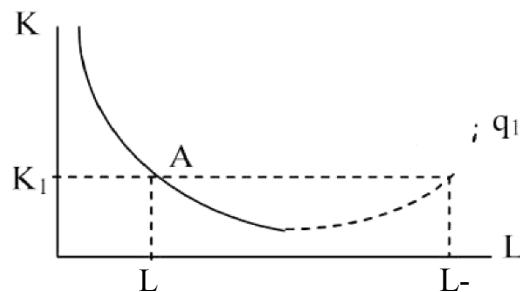


The isocvant (equal product line) reflects all combinations of the two factors of production (labor and capital) in which output remains constant. In Figure 6-1, its corresponding output is plotted next to the isocvant. Thus, output q_1 is achievable with L_1 labor and K_1 capital, or with L_2 labor and K_2 Capital. Other combinations of the amounts of labor and capital required to achieve a given output are also possible.

All combinations of resources corresponding to a given isoquant reflect technically efficient modes of production.¹ Method *A* is technically efficient compared to method *B* if it requires the use of at least one factor in smaller quantities and all others in smaller quantities compared to method *B*. Accordingly, method *B* is technically inefficient compared to *A*. Technically inefficient methods of production are not used by rational entrepreneurs and do not belong to the production function.

It follows from the above that the isocvant cannot have a positive slope, as shown in Fig. 6-2:

Figure 6-2. Technically efficient and inefficient production



The dotted line represents all technically inefficient production methods. In particular, in comparison with method *A*, method *B*, in order to ensure the same output (q_1), requires

¹ There are, therefore, many technically efficient ways of producing a given volume of production. Which of them will be chosen, i.e. recognized as economically efficient, depends on the prices of labor and capital. This will be discussed in the topic "Cost Analysis".

the same amount of capital, but more labor. Obviously, therefore, method *B* is not rational and cannot be taken into account.

Based on the isoquant, you can determine the maximum rate of technical replacement.

The marginal rate of technical replacement of factor Y by factor X ($MRTS_{xy}$) is the amount of factor Y (e.g., capital) that can be given up when factor X (e.g., labor) is increased by 1 unit so that output does not change (we stay on the same isoquant).

Consequently, the marginal rate of technical replacement of capital by labor is calculated by the formula:

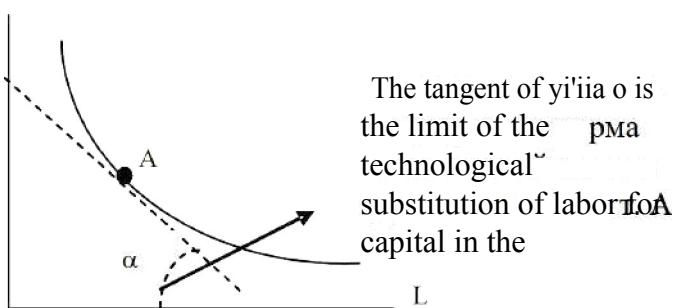
$$TS_{LK} = -\frac{\Delta K}{\Delta L}$$

For infinitesimal changes in L and K it is:

$$TS_{LK} = -\frac{dK}{dL}$$

Thus, the marginal rate of technical replacement is the derivative of the isoquant function at a given point. Geometrically, it represents the slope of the isocvant (Fig. 6-3):

Figure 6-3. Limit of technical replacement

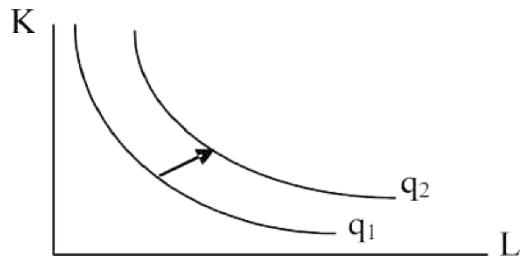


When moving from top to bottom along the isocvant, the marginal rate of technical replacement is constantly decreasing, as evidenced by the decreasing slope of the isocvant.

If the producer increases both labor and capital, it allows him to achieve more output, i.e. to move to a higher isoquant (q_2). The isocvant located to the right and above the previous one,

corresponds to a larger volume of output. The aggregate of isocvants forms an isocvant map (Fig. 6-4):

Figure 6-4. Map of isoquants



2. Production in a short period of time

Economists distinguish between short and long periods in the production process. In a short period, labor is considered a variable factor, and capital is considered a constant factor. This is due to the fact that a producer can change the amount of labor used quite easily and quickly by hiring additional workers or introducing overtime hours. He usually needs, however, considerably more time to increase capital, i.e., to acquire and set up additional equipment, expand production areas, etc.

In the short term, a distinction is made between gross, average and marginal product of labor.

Gross output (q) is simply another name for output. Average The product of labor (APL) is output divided by the amount of labor used.

$$\text{AP}_L$$

More often used is the concept of "labor productivity," which expresses the same thing.

The marginal product of labor (MPL) is the increment in output with one unit increment in the variable factor labor:

The marginal product of labor shows how much additional output an additional worker brings to the firm.

Suppose a producer, using a certain amount of capital, hires 10 workers and produces 100 units of output. In a short period, keeping capital the same, he hires one more worker, which leads to an increase in output to 108 units. Calculate the change in the average product of labor as well as the value of the marginal product:

L	q	AP	MR
10	100	10	
11	108	9,8	8

In our example, the amount of labor increased by 1 unit ($\Delta L = 1$), and output increased by 8 units ($\Delta q = 8$). Consequently, the additional worker provided an increase in production of 8 units. This is the marginal product of the eleventh worker.

If a firm increases capital with an unchanged amount of labor, then the marginal product of capital (MPC) is the increment in output with one unit increment in capital:

$$\Delta K$$

If the production function is given in the form of an equation, then in order to calculate the marginal products of labor and capital we must take the partial derivatives of the production function for labor and capital, respectively. In this case:

$$MP_L = q_L = \frac{\partial q}{\partial L} \quad \text{and} \quad MP_K = q_K = \frac{\partial q}{\partial K}$$

At any point on the isoquant, the marginal rate of technical substitution of capital for labor is equal to the ratio of the marginal products of labor and capital:

$$MRTS_{LK} = \frac{MP_L}{MP_K}$$

This equation can be justified as follows. Let the marginal product of labor be 10, and the marginal product of capital be 5. This means that by hiring one more worker the firm increases output by 10 units, and by giving up one unit of capital it loses 5 units

production. Consequently, to keep output the same, the firm can replace two units of capital with one worker.

There is also a more rigorous formal proof: The full differential of the output function of the two factors:

$$dq = dK * \frac{\partial q}{\partial K} + dL * \frac{\partial q}{\partial L}$$

Because when moving along the isoquant, the output remains the same,

to:

$$dq = dK * \frac{\partial q}{\partial K} + dL * \frac{\partial q}{\partial L} = 0$$

Hence:

$$\frac{OK}{IL} = \frac{\partial q}{\partial K} = \frac{CL}{".K} = \frac{UP}{CVT}.$$

If the amount of labor increases at constant capital, the marginal product first increases, then reaches a maximum, and then begins to fall. The latter reflects the law of diminishing productivity of a variable factor. This law states that as we increase the number of workers for a given piece of equipment and production area, we inevitably come to a situation where the output from an additional worker begins to decline. If this were not the case, we could, for example, harvest all the land from an area the size of a flowerbed; it would only be enough to increase the number of peasants tilling that area. The law of diminishing productivity limits the growth of production in the short run, when the firm can increase output only by changing the number of workers and working hours, but has not yet had time to increase its capital.

Let us consider a conditional example. Let the dependence of output on the amount of labor with constant capital be known. This allows us to calculate the values of the marginal and average product of labor for all levels of production (Table 6-1):

Table 6-1. Dynamics of production in the short period

L	q	MR	AP
0	0		
1	1	1	1
2	3	2	1,5
3	6	3	2
4	10	4	2,5
5	13	3	2,6
6	15	2	2,5
7	16	1	2,3
8	16	0	2
9	15	-1	1,7
10	13	-2	1,3

The table shows, that at hiring one Up to four employees from

the marginal product of labor increases. This increase in the marginal product is an objective process. It is conditioned by the fact that, when there are relatively few workers, the use of one more worker improves the possibilities of cooperation of workers - their mutual assistance. As a result, production grows faster than the number of workers.

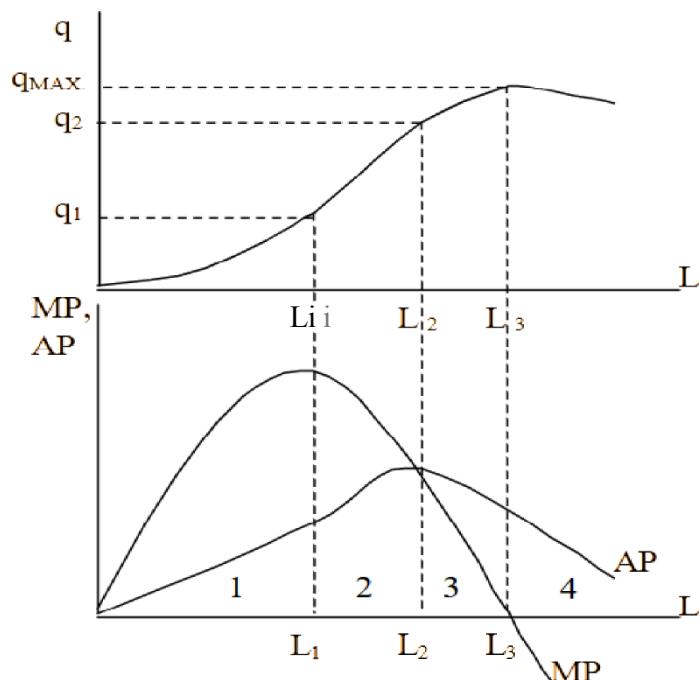
Then, however, there comes a moment when, for a given capital, the marginal product of labor becomes maximal. As new workers are hired, output continues to increase, but more slowly than the number of workers increases - the opportunities for cooperation slowly begin to deteriorate. Consequently, the marginal product of labor decreases. At some point (using 8 workers in our example) the marginal product of labor becomes zero. The latter means that the next worker is useless at all, because hiring him does not increase output at all. In other words, at the moment when the marginal product reaches zero, the output becomes maximum (Fig. 6-5).

All the more futile is the use of even more labor. There are so many workers that they begin to interfere with one another. (Don't forget that capital, i.e., equipment and production space, is assumed unchanged.) As a result, not only is production no longer growing, but it begins to decline, i.e., the marginal product of labor becomes negative.

As for the average product of labor (labor productivity), it increases following an increase in the marginal product, albeit more slowly. When the marginal product begins to fall, the average product still rises for some time. The point is that the average product increases as long as it is lower than the marginal product. Consequently, the decreasing marginal product becomes equal to the average product at the point of maximum of the latter (see Figure 6-5). As the number of workers continues to increase, the average product of labor decreases, but again more slowly than the decreasing marginal product.

The dynamics of output, marginal and average product depending on changes of the variable factor - labor can be shown graphically (Fig. 6-5):

Figure 6-5. Gross, average and marginal product of a variable factor



Four zones (stages of output growth) can be distinguished in the figure:

Zone 1: The marginal product of labor here grows and reaches a maximum with the number of workers L_1 , respectively, the average and gross product also increase. The gross product here reaches the value of q_1 .

Zone 2: The marginal product begins to decrease, while the average product still increases, eventually reaching its maximum. The gross product also increases (reaching the value of q with the number of workers L_2), because the marginal product is still positive.

Zone 3: The marginal product continues to fall, but while it is positive, the gross product still increases; as soon as the marginal product becomes zero, the gross product reaches its maximum (the value q_{shah}) - OISCHOUDE this at the number of workers L' . In turn, in this zone the average product begins to decrease, though more slowly than the marginal product.

Zone 4: The marginal product becomes negative, the average and the gross product falls. All this happens when the number of workers exceeds L .

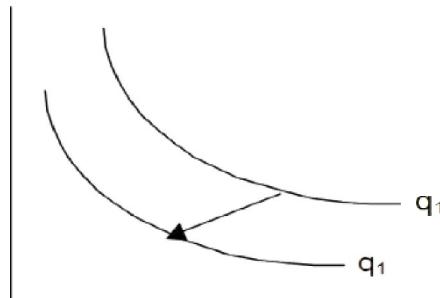
Obviously, zone 4 does not interest the rational entrepreneur, because the additional use of variable production factors (labor) only reduces output. The same can be said about zones 1-2, because here the average product of variable production factors (labor productivity) increases, and hence labor input per unit of output decreases. Therefore a rational entrepreneur will use labor between L_2 and L_1 , i.e. within the boundaries of zone 3, which will ensure output from q_2 to q_{max} .

3. Production in the long term

In the long run, not only labor but also capital is a variable factor of production. Also variable are production technologies, i.e., modes of production. Technical

progress means that the same amount of output can be obtained with less labor and capital. This means that all isoquants shift downward to the origin of the coordinates (Figure 6-6):

Figure 6-6. Shift of isoquants due to technological progress



In the long run we cannot talk about the productivity of any one production factor (all factors change), but only about the return on scale. Return on scale shows how many times the output increases when all the factors of production increase by a factor of one.

Three cases are possible:

- 1) If an increase of all factors of production by a factor of p increases output by more than a factor of p, there is an increasing return on scale;
- 2) If an increase in all factors of production by a factor of n increases output by less than a factor of n, there is a diminishing returns to scale;
- 3) If all factors of production increase by a factor of p, then output also increases by a factor of p, there is a constant return on scale.

The returns to scale can be determined analytically by a production function of the form:

$$q = AK^{\alpha}L^{\beta}$$

Let both capital and labor increase by a factor of n, resulting in an increase in output from q to Q. Then:

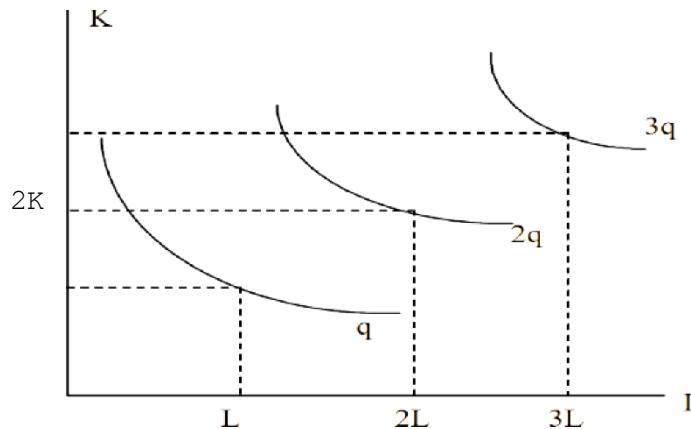
$$Q = A(nK)^{\alpha}(nL)^{\beta} = AK^{\alpha}L^{\beta} \cdot n^{\alpha+\beta} = n^{\alpha+\beta} q$$

It follows that when $n^{\alpha+\beta}=1$ output increases exactly by a factor, i.e. the returns to scale are constant. At $n^{\alpha+\beta}>1$, output increases by more than p times, i.e. the returns to scale increase. Finally, at $n^{\alpha+\beta}<1$ output

increases by less than p times, i.e. there is a decreasing return on scale.

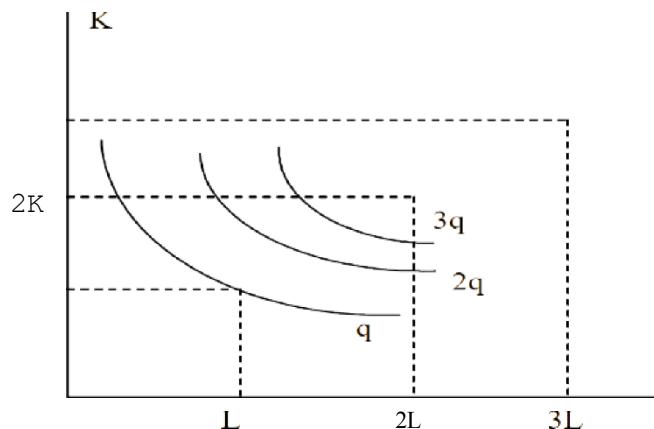
Geometrically, all three cases will look like this. With constant returns to scale, the distance between isoquants remains the same (Figs. 6-7):

Figure 6-7. Constant returns to scale



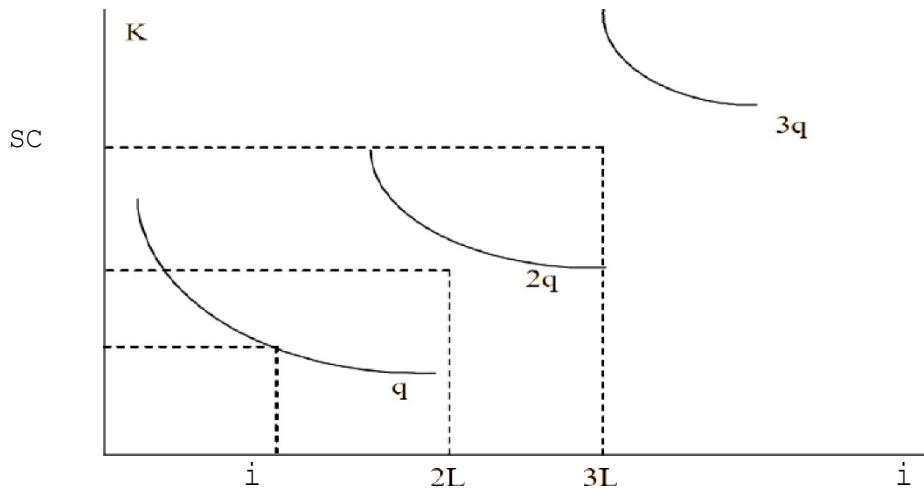
On the contrary, with increasing returns to scale, the distance between isoquants is decreasing all the time (Fig. 6-8):

Figure 6-8. Increasing returns to scale



Finally, with diminishing returns to scale, the distance between isoquants increases (Figs. 6-9):

Figure 6-9. Declining returns to scale



In practice, when an enterprise begins to increase labor and capital, it first encounters increasing returns to scale. For example, when labor and capital are doubled, output is tripled, indicating a reduction in unit costs and an increase in production efficiency. However, a further increase

And the GIPPs o f the eCeS JeNNTeNT or L A T e N T e N T leads to the fact that

increasing returns to scale are replaced by constant and then decreasing returns to scale: a doubling of resources leads to an increase in output by a factor of one and a half, for example. The efficiency of production falls. This is a signal that the enterprise has become too large and it is advisable to reduce its size.

The nature of returns to scale plays an important role in determining the optimal size of enterprises in a given industry. In agriculture, for example, increasing returns quickly give way to decreasing returns, which is why small farms dominate. The opposite is true of mass automobile production: "Zhiguli" can in principle be assembled in a small workshop, but their production at "Avtovaz" gives us an increasing return on scale. That is why giant factories are economically efficient when it comes to car production.

SELF-STUDY ASSIGNMENTS

1. A production function is given that determines the dependence of output on the number of production factors used by the firm:

$q=L^{1/3} K^{2/3}$. The amount of capital is fixed at 16 units. Complete the table showing the change in output, the marginal product, and the average product of labor as a function of changes in the quantity of labor:

L	1	2	3	4
q				
M _L				
AP				

What does the law of diminishing factor productivity reflect?

2. Do the average, marginal, and gross products of labor depend on the amount of capital used by the firm? If yes, how?

3. Show me, how implementation organization progressive forms

P}EoSuppLiTy of the Kf]e T isoKwAnT.

4. An agricultural firm has determined that under a given technology, depending on the amount of fertilizer and labor used, its output will vary as follows:

Labor costs (in man-hours)	Fertilizer consumption (in quintals)			
	10	20	30	40
10	40	60	70	76
15	60	110	150	300
20	90	170	300	420
25	130	240	400	480
30	140	300	420	540

Construct an approximate isoquant map of the firm and explain its meaning. If fertilizer costs are fixed at 30, what is the

maximum maximum product What is the marginal product of a factor of production?

5. A firm could increase its output by hiring additional workers. All other factors of production remain unchanged. Management knows that currently the marginal product of labor is 10 pieces per hour, and the average product of labor is 12 pieces per hour. How will the average product of labor change (increase, decrease, or remain the same) if the number of employees increases?

6. The table below contains data on the costs of labor, capital, and output in the production of a certain commodity:

Combination s	Issue	Labo r	Capital
A	200	30	80
B	350	45	120
C	700	90	240
D	750	99	264

Answer the following questions pertaining to this example:

- a) Determine the change (in percentages) in labor and capital costs when going from combination A to B, B to C, and C to D.
- b) Determine how the returns to scale change from combination A to B, C to D, and D to E.

7. The production function of the firm has the form: $q = 4 L^2 K^2$, where q is output; L is labor hours; K is machine hours. Suppose that 16 hours of labor and 25 machine hours are expended per day. What is the maximum amount of output? Determine the average products of labor and capital under these conditions. Suppose that the firm doubles the cost of both factors. Determine the increase in output. What are the returns to scale in this case?

8. The production function of the firm has the form: $q = 3L^{1/2} K^{1/3}$, where q is output; L is labor hours; K is machine hours. Derive a function of the marginal products of labor and capital. If 9 hours of labor and 8 machine hours are expended per day, what will be the values of MCL AND MPK Calculate how much, approximately, the output will change if capital costs increase by 6% and labor costs decrease by 4%.

9. The firm's production function: $q=2K^{0.6} L^{0.4}$. Over the long run, the firm has expanded by doubling its labor and capital costs. How many times will the output of the firm increase? How will the average product of labor and capital change? Justify your answers based on the returns to scale for a given production function.

10. The production function of the firm is $q = x-y$. Calculate the marginal rate of technical substitution of factor x for factor y at the point where $x = 5$ and $y = 6$.

11. The following information is available:

L	AP_L	MP_L
-----	--------	--------

3	18	28
---	----	----

6	21	16
---	----	----

Calculate elasticity of output on costs of labor with the use of three workers.

TEMA 6. THE STOCK MARKET

1. The importance of the stock market. Securities
2. Types of securities
3. Functioning of the stock market
4. The stock market in Russia

1. The importance of the stock market. Securities

Households spend part of their income (after taxes) on personal consumption and save the other part. Accordingly, national income is divided into consumption and savings. Thus, economic agents have temporarily free money, which they want to use to generate income in the future. At the other pole of the financial markets are firms in need of money to increase their capital, i.e. for investment. The transformation of savings into investment is the most important macroeconomic problem. The economy's ability to accumulate capital and, consequently, to grow over the long term, depends on its successful solution.

The transformation of savings into investment takes place in financial markets. These markets are diverse. We will distinguish their two segments.

First, there is the market for bank loans. Commercial banks accumulate the savings of firms and households, and then offer short-, medium-, and long-term loans to households and firms at a certain lending rate. This market will be discussed in Topic 8.

The second most important segment of the financial market is the securities or stock market. It is connected with the fact that in the market economy its participants enter into various relations with each other concerning the transfer of money and goods. These relations are formalized in a certain way by means of securities. A **security** is a document that certifies the property rights of participants in market transactions.

The existence of securities is closely related to the transformation of savings into investments. For example, if a saver wants to invest his money in a firm as a part-owner, he buys shares in the firm. When a saver wants to offer money to the firm as a lender, he buys the firm's bonds. In both of these cases, the firm uses the money as an investment.

Securities can also mediate commodity circulation. If one firm, for example, buys the products of another, but can not immediately pay, then the debtor firm issues a bill of exchange or promissory note for the amount of the debt. At the same time the circulation of securities is isolated from the movement of their primary basis - goods and money. After securities are issued and placed for the first time, they can be sold and bought again and again on the secondary market. At the same time, the market price of these securities can fluctuate freely under the influence of supply and demand.

2. Types of securities

The main types of securities are shares, bonds, bills, checks, savings (deposit) certificates, and derivative securities.

1. A share is a security certifying its holder's (shareholder's) contribution of capital to a joint stock company and the shareholder's right to receive part of the company's profit in the form of a dividend, to participate in the management of the company, to receive information about the company's activities and part of the company's property in case of its liquidation. Shares can be, on the one hand, ordinary and preferred, and on the other hand - registered and bearer.

The holder of a common share has the right to participate in the management of the company by voting on all issues at a general shareholders' meeting. At the same time, ordinary shares do not entitle the holder to receive dividends in a fixed amount and in priority order.

Preferred shares give their holders certain advantages over the holders of common shares. Russian Federation Law

"On Joint-Stock Companies" provides for two privileges:

- receiving dividends of a fixed, guaranteed amount;
- priority receipt of the remainder of the property of the company in the event of its liquidation.

It is sometimes suggested that holders of preferred stock have no right to vote at a shareholders' meeting at all. This is not the case. The law gives holders of such shares the right to vote in the following cases:

- in resolving issues of reorganization and liquidation of the company;
- when deciding on amendments and additions to the charter of the company, restricting the rights of holders of preferred shares. Such issues include, for example, the determination and modification of dividends on preferred shares;
- in all matters of AO activity, if at the last annual meeting of shareholders it was decided not to pay dividends on preference shares or to pay them incompletely. Once the dividend arrears are paid, this right is revoked;
- in solving a number of other issues in accordance with the law and the charter of the company.

Amendments to the AO law, which came into force in 2001, significantly expanded the rights of preferred shareholders, making them an attractive investment target. In particular, decisions on dividends and AO reorganization can be made only if more than 70% of the owners of common shares and more than 70% of the owners of preferred shares present at the meeting vote for them. Thus, no important decision affecting their interests can now be made without the latter.

Registered share - a share whose owner's name is recorded on its letterhead or in the register of shareholders. A bearer share is a share whose owner's name is not fixed, and its circulation does not need special registration.

In Russia, according to the Law on Joint Stock Companies, all shares are registered shares. At the same time, the Law "On the Securities Market" allows the issue of bearer shares in a certain ratio to the size of the authorized capital of the AO.

2. A bond is a security that certifies a loan relationship between its owner (lender) and the person who issued it (borrower). The fundamental difference between a share and a bond is that the owner of the share is one of the owners of the company, assuming the risk of its activities. In contrast, the owner of a bond is only a creditor of the company with the right to demand repayment of the debt.

Bonds are extremely varied and differ from one another:

- Issuers;
- Maturity;
- Form of existence;
- Order of ownership;
- The method of income payment;
- The nature of the treatment; etc.

A. Depending on the issuer (the person who issued the bond), a distinction is made:

- Government bonds;
- Municipal Bonds;
- Bonds of the Bank of Russia;
- Bonds of enterprises;
- Foreign bonds.

Before the August (1998) crisis, the Russian government, represented by the Ministry of Finance, widely distributed various types of its bonds to pay off very large budget deficits. Among the best known of these were government short-term bonds (GKOs), federal loan bonds (OFZs), and government savings bonds (OFC3). The first two types of bonds were primarily for legal entities, while the third type was for individuals. Currently, the need for the state to issue bonds has decreased markedly due to the federal budget surplus.

From time to time regional authorities actively try to place their bonds. However, they have to experience difficulties with the placement due to the refusal to pay debts on previously issued bonds. After the August crisis, only Moscow and St. Petersburg paid their investors without delays.

As for the bonds of the Bank of Russia, the Central Bank is in no hurry to issue them on the market, preferring other ways to raise funds.

The market for corporate bonds (AO bonds) is developing quite actively. At the same time, the purchase of such bonds remains very risky for investors, because from time to time there are threats of default by this or that firm.

B. Depending on the maturity date, bonds are divided into:

- Short-term;
- Medium-term;
- Long-term;
- Indefinite.

The time frame determining whether a bond belongs to one group or another is different for each country and is determined by local legislation and established practice. Usually, bonds with a maturity of up to 3 years are considered short-term bonds. Medium-term bonds are bonds that will be redeemed in 7-10 years.

Accordingly, bonds with a maturity of more than 10 years are considered long-term bonds. As for perpetual bonds, they do not have a predetermined maturity. Investors purchase such bonds with the expectation of periodic interest income paid on them.

In Russia, because of the high risks, short-term bonds absolutely dominate.

B. According to the form of existence, bonds are divided into:

- Documentary, i.e. existing in tangible paper form;
- Non-documentary, existing in the form of entries in special accounts.

For example, the government short-term bond (GKO) cannot be touched, it exists only in electronic form. On the other hand, from 1995 to 2001, the Ministry of Finance borrowed funds from individuals, placing state savings bonds (OFC3). These securities were placed in certificated form and were quite successful. But they also had a number of drawbacks. In particular, it was inconvenient to receive interest income on them. In addition, these securities were quite easy to counterfeit. This prompted the Ministry of Finance to give up issuing OGSZs. Now it is planned to issue new government bonds for the population - in the form of plastic cards, i.e. in a non-documentary form.

Г. Depending on the order of ownership, bonds may be:

- The rights of ownership of which are confirmed by entering the name of the owner in the text of the bond and in the registration book maintained by the issuer;
- Bearer bonds, the rights of ownership of which are confirmed by the mere presentation of a bond.

Д. According to the method of payment of income, bonds are:

- Interest (coupon);
- Discounted (with a zero coupon).

Owners	interest	bonds	reimbursed
bonds,	plus they receive		par value
			interest in the form of a
coupon			

income. A coupon is a cut-out coupon with the interest rate indicated on it. An example of such bonds is the State Savings Loan Bonds. These bonds were issued for two years with four semiannual coupons. The interest income was thus paid every six months, and as the next payment was made, the corresponding coupon was cut out. And at the expiration of two years the holder received the face value of the bond along with the last coupon yield.

No interest is paid on discounted bonds. Such bonds are redeemed at par and placed at a price below par, i.e. at a discount (discount). The difference between the redemption price and the purchase price of the bond constitutes the investor's income. An example of a discounted bond is a GKO.

E. By the nature of circulation, bonds are:

- Convertible, i.e. giving the holder the right to exchange them for shares of the same issuer, both ordinary and preferred;
- Non-convertible, i.e., not granting such a right.

3. Bill of exchange is an unconditional obligation of the drawer (promissory note) or other payer (bill of exchange) to pay a certain amount of money at the expiration of a certain period to the holder of the bill.

The scheme of using a promissory note is as follows. Let firm A owe firm B. Not having the necessary amount A writes a promissory note to B. Firm B can wait for the deadline for payment on the bill or pay with the bill to firm C by making a transfer inscription (endorsement) on the bill. Then firm C will present the bill for payment to the drawer, firm A.

A bill of exchange (draft) is a written order of the creditor (the drawee) to the debtor (the drawee) to pay a specified amount to a third party (the remitter). For example, company B owes company A, company A owes company

B. A writes a promissory note to B demanding payment of the specified amount to C. Firm C presents the note to firm B for **acceptance** (consent to payment). After acceptance, B becomes a debtor of C.

Thus, while a promissory note is written by the debtor, a bill of exchange is written by the creditor. Both promissory notes and bills of exchange can change hands by means of endorsement.

The essential peculiarity of bill circulation is the joint liability of each obliged under the bill (endorser) to the holder of the bill. This means that if the debtor refuses to pay the bill, the present holder can sue any of the previous holders of the bill, who acted as endorsers.

A bill of exchange has special value as a means of payment if it has an **aval** - a guarantee of payment. Usually a bank acts as an avalist.

It often happens that the creditor-holder of the bill urgently needs money, and the deadline for payment has not yet arrived. In this case, the bill can be taken to the bank, receiving there a bill amount minus a certain discount. Later the bank will bring the bill of exchange to the debtor and receive income from this transaction (the difference between the amount owed and the amount paid by the bank for the bill of exchange). This operation is called **bill discounting**. Bill discounting is essentially a form of bank lending to a billholder who needs the money. The point is that if the debtor refuses to pay the bank on a bill of exchange, the latter will return the bill to the creditor by debiting his account with the amount of the bill of exchange.

4. A check is an unconditional order from the drawer to the bank to pay a specified amount to a third party. For example, by paying by check in a store, a customer orders his bank to transfer money from his account to the store's account.

5. A **savings (deposit) certificate** is a security certifying the amount of the deposit made to the bank and the right of the depositor to receive the deposit amount and interest on it within a specified period.

6. A derivative security is a security on some price asset: on the prices of goods (usually sold on the stock exchange), on the prices of major securities, on the prices of the foreign exchange market (exchange rates), etc.

There are the following main types of derivative securities: forwards, futures, options.

A forward is a contract for future delivery of a given asset at a price fixed today. For example, a farmer agrees in advance to deliver at a certain date the grain of the future harvest.

A futures contract is similar to a forward, but is concluded on an exchange. Because of this, the object of a futures contract (unlike a forward) can only be a standard exchange batch of goods. For example, a currency futures contract may be concluded only for \$10000, but not for \$999. On the other hand, the execution of a forward is guaranteed, strictly speaking, only by the good name of each party, while the execution of a futures contract is guaranteed by the exchange clearing house.

An option is an exchange contract for the right to buy or sell a given asset in the future at a price set today. The fundamental difference from the futures lies in the fact that the exercise of an option is only binding on its seller; the buyer can demand the exercise of the option if it finds it profitable and not exercise the option otherwise.

Suppose person A sells person B an option to sell \$1,000 at 30 rubles per dollar in three months. Person A can now not fail to exercise the option, but will person B want to exercise the contract? The answer depends on what the market rate of the dollar will be on the date of exercise. Let's assume the actual exchange rate is 31 rubles. Then B will demand to execute the contract and buy dollars at a preferential price. If the exchange rate reaches only 29 rubles, B would prefer to simply terminate the contract. For such a right not to execute the contract the buyer of the option pays to its seller a certain amount of money, called **a premium**.

3. Functioning of the stock market

Securities are sold and bought on stock markets. The primary market is the market on which first issued securities are sold. Its main participants are issuers and investors. Issuers in need of financial resources issue securities into circulation, i.e. they determine their supply. On the contrary, investors, seeking application of their financial capital, form demand for securities.¹ Precisely on the primary market mobilization of temporarily free money resources and their investment into economy occur. Thanks to the primary stock market monetary funds are directed to those enterprises and industries, which provide the highest income to investors. Thus, the primary market acts as the regulator of market economy, providing the most effective distribution of resources between branches and the enterprises.

The placement of securities in the primary market takes place either through their direct sale to investors, or through intermediaries. Investment banks usually act as intermediaries. Banks may act as agents, receiving commissions for their services. More often, however, banks buy the whole issue of securities and then trade them "on their own behalf".

In Russia, a prerequisite for the placement of securities is the registration of their issue. If the securities are placed by open subscription (sale to all comers), it is also necessary to register the prospectus. The latter contains data on the issuer, its financial position, the number of issued securities, the issuance procedure and other information required by investors.

¹ This division of stock market participants into issuers and investors is made by practitioners. Note that in paragraph 1 of this topic, those who invest money in businesses are referred to as savers and those who use that capital are referred to as investors. Such definitions are characteristic of economics courses.

The secondary stock market is a market in which the resale of securities previously issued into circulation is carried out. Unlike the primary market, this market does not directly affect the amount of investment in the economy, because it provides only redistribution of securities from one economic entity to another.

We should not think, however, that the secondary market is insignificant for the economy. The main actors in this market are **speculators**. They are investors who make money on fluctuations in the price of securities. They seek to buy securities at a time when their prices are falling to their lowest, in order to resell the securities when prices are rising. The difference between the buy and sell prices forms the income of speculators. Thus, if an enterprise is inefficient, speculators begin to get rid of its securities, and the price of securities falls. On the contrary, the demand for the securities of highly profitable enterprises and, correspondingly, their prices increase. Thus, the situation on the secondary market shows which enterprises and sectors are in crisis, and which, on the contrary, are on the rise. Thus, the secondary market sends signals to investors about promising directions of future investments, and provides structural reorganization of the economy. The secondary market is also an indicator of the state of the economy as a whole: on the threshold of a recession, securities (first of all, shares) usually become cheaper.

Besides, an opportunity to sell securities on the secondary market at any moment makes it more justified for investors to buy them on the primary market. Therefore, a full-fledged primary securities market cannot exist without the secondary market. At the same time, in terms of the volume of made transactions the secondary securities market in all countries many times exceeds the primary market.

The stock market exists in two main organizational forms: in the form of exchange and over-the-counter markets. In the first case, securities are sold on stock exchanges. The **stock exchange** is

an organized, regularly functioning securities market, trading on which is subject to strictly established rules. Stock exchanges perform a number of basic functions.

The first function of an exchange is to provide a venue for both primary and secondary trading of securities. At the same time, the exchange must have highly qualified personnel, who are not only able to conduct competent trading, but also ensure effective oversight of the execution of transactions. Trading intermediaries between sellers and buyers are usually brokers and dealers at stock exchanges. **Brokers** are participants of the stock market, acting as an agent or commission agent. A broker acts at the exchange in the interests of the client and at his expense, and receives income from the commission charged on the sum of the transaction. **A dealer** is a participant of the exchange market, which makes transactions on its own behalf and at its own expense. Thus, the dealer's income is derived from the difference between the sale and purchase prices of the securities.

The second function of the exchange is to establish equilibrium market prices. This is possible because the exchange gathers a large number of buyers and sellers who agree on prices acceptable to them. At the same time the exchange achieves confidence in the established prices.

The third function of the exchange is to accumulate temporarily free money of investors and facilitate the transfer of ownership of securities.

The fourth function of the exchange is to ensure publicity and openness of trading. The exchange guarantees that bidders receive information sufficient for them to make their own judgments on the advisability of buying (selling) securities.

The fifth function of the exchange is to create a mechanism for the smooth resolution of disputes. This mechanism includes the appointment of persons to act as impartial arbiters of disputes, as well as the determination of compensation for the aggrieved party.

The sixth function of the exchange is to guarantee execution of concluded transactions. This is achieved by registration of transactions, exchange mediation in their execution, imposition of strict requirements for professionalism and financial condition of trade participants, etc.

The seventh function of an exchange is to develop a code of conduct for traders. It is about adhering to ethical standards that participants must follow. In particular, it is inadmissible to resort to unfair methods in the process of negotiations and transactions - to conceal important information, to place false advertising, to fail to take the necessary measures to protect clients' money, etc. The Enron scandal has forced stock exchanges around the world to become even tougher on the reporting of companies and on the quality of their management in general.

Although stock exchanges still play a prominent role in the organization of securities trading, their importance is gradually diminishing. On the one hand, only securities of the highest quality, which have passed a strict admission to trading - the so-called **listing** procedure, are traded at stock exchanges. On the other hand, with modern means of communication available, the exchange as a trading place is not so necessary any more. Its main competitors are banks, which gradually become settlement centers for securities trading. New centers of over-the-counter turnover with the use of computers and special communication channels emerge.

4. The stock market in Russia

The development of the stock market in our country lags behind the Western countries for obvious reasons. In the countries with a developed market economy, the dynamics of the rates (prices) of securities - especially shares - significantly affect investments and the general state of the economy. In Russia, this relationship is markedly weaker. Shares of a very limited number of leading firms - the so-called "leading companies" - are systematically traded on stock markets here.

"blue chips. There are about a dozen such firms, and the vast majority of them belong to the oil and gas or energy sectors.

In spite of the fact that lately investors, having considerable free funds, more and more actively buy shares of the second echelon firms, these securities are traded from time to time, in other words, are not liquid enough. Thus, structural distortions, typical for our economy, are even more evident on the stock market. In fact, the Russian stock market is in a situation when only giant companies, which already have no problems with financing both inside the country and on the international markets, can count on investments.

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The low liquidity of the Russian stock market has objective reasons. One of the main ones is the established practice whereby full control over a company is possible only if a shareholder has a blocking stake of more than 75 percent of voting shares. According to experts, the reason for that is the provision according to which the blocking stake, the owners of which may seriously complicate the life of the controlling shareholder, is 25 percent plus one share. And since in Russia every now and then the shareholders complicate each other's lives to the point of full expropriation of property, it would be in the interest of the controlling stockholders not to let anyone accumulate a blocking stake. The battles for property are too fresh in our memory to risk giving up full and undivided control, even to attract investment.

As a result, the Russian stock market still poorly performs its main function of mobilizing capital for the national economy and its flow from one industry to another. With a very high savings rate в economy - 30-35% GDP, according to estimates experts estimate that savings in the Russian economy are far from being fully transformed into investment, but export of capital continues. C on the other hand on the other hand, excess funds in the resource industries are not flowing to where they are vitally needed. A large shortage of capital investment is felt in the

infrastructure, transport industries, manufacturing and science.

It would be wrong, of course, to blame this state of affairs solely on the organization of the stock market or, more broadly speaking, the financial

markets. The financial system is only a mirror reflecting the structural imbalances in the economy, very large differences in the profitability of the commodity and manufacturing industries. No one will buy shares of unprofitable enterprises when it is possible to buy shares of profitable enterprises. Strategic way out is, therefore, is to deepen structural market reforms primarily primarily B

The market reforms were primarily in the areas of debureaucratization of the economy and protection of private property.

But today there are already positive changes. The priorities of big business in our country have been gradually changing in recent years. Gradually, there comes an understanding that transparency of corporate governance is a prerequisite for long-term strengthening of companies' positions in the stock market. Information transparency and introduction of international financial reporting standards make a company more attractive to investors, and lead to increase of its capitalization, i.e. the market value of its shares. That is why some (though by no means all) heads of companies are gradually increasing transparency of their business. For its part, the State Duma passed amendments to the RF Criminal Code that introduced criminal liability for managers of companies and professional securities market participants for providing investors with untrustworthy information.

In addition, in 2002, the Duma adopted amendments to the law "On the Securities Market" designed to make the Russian stock market more transparent and controlled, but also less bureaucratic. First of all, the updated law brought the requirements for the contents of the issuer's prospectus and quarterly report into compliance with international

standards. The law toughened the requirements for disclosure of important information for investors. Now the information about the issuer must include data on its financial position, governing bodies, previously placed securities and risks arising from their purchase. The list of required information even includes data on the company's participation in court proceedings, education of its employees and development trends in the issuer's field of activity. At the same time the law has excluded unnecessary and unreasonable requirements preventing issuance.

In addition, the law introduced the concept of "price manipulation" as well as liability for it. Price manipulation is understood as the actions undertaken to create the appearance of rise or fall in prices in the stock markets in order to induce investors to buy or sell securities. This creates a basis for detection and suppression of such violations in order to improve the investment climate in our country.

All the aforesaid determines a very dynamic development of the Russian stock market. In recent years it turned out to be one of the most profitable in the world. In particular, in 2003 the PTC index - the main indicator by which the change in the value of Russian shares is measured - increased by 57.2%.

There are certain reasons for such positive developments. The growth of the Russian economy, the state budget surplus, the timely execution of foreign debt payments, improved relations with the United States and international financial organizations, further steps to reform legislation in accordance with the requirements of a market economy, and improvements in the quality of corporate governance undoubtedly attracted investors to the Russian market.

As a result, in October 2003, the international expert agency Moody's made a sensational and extremely important decision for our country: the rating of Russian government bonds was upgraded to investment grade. And in January 2004, a similar decision was taken by

another reputable agency - Standard & Poor's. This means that it is recommended to buy Russian bonds not for short-term speculative purposes (buy today, sell tomorrow), but for the long term as a very reliable asset.

The latter should increase the inflow of investments to Russia by an order of magnitude, opening for it a whole new layer of foreign investors. The fact is that many large investors, for example pension funds, have no right to invest in securities with a rating below investment grade. Now the Russian market is open to them.

It is also very important that the change in the rating improves the conditions not only for public, but also for private borrowing. The ratings of the largest private companies can also be raised, and borrowing for them will become cheaper, which will increase the payback period of projects. The possible inflow of foreign capital should lead to an increase in the value of all Russian assets - from securities to land and real estate.

We should not, however, get carried away. First of all, so far Russia has received the lowest investment grade ratings. Many countries, such as Thailand and Croatia, have the same rating. The ratings of the leading states (the United States, Western European countries, Japan, etc.) are much higher.

Second, the current trend cannot be regarded as stable. Up to now the rapid growth of stock market capitalization (i.e. the value of circulating shares) occurred not at the expense of new issuers entering the market, but due to an increase in the value of shares of several old (mostly oil) companies. And this makes the market dependent on the world prices for energy carriers and the situation in one particular industry.

Other unfavorable factors remain. First of all, investors' private property rights, including those of foreign investors, are very poorly protected. A very alarming characteristic of modern Russian

the activity of the authorities' attack on Yukos, which twice led to a collapse of the stock market in the summer and autumn of 2003. The continuation of the struggle between the authorities and Yukos in 2004 brought the stock market to an even more serious crisis: after surging in the first months of the year, by July the PTC index had fallen to a lower level than at the beginning of the year. The general mood of investors at that moment was expressed by one analyst: "How can one think of buying other securities if Russia's biggest company has been turned into nothing?

It is indicative that the most successful and, at the same time, the most transparent company in the industry, which for the first time in recent Russian history provided full information about its owners, was chosen as the target of the attack. Investigators used this data to seize the shares belonging to the accused. Thus Russian business got a clear lesson: if you want to keep your property, don't be transparent!

The Yukos affair has demonstrated that the political risks of investing in Russian securities today are very high. Investors responded by traveling out of Russia: in particular, in the first half of 2004, net capital outflow (exports minus imports) totaled \$5.1 billion.

The situation with Yukos is only an isolated case. Practically any enterprise can be taken away from its owners by decision of federal or local authorities. At the same time, the role of the administrative factor in resolving corporate disputes is extremely high, which speaks to the imperfection of the judicial system of the Russian Federation.

At the same time, many important structural reforms - natural monopolies, the housing and utilities sector, the civil service, the military, banking, etc. - are being carried out slowly or are stalled altogether. All these phenomena do not increase investors' optimism concerning the prospects of the Russian economy and the improvement of the investment climate in our country.

SELF-STUDY ASSIGNMENTS

1. Explain the differences between the main types of securities. What is the difference between a stock and a bond?
2. What is the difference between a promissory note and a bill of exchange, and both of them - from other borrowed obligations, for example - from the bond?
3. Suppose that you have deposited a bill of exchange with a commercial bank. Subsequently, the firm became insolvent. Is it safe to say that this is now a problem of the bill-holder's bank, which no longer concerns you?
4. At one time TverUniversalbank actively issued its bills, which then changed hands on the financial markets. Later this bank had its license revoked, i.e. it was declared insolvent. What can the last holder of a promissory note do to get his money back?
5. What are the primary and secondary stock markets? Describe them.
6. Explain why the transparency of corporate governance is important in terms of the capitalization of the firm - the growth of the market value of its shares?
7. Analyze the main problems of development of the Russian stock market at the present stage.
8. Suppose some time ago you bought a bond. The annual payments on it are 8% of the face value and about the same was the interest paid by banks on deposits.

Explain whether the market price of the bond was above, below, or about the same as the face value.

Today the bank interest rate has dropped to 5% per annum. . What will happen to the market price of the bond? Why?"

9. The bond pays an annual yield of 6% of its nominal value, equal to 1,000 rubles. In fact, the bond was sold for 800 rubles. What is the annual interest income of the owner of the bond?

10. At the end of each year, for 3 years, the bond will pay an annual income of 8% of its nominal value, equal to 1,000 rubles. In addition, at the end of the third year the owners of the bond will be paid its face value. What will be today's market price of the bond if the bank interest rate is 10% per annum?

' To solve this and the following problems, we must return to the topic 'Capital and Interest' in the course on microeconomics.

TEMA 7. COST ANALYSIS

1. Accounting and economic costs
2. Isocosta and cost-effective production
3. Types of costs
4. Costs in a short period
5. Costs in the long term

1. Accounting and economic costs

A firm's accounting costs are the sum of its actual payments for purchased resources. In particular, the firm pays salaries to its employees, buys raw materials and supplies, pays for utilities, pays interest on loans, makes deductions to the depreciation fund, incurs research and advertising costs, pays taxes attributable to the cost of production, etc. At the end of the reporting period, the accountant summarizes all these expenses in his report.

For example, the firm uses equipment worth 200 rubles and a lifetime of 5 years. It annually uses raw materials worth 80 rubles and pays 60 rubles of wages. To buy the equipment was taken a loan (200 rubles) at 10% per annum. For simplicity, assume that the firm does not make other payments. Then its accounting costs will be:

Depreciation of equipment ¹	40 rubles.
Payment for	raw materials 80 rubles.
	Salary 60 rubles.
Interest for the	loan 20 rubles.
Amount of accounting	costs 200 rubles.

Economic costs are quite another matter. Economic costs are opportunity costs or opportunity costs. They represent the value of those benefits that can

¹ Depreciation is the compensation for depreciation of fixed assets (fixed capital).

would be obtained in the most profitable of all alternative uses of limited resources (topic 1, item 1).

In practical calculations, economic costs include, in addition to explicit (accounting) costs, also implicit costs.

Thus:

Economic Costs = Accounting Costs + Implicit Costs

Implicit costs are the sum of unreceived

of the firm's income on the resources it owns. We are talking about the revenues that the firm's management *could have earned by* using its own resources in some other way than in this business.

The point here is that entrepreneurs do not come into the business empty-handed, but invest some of their resources in the firm. Most often they are the entrepreneurs' own funds and their own labor. These resources are given to the firm as if for free, but this does not mean that their expenditure should not be accounted for.

To calculate implicit costs, we must take into account the best of the alternative possibilities of the firm's management to use their own resources, which they have actually invested in this business. Suppose the management uses equity capital of 100 rubles in this business, which in another case would have been put in the bank and brought 10% per annum. In addition, the leaders for the sake of his own business left a job for hire, losing 20 rubles wages. Therefore, the implicit costs will be:

Uncollected	interest	on	equity
			10rubl
es. Unreceived salary			20
rubles			

The amount of implicit costs **30 rubles.**

Thus, the economic costs in our example would be: $200+30=230$ rubles.

Suppose now that the firm's revenue from the sale of manufactured products is 220 rubles. The accountant will congratulate the profit

(20 rubles), and the economist will record a loss (10 rubles). The latter means that executives would be better off staying out of the business altogether and keeping their money in the bank and working for hire.

Thus, the accounting of implicit costs as part of the full economic costs is necessary to determine the profitability of the business for entrepreneurs.

Let's summarize:

1. The difference between revenue and accounting costs constitutes the firm's accounting profit:

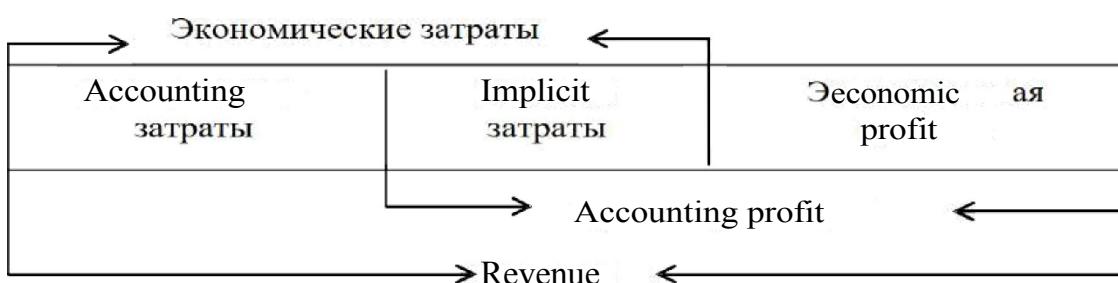
$$\text{Accounting profit} = \text{Revenue} - \text{Accounting costs}$$

2. The difference between revenue and economic costs constitutes the economic profit (excess profit) of the firm:

Economic Profit = Revenue - Economic Costs Since, remember, economic costs are the sum of accounting and implicit costs, economic profit is also equal to the difference between accounting profit and implicit costs: Economic profit = Accounting profit - Implicit costs

Schematically, the above can be represented as follows (Scheme 7-1):

Figure 7-1. Costs, revenue and profit



3. If the economic profit is negative (a loss), the business is unprofitable, no matter how large the accounting profit may be. This means that the revenues are too small and the accounting profit does not cover implicit costs, and therefore it is more profitable for entrepreneurs to use their resources elsewhere than in this business. At the same time, a firm can exist quite well without making an economic profit if the accounting profit covers the implicit

costs, i.e. potential income from the alternative use of resources owned by entrepreneurs.

We conclude with two practical examples:

The owner of a small bar is planning to put a slot machine, in order to increase his profits. The accounting costs of such a project will be equal to the depreciation of the machine plus the cost of its operation. And what are the hidden costs? To account for them, we must remember that the installation of the machine had to sacrifice one table at the bar. Accordingly, the implicit costs of the vending machine are equal to the lost profit from the table.

Another example. A lady is an intermediary between a mayonnaise factory and a retailer. Her business is that she buys mayonnaise from the factory and then fits it into various retail outlets. One day she ran into problems: the owner of a container at the wholesale market refused to buy mayonnaise, arguing that it was slow to sell. Our businesswoman does not understand what this is all about. Her reasoning: I don't take money for mayonnaise up front, I give it to sales and receive money only after the sale; what does speed of sale have to do with it?

What doesn't she understand about the implicit cost theory? The answer is very simple: the container is not rubber, and if there is mayonnaise in one corner, then you can no longer put there, say, sour cream, which sells faster. Thus, the implicit cost of mayonnaise to the merchant is equal to the lost profits from the sale of sour cream. Taking into account these implicit costs, the economic profit from selling mayonnaise becomes negative, and it is not profitable to trade in it.

So, any businessman, even without having a concept of implicit costs, intuitively considers their existence in his practical activities.

2. Isocosta and cost-effective production

A. Constructing an isocost

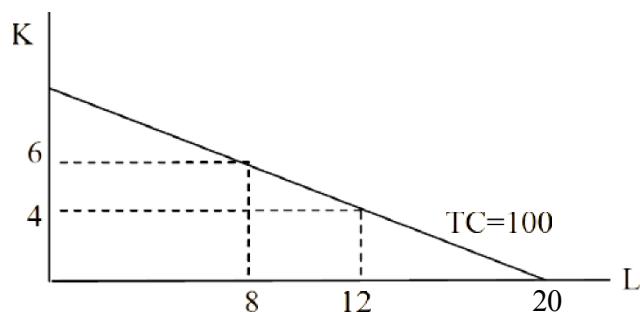
Let the firm use two factors of production, labor and capital, whose prices are given. Denote the number of man-hours of labor by the letter L , and the number of machine-hours of capital by the letter K . The prices of one hour of labor and capital denote respectively P and O_k . Then the total cost of the firm (TC) will be:

$$TC = K \cdot O_k + L \cdot P$$

Suppose the total cost at the moment is set and is 100 rubles, the price of man-hours of labor is 5 rubles, and each machine-hour of equipment costs 10 rubles. If at the given costs the firm decides to use only labor, all it can use 20 man-hours of labor. However, the firm will have no money left to purchase or rent equipment, i.e. the amount of capital used will be zero. If the firm only wants to use capital, it will have access to 10 man-hours of capital and zero man-hours of labor. Other combinations of labor and capital available to the firm at the given costs and prices of production factors are also possible. For example, 12 man-hours and 4 machine-hours. Or 8 man-hours and 6 machine-hours. And so on.

By plotting all the quantities of labor available to the firm on the X-axis and the quantities of capital on the Y-axis, we obtain an isocost. The isocosta (equal-cost line) reflects all combinations of labor and capital in which the firm's total costs remain the same (Figure 7-1).

Figure 7-1. Construction of an isocost



Function isocost is not difficult to derive by The isocost function is easy to derive by converting the original total cost function:

$$TC = K \cdot PK + L \cdot PL \quad PK \cdot K = TC - L \cdot PL$$

Отсюда:

We obtained the desired function reflecting the dependence of the amount of capital used on the amount of labor used at given total costs and prices of labor and capital.

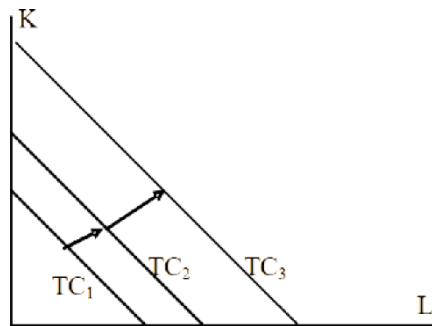
Hence the implication:

1. An increase in costs (from TC to TC and TSS) shifts the isocosta to the right - up parallel to the previous one (Figure 7-2A);
2. Since p is the slope of the isocost, the cheapening of labor

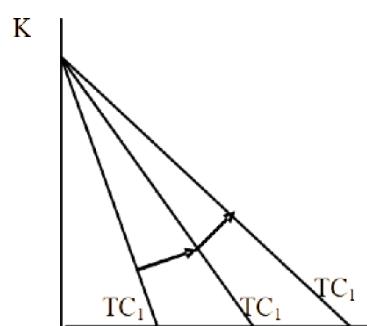
(higher cost of capital) at the same total cost makes the slope of the isocost slope flatter (Fig. 7-2B). Conversely, the rise in the cost of labor (cheaper capital) increases the slope of the isocost.

Figure 7-2. Isocosta shifts

A. The firm's costs are increasing.



B. Labor becomes cheaper, costs remain the same

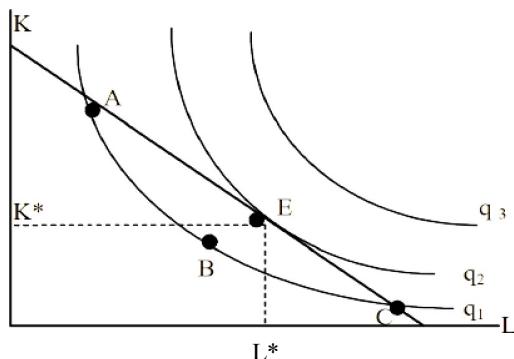


You can see this by first increasing the total cost in our conditional example from 100 to 120, and then changing the prices of labor and capital at the same cost. See how the isocost position changes as a result.

B. Optimal combination of factors of production

Let's now combine the isocosta and the isoquant map (topic 6, item 1) in one diagram (Figure 7-3):

Figure 7-3. Economically efficient output



There are three isocquanta and one isocosta in the figure. Recall that the isocvant reflects all combinations of labor and capital in which output remains unchanged. The isocvant above and to the right of the previous isocvant corresponds to a larger volume of output. The volumes of output (q_1 , q_2 , q_3) are shown next to the corresponding isoquant. In turn, the isocost reflects all combinations of labor and capital available to the firm at given total costs and prices of labor and capital.

It follows that in A, B, and C the output is the same, because they are all on the same isoquant. The total costs in A and C are also equal, since these points belong to the same isocost. Costs are lower in B because it uses less labor and capital, i.e. it belongs to a "lower" isocost, which is not shown in the figure.

We are interested, however, in the maximum output achievable for a given total cost. The output we are looking for, q_3 , is defined by the touch point of the isocost and the highest available isoquant (t. E). To achieve it, the firm must use L^* labor and capital. For all other combinations of factors of production available to the firm, output will be lower because in these cases the firm will be on the "lower" isoquants. At the same time, the "higher" isoquants - e.g.

isoquant q' - are located above the isocost, and, therefore, are not available to the firm

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So, by applying t' labor and capital, the firm maximizes production at a given cost. Therefore, t' . E corresponding to this combination of labor and capital is called the point of the optimal combination of factors of production.

Recall that all points on any isoquant (for example, on isoquant q') reflect different technically efficient ways to produce a given volume of output (topic 6, item 1). But only at t' . E output q is obtained at the lowest possible cost. Thus the combination of t' , x' reflects the economically efficient way of producing output in volume chz .

Recall also that at any point on the isocvant, the marginal rate of technical substitution of capital by labor is equal to the ratio of marginal products of labor and capital, i.e., the equality is satisfied (topic 6, item 2):

. T.9, " —

At the same time, at the point of the optimal combination of factors of production, the marginal rate of technical substitution is also equal to the ratio of labor and capital prices. In other words, this equation takes the form:

$$MRTS_{LK} = \frac{MP_L}{MP_K} = \frac{P_L}{P_K}$$

This can be justified as follows. Suppose at some point on the isoquant, the marginal product of labor is 10 units of a certain product, and the marginal product of capital is 5 units. The ratio of the marginal products is, therefore, 2:1. The prices of labor and capital are, let us assume, equal, i.e. the price ratio is 1:1. Thus there is an inequality:

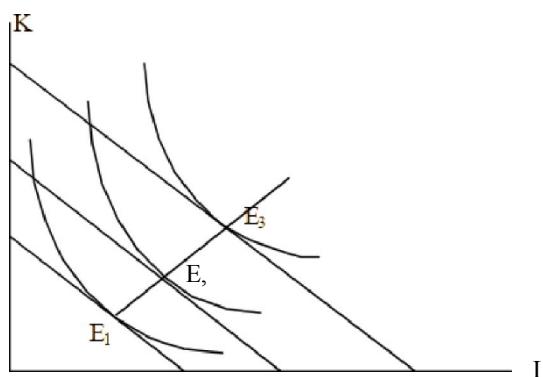


As a result, by giving up one unit of capital, the firm loses 5 units of output. However, it can use the money it saves to hire another unit of labor, which would bring it an additional 10 units of output. Under such conditions, by replacing capital with labor, the firm increases its output at the same cost, i.e. it moves to a higher isoquant while remaining on the same isocost. The firm will, therefore, substitute capital for labor until it reaches the point of optimal factor combination at which the ratios of marginal products and prices of labor and capital are equal to each other !

Now let us imagine that the firm finds itself at the point on the isocvant, where the ratio of the marginal products of labor and capital is less than the ratio of their prices. In this case, it becomes profitable to replace labor with capital, again up to the point where the optimal combination of factors is reached.

Let us go further. Let the optimal combination of labor and capital is reached. If the firm increases its costs, the isocost shifts to the right - up. Accordingly the points of the optimum become E_1 , E_e , E_e on higher and higher isocvants. Connecting these points we get the line "development path" (Fig. 7-4).

Figure 7-4. The "development path" line



Don't forget the law of diminishing productivity (theme 6, item 2). This means that as the amount of labor used increases, the marginal product of labor decreases. At the same time, a decrease in capital leads to an increase in the marginal product of capital.

The change in the slope of this line indicates which factor use relatively increases with increased production.

B. Mathematical application

Let the production function look like this (topic 6, item 1):

$$q = AK^\alpha L^\beta$$

Parameters A , α and β we know are known. We know also function

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- ISOKOGTZ:

$$TC = K^\alpha P_K + L^\beta P_L$$

The firm must determine the optimal combination of labor and capital to maximize output for given costs and prices of labor and capital.

A graphical solution to this problem was given above: the best combination of production factors corresponds to the touch point of a given isocost and the highest available isoquant. Now the same problem is to be solved analytically.

We remember that at the point of the optimal combination of factors there is equality:

— —

The marginal product functions of labor and capital can be obtained by taking the derivatives of the production function for labor and capital, respectively (Topic 6, Section 2):

$$MP_L = q'_L = \frac{\partial q}{\partial L} \text{ и } MP_K = q'_K = \frac{\partial q}{\partial K}$$

Thus:

$$MP_L = AK^\alpha \beta L^{\beta-1} \text{ и } MP_K = AL^\beta \alpha K^{\alpha-1}$$

Hence:

$$\frac{MP_L}{MP_K} = \frac{AK^\alpha \beta L^{\beta-1}}{AL^\beta \alpha K^{\alpha-1}} = \frac{P_L}{P_K} \rightarrow \frac{\beta K}{\alpha L} = \frac{P_L}{P_K}$$

We recall the total cost function and obtain a system of two equations with two unknowns (L and K):

$$TC = K \alpha + L \beta \text{ AND } \frac{\beta K}{L} = \frac{P_L}{P_K}$$

Solving this system, we find the optimal values of labor and capital:

$$L = \frac{TC * \beta}{P_L(\alpha + \beta)} \text{ AND } K = \frac{TC * \alpha}{P_K(\alpha + \beta)}$$

3. Types of costs

In the previous paragraph, the firm could change both labor and capital in its search for the optimal combination of production factors. In practice, however, it is much easier for a firm to hire additional workers than to acquire new equipment-capital. The latter requires more time. In this regard, production theory distinguishes between short and long periods.

In the long run, a firm can change all factors of production to increase output. In a short period, some factors of production are variable and others are constant. Here, to increase output, the firm can measure only the variable factors. The prices of the factors of production in the short period are assumed to be fixed. It follows that all costs of the firm in the short period can be divided into constant and variable.

Fixed costs (FC) are costs whose value does not change with changes in output, i.e., they are the costs of fixed factors of production. Usually fixed costs are depreciation, rent, interest on credit, salaries of management and office employees, etc. Constant costs usually also include implicit costs.

Variable costs (VC) are costs that change with changes in output, i.e., they are the costs of variable factors of production. They usually include wages and salaries

production workers, the cost of raw materials and supplies, electricity for technological purposes, etc.

In theoretical microeconomic models, variable costs usually include labor costs and fixed costs

- the cost of capital. From this point of view, the variable cost is equal to the product of the price of one man-hour of labor (P_a) by the number of man-hours (L):

$$VC = L \cdot P_a$$

In turn, the value of fixed costs is equal to the product of the price of one machine-hour of capital (P_k) by the number of machine-hours (K):

$$FC = K \cdot P_k$$

The sum of fixed and variable costs gives us total costs (TC):

$$FC + VC = TC$$

In addition to total costs, you also need to know average costs. Average fixed costs (AFC) are fixed costs, per unit of output:

Average Variable Cost (AVC) is the variable cost per unit of output:

Average total cost (AC) is the total cost per unit of output or the sum of average fixed and average variable costs:

When analyzing the market behavior of a firm, marginal costs play a major role. Marginal cost (MC) reflects the increase in total cost when output (q) increases by one unit:



Since only variable costs increase with output, the increment of total costs equals the increment of variable costs ($ATC=AVC$). Therefore, we can write:

We can also say this: the marginal cost is the cost associated with the production of the last unit of product.

Here is an example of calculating costs. Let the variable costs be 100 for output of 10 units and 105 for output of 11 units. Fixed costs do not depend on the output and are equal to 50. Then:

q	FC	VC	TC (FC+VC)	AFC (FC/q)	AVC (VC/q)	AC (TC/q)	MC (ATC/Aq)
10	50	100	150	5	10	15	
11	50	105	155	4,55	9,55	14,1	5

In our example, output increased by 1 unit ($Aq=1$), and variable and total costs increased by 5 ($AVC=ATC=5$). Consequently, the additional unit of output required a cost increase of 5. This is the marginal cost of producing the eleventh unit ($MC=5$).

If the total (variable) cost function is continuous and differentiable, then we can determine the marginal cost for a given amount of output by taking the derivative of that function over the output:

$$MC = TC'_q = \frac{\partial TC}{\partial q} = \frac{dTC}{dq} \text{ или } MC = VC'_q = \frac{\partial c}{\partial q} = \frac{dc}{dq}$$

4. Costs in a short period

A. Production function and cost functions

The cost functions are directly derived from the production function. Assume, as usual, that labor is a variable factor of production and capital is a constant one. Then:

$$VC = L * L$$

Отсюда:

Recall that the average product of labor is the quotient of output divided by the quantity of labor (topic 6, item 2):

$$AP_L = \frac{q}{L}$$

Hence:

".

As for the total costs, they are:

$$TC = FC + VC = P_k * K + L * L$$

So the average total cost is equal:

$$ATC = \frac{TC}{L} = \frac{P_k * K + L * L}{L} = \frac{P_k * K}{L} + \frac{L * L}{L} = \frac{P_k * K}{L} + L$$

Using the same scheme, we derive the marginal cost function:

— — — — —

Since the price of labor, like any other price, is set in a short period and does not change, the

Again, remember that the marginal product of labor (MPL) is the increment of output with one unit increment of labor:

Hence:

—

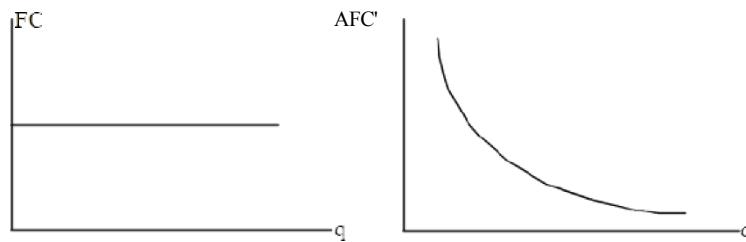
Now let's put all the formulas together for clarity:

$$f'g'' = f''g - f'g' , \quad f'g'' = f'g - f'g' , \quad f'g'' = f'g - f'g'$$

Hence important conclusions: as long as marginal and average products of labor increase, average variable and marginal costs decrease; if marginal product of labor is constant (and equal to average product), average variable and marginal costs are also constant; if marginal and average products of labor begin to fall, average variable and marginal costs increase.

The dynamics of costs versus output can be illustrated graphically by plotting output on the *x-axis* and costs on the *y-axis*. Since fixed costs do not change with increasing output, the FC line runs parallel to the X-axis. At the same time, the average fixed costs decrease all the time and tend to zero, because in the formula $AFC=FC/q$ the numerator does not change, while the denominator grows (Fig. 7-1):

Figure 7-1. Fixed and average fixed costs



As for all other costs, their functions may be different, depending on the assumptions made.

B. Simplified cost functions

Let us first consider simple cost functions based on the premise that marginal costs are constant. In theory this (as just shown in Section 4A of this topic) follows from the constancy of the marginal product of the variable factor of production. Accordingly, the law of diminishing productivity (Theme 6, Section 2) does not apply in this case. In real life the premise often corresponds to the practice of small business.

Let us have in front of us a small store selling beer. For The output of a trading firm is the number of goods sold. But in order to sell a product, it must first be bought. Accordingly, the costs of

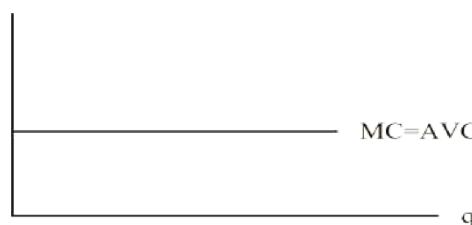
purchase of beer from a wholesaler - variable costs: the more beer is sold, the higher the purchase costs. Let's assume that each bottle is purchased for 5 rubles. All other costs (rent, seller's salary, etc.) we assume constant and constituting in the aggregate 100 rubles per day. Let's make a table of the dynamics of costs from the output - the number of sold bottles (Table 7-1):

Table 7-1. Dynamics of costs

q	FC	VC	TC	MC	AFC	AVC	AC
0	100	0	100				
1	100	5	105	5	100	5	105
2	100	10	110	5	50	5	55
3	100	15	115	5	33,3	5	38,3
4	100	20	120	5	25	5	30
5	100	25	125	5	20	5	25
100	100	500	600	5	1	5	6
Etc.							

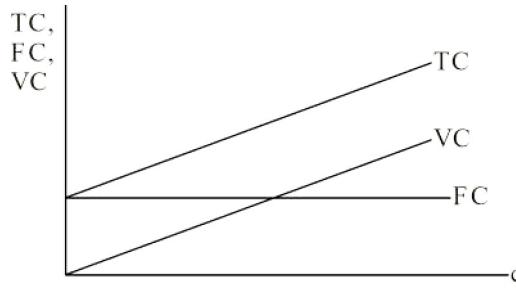
In this case, the marginal cost does not change with output, because with each additional bottle of beer the total (variable) cost increases by the same amount each time - the purchase price of that bottle. But in this case the marginal cost necessarily equals the average variable cost (MC=AVC), because no matter how many bottles we sell, the variable cost per bottle will always be equal to its purchase price. This is reflected in Fig. 7-2:

Figure 7-2. Marginal and average variable costs



As long as average variable costs do not change with increasing output, the variable and therefore total cost functions will be linear (Figure 7-3):

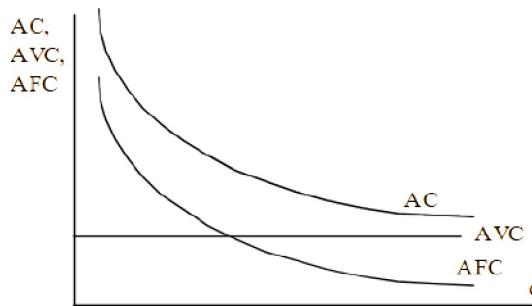
Figure 7-3. Fixed, variable and total costs



Since $TC = FC + VC$, and fixed costs do not change, the lines of variable and total costs are parallel to each other in the figure, and the distance between them equals fixed costs. At zero output, variable costs are zero, but fixed costs are not zero, because they have to be borne even if the firm produces nothing. Thus, at zero output, total costs are equal to fixed costs, i.e., the TC line leaves the point of fixed costs.

In this regard, the average cost functions will look like this (Fig. 7-4):

Figure 7-4. Average costs



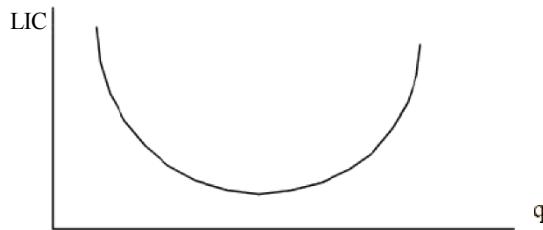
The dynamics of average fixed and average variable costs have already been discussed. As for the average total cost function (AC), it is decreasing and tends to AVC , since $AC = AFC + AVC$, with average fixed costs falling and tending to zero, and average variable costs remaining the same. Thus, the lines AC and AFC are parallel to each other, and the distance between them is equal to AVC .

Conclusion: the greater the volume of output, the lower the average constant, respectively, and the average total cost of the firm.

B. Complicated cost functions

Very often we have to deal with complicated cost functions based on the law of diminishing productivity (topic 6, item 2). It leads to the fact that the marginal cost, after an initial decrease, sooner or later begins to grow (Fig. 7-5):

Figure 7-5. The marginal cost curve



This means that initially each successive unit of output requires less and less additional cost, and then the trend reverses: the larger the output, the more expensive each successive unit of output becomes.

Such dynamics of marginal, respectively, and average variable costs are caused by the dynamics of the marginal and average product of the variable factor of production - labor, discussed in theme 6, item 2. Recall that marginal and average products first increase, then reach a maximum, and then begin to decrease. So, while the marginal (average) product of labor increases, marginal (average variable) costs decrease; the moment the marginal (average) product of labor reaches a maximum, marginal (average variable) costs become minimal; if the marginal (average) product of labor begins to fall, marginal (average variable) costs increase.

Let us give a conditional numerical example. In this case we initially know the value of fixed costs, as well as the dynamics of variable costs depending on changes in output. All other costs are estimated (Table 7-2):

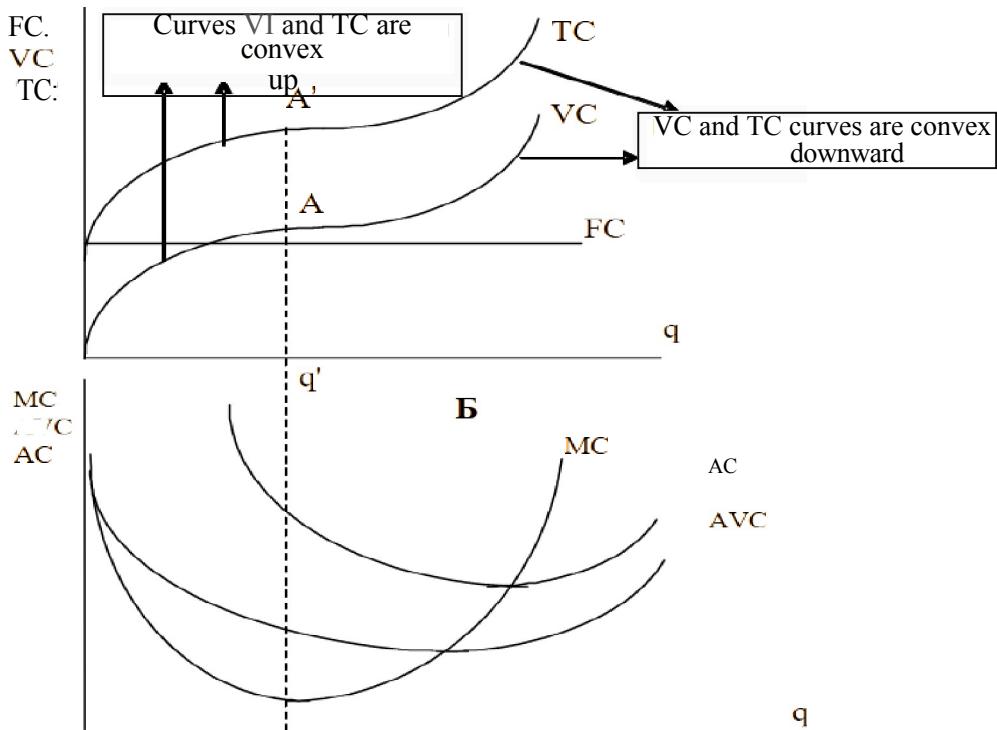
Table 7-2. Complicated variant of cost dynamics

q	FC	VC	TC	MC	AFC	AVC	AC
0	25	0	25				
1	25	30	55	30	25	30	55

2	25	54	79	24	12,5	27	39,5
3	25	74	99	20	8,3	24,7	33
4	25	91	116	17	6,3	22,8	29,1
5	25	107	132	16	5	21,4	26,4
6	25	124	149	17	4,2	20,7	24,9
7	25	144	169	20	3,6	20,6	24,2
8	25	168	193	24	3,1	21	24,1
9	25	198	223	30	2,8	22	24,8
10	25	240	265	42	2,5	24	26,5

In this case, the variable and total cost functions are no longer linear, although the TC and VC lines are still parallel to each other, and the TC curve leaves the fixed cost point (Figure 7-6A):

Figure 7-6. Functions of variables, total, marginal, average variables, and average total costs



The nature of the variable and total cost curves is determined by the dynamics of marginal costs. As long as marginal costs decrease, variable and total costs increase more slowly than output. In Fig. 7-6A this is reflected by the convexity of the VC and TC curves up to the inflection points (points A and A'). At the output corresponding to the inflection points (q'), marginal costs reach a minimum. Then they

begin to increase, causing variable and total costs to rise faster than output. This means that the *VC* and *TC* curves

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The marginal cost function also determines the appearance of the average variable and average total cost curves (Fig. 7-bB).

The *MC* and *AVC* curves leave the same point: for infinitesimally small values they are equal. Then the marginal cost decreases and "pulls with it" the average variable cost, which also falls, but more slowly. At a certain level of output (q') marginal cost reaches its minimum. Then marginal costs begin to rise, dragging average variable costs along with them, although the latter are still falling for some time "by inertia". The point is that average variable costs fall as long as they are greater than marginal costs. The marginal cost curve, therefore, crosses the *AVS* curve at its minimum, after which both functions increase.

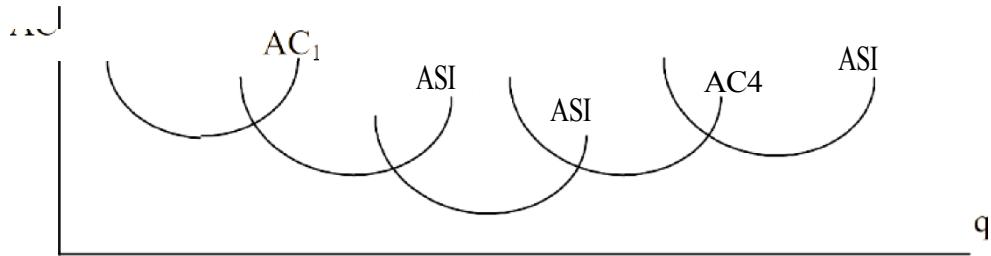
The average total cost curve (*AC*) comes out of infinity, because when production is close to zero, fixed costs still have to be incurred, and hence the total cost per unit of output is very high. Then the average total cost falls, reaching a minimum at the point of intersection with the marginal cost curve. The point of minimum of average total cost is to the right of the point of minimum of average variable cost. This is because average total costs include not only average variable costs, but also average fixed costs, and the latter are constantly decreasing. As output increases, the *AC* and *AVC* curves converge as the average fixed cost tends to zero.

5. Costs in the long term

In the long run, the firm can change all the factors of production-not only labor, but also capital. As a result, there are no fixed costs here, all costs become variable. Suppose the firm

decides the question of what size plant it is reasonable to build how much capital to use. There are five options, and each plant size (capital is fixed) corresponds to a different curve of short-term average total costs: from AC_1 at the smallest plant to AC_5 at the largest (Fig. 7-7):

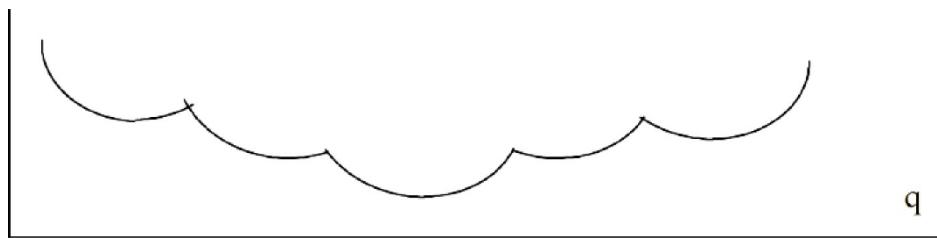
Figure 7-7. Short-term average total cost curves as a function of capital



We see that at first the transition to a larger plant leads to a decrease in costs per unit of output: the point of minimum of the AC' function is located below the corresponding points of the AC and AC_i functions. Then these costs increase. This is due to the fact that, at first, as the plants get larger, the returns to scale increase, and then begin to decrease (theme 6, item 3). In fact, if, for example, as labor and capital are doubled (twice the size of the larger plant), output more than doubles (increasing returns to scale), then the cost per unit of output decreases. And vice versa.

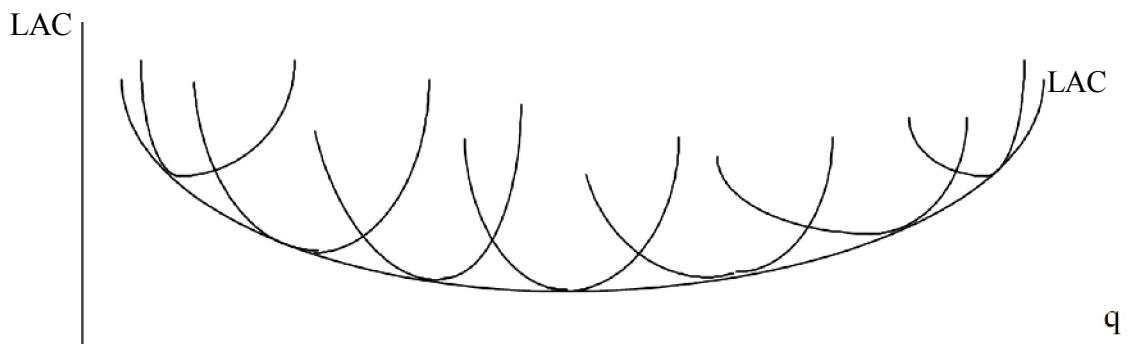
The segments of the AC curves above their intersection points do not interest the firm: there is no point in incurring higher costs if the same output can be obtained at a lower cost at another plant. Therefore, the long-run average cost curve (LAC) will look like this (Fig. 7-8):

Figure 7-8. Long-term average cost curve



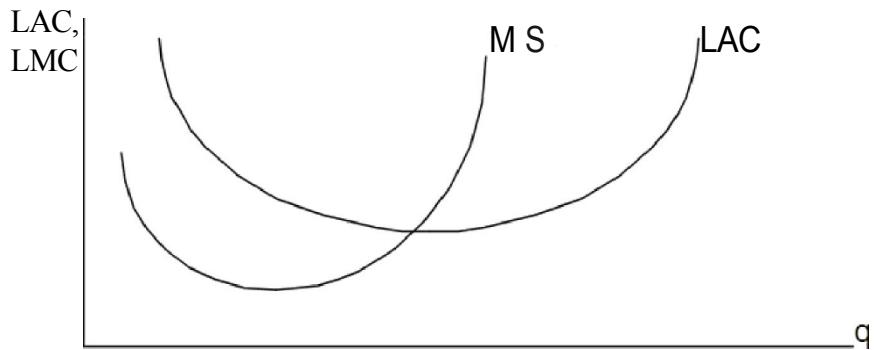
Suppose now that the firm can choose not from five, but from an infinite number of variants of the size of its plants. In this case each of the plants differs from the other by a very small amount of capital (conventionally, by one machine). Then the short-term average total cost curves become very numerous, they are located very close to each other, and the long-term average cost curve smoothly envelopes them (Fig. 7-9):

Figure 7-9. Short-term and long-term average cost curves



As for the long-run marginal cost (LMC) curve, it does not envelope short-run marginal cost curves at all. Short-run marginal costs are plotted for each given plant, while long-run marginal costs reflect the increase in total costs as output increases by one, provided all factors, including capital, begin to change. The long-run marginal cost first decreases, then reaches a minimum, then increases, crossing the LAC curve at its minimum (Figure 7-10):

Figure 7-10. Long-run marginal and average costs



So, the dynamics of long-run average cost depends on the volume of output, but for any level of output there is a cost minimum. Therefore, in order to construct the LAC curve, we must find the touch points of all isocosts and isoquants. The initial decline of the LAC curve is associated with an increase in returns to scale, and the subsequent growth of the curve is associated with a decline in returns to scale. At the point of LAC minimum, the return on scale

SOURCE.

SELF-STUDY ASSIGNMENTS

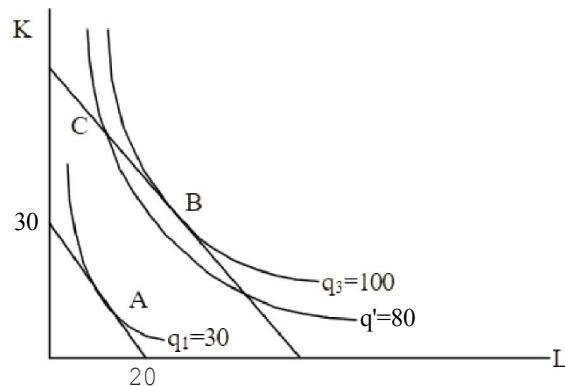
1. Deposits have an interest rate of 8% per annum, which is the highest return you can get on your money. You withdrew 500,000 rubles from your deposit to buy a car. Its annual depreciation is 50,000 rubles. What is your implicit annual cost?

2. At the end of the year, your accountant tells you that your profit is 400,000 rubles. By running your own firm, you are missing out on a salary of 250,000 rubles, which you could have earned by working elsewhere. You also have 1000000 rubles of your own money invested in your business.

Assuming that you miss out on 12% of the annual return on that investment, calculate the economic return. Will you stay in the business for the next year? (Assume that you can withdraw your funds easily and without loss.)

3. The firm's revenue is 200 rubles. Accounting profit is equal to 50 rubles. Implicit costs are equal to 30 rubles. Calculate accounting costs, economic costs, and economic profit.

4. Using the graphs above, answer the questions:



1. What is the marginal rate of technical replacement of capital by labor in point *A*?

2. If the price of capital is 6 rubles and the price of labor is 4 rubles, and a firm at point *B* uses 50 units of capital and 30 units of labor, what is the average cost at this point?

3. Reflects whether point *C* is optimal combination of factors of production? Why yes or no?

4. Explain how resource prices would have to change for point *C* to begin to match their optimal combination.

5. Skilled and unskilled workers in a given factory can substitute for each other. The marginal rate of technical replacement of unskilled workers by skilled workers at a given point on the isoquant equals 3. The wage of a skilled worker is 100 rubles per hour and that of an unskilled worker is 25 rubles per hour. So the manager concluded that it is reasonable to hire more skilled workers at the expense of reducing the unskilled workers, so that the total payroll would remain the same. Is he correct? Justify the answer.

6. There is the following relationship between output (q) and the total cost of the firm (TC):

q	0	1	2	3	4	5	6	7	8	9	10
TC	8	12	16	20	24	28	32	36	40	44	48

Make a table showing the dynamics of fixed, variable, average fixed, average variable, average total, and marginal costs.

7. Fill in the empty cells:

q	FC	VC	TC	AFC	AVC	AC	MC
100				20	10		
200					10		

8. The average total and average fixed costs for 100 units of production are 2.5 and 1.5 rubles, respectively. Calculate the amount of variable costs.

9. Capital (means of production) is a constant factor of production and its expendable quantity is 10 units. Labor is a variable factor. The price of a consumable unit of capital is 5 cents per unit, and the price of labor is 10 cents per unit. There is the following relationship between the amount of labor used and the amount of output:

Amount of labor	1	2	3	4	5
Issue	20	40	70	90	100

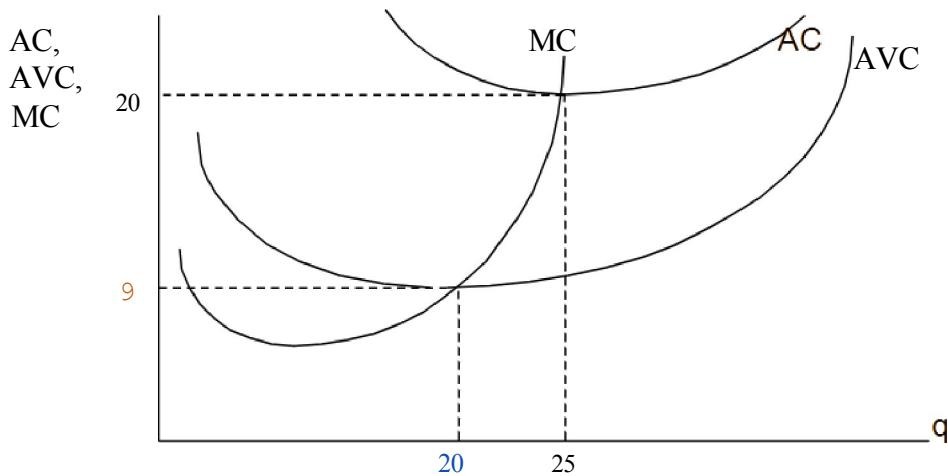
Make a table showing the dynamics of average fixed costs, average variable costs, average total costs, and marginal costs.

10. The total cost of production of radios in one of the factories is estimated at 50,000 denizens per month with a production volume of 1,000 pieces. The fixed costs are 10,000 units per month. Determine .

variable costs, average total costs, average variable costs and average fixed costs.

11. At the output of 100 units, the average variable cost was 20 rubles, and at the output of 101 units it dropped to 19.9 rubles. Calculate the marginal cost.

12. Using the graphs below, answer the questions:



1. What is the amount of variable costs in the production of 20 units?
2. If the average fixed cost is 25 rubles for 10 units of production, what will be the average variable cost for 25 units of production?
3. Does the law of decreasing productivity apply to the production function defining the cost functions shown?

13. The production function of the firm: $q=x-y^{1/4}$. Producer's budget constraint: $200=20x+8y$. Calculate the marginal rate of technical substitution of factor y by factor x at the point of optimum.

14. The production function of the firm is $q = xy/(x+y)$. The producer spends 80 rubles to buy factors of production. The price of factor x is equal to

25 rubles, and factor y equals 9 rubles. Calculate the optimal combination of factors.

15. The firm's production function: $q=K^{12} L^{12}$. The firm uses 16 units of labor and 9 units of capital, the latter being a constant factor. The price per unit of labor is 6 rubles. Calculate the values of marginal and average variable costs.

16. The production function of the firm: $q = x^2 y^2$. The price of factor x is 4 rubles, and the price of factor y is 6 rubles. The firm's costs are 24 rubles. Factor y has become four times cheaper. How much money will the firm save by keeping the production level the same?

17. The production function of the firm: $q = x \cdot u$. The price of factor x is 40 rubles, and the price of factor y is 10 rubles. Derive the total cost function of the firm from output. What are the functions of long-run average and marginal costs?

18. The production function of the firm is $q=100KL$. If the price of labor is 30 rubles and the price of capital is 120 rubles, what will be the average cost of producing 100 units of product?

19. The production function of firm XYZ is $h = * -$,
where q is output per week;
 K is the amount of capital used; L is the
amount of labor used.

A. An employee's wage rate is 500 rubles per week, and it costs 2,000 rubles per week to rent one piece of equipment. What amount of labor and capital should the firm use when fulfilling an order to produce 200 units of product to provide economically

effective output? What would be the total cost of the firm? Illustrate the situation graphically.

Б. A contract for the production of 200 units has been signed, but the firm has only 100 workers available in the short term. The firm's budget (the amount of total costs) is based on the calculations in item *A*. By what amount will the average total costs in the short run exceed the average long-term costs? Illustrate the situation graphically.

В. Suppose the firm has only 100 thousand rubles to buy the necessary resources. What is the maximum possible output? Illustrate the situation graphically.

Г. The firm has had to double the wages of its workers. How much labor and capital will the firm use to achieve economically efficient output if it wants to produce 100 units? Illustrate the situation graphically.

Д. Derive functions of total, marginal, and average costs of the firm in the long run as a function of labor and capital prices and output. Draw conclusions.

TEMA 7. ANALYSIS OF AGGREGATE DEMAND

1. Classical and Keynesian theories of full employment
2. Structure of aggregate demand
3. Equilibrium in the Keynesian income-expense model
4. Multiplier

1. Classical and Keynesian theories of full employment The main question in macroeconomics is how to achieve full utilization of available resources or a state of "full employment. Classical economists believed that full employment is achieved automatically. In doing so, classical macroeconomics proceeds from two basic assumptions:

First, it argues that aggregate demand should in principle be sufficient to purchase all the products produced at full employment, since supply generates demand. Only temporary mismatches of supply and demand for individual commodities are possible and are quickly eliminated by the market.

Second, even if the situation of lagging aggregate demand behind aggregate supply (everyone wants to sell, but no one is willing to buy for some reason) were to arise by chance, the market mechanism would again come to the rescue. Firms, unable to sell everything they produce, will begin to skim prices and wages; interest rates will go down in the financial markets. All this will quickly lead to an increase in aggregate demand, which will equalize with aggregate supply under full employment.

Thus, at the macroeconomic equilibrium point, actual GDP is equal to potential GDP. This finding led the classics to conclude that government regulation of the economy is harmful, undermining the efficiency of market self-regulation.

Classical macroeconomics faced a serious test during the Great Depression of the 1930s, which it explained

couldn't. In those years, U.S. GDP fell by nearly a third, and a quarter of workers became unemployed. Worst of all, the economy was stuck at that bottom for a long time - market mechanisms proved incapable of fixing the situation.

In 1936 D. Keynes' book "The General Theory of Employment, Interest and Money" appeared, which changed the whole of economic science. Keynesian theory challenges the main postulate of the classics - the self-regulation of the market economy.

Keynes emphasized that full employment under market conditions could arise only by chance. Keynesian macroeconomics is a theory of aggregate demand. According to Keynes, aggregate demand is unstable and usually insufficient to realize potential GDP. As a result, equilibrium GDP is usually lower than potential GDP. Hence, underutilization of resources, particularly unemployment.

The investment demand of firms is especially volatile. Keynes criticized the classics for their assertions that investment and savings of households must coincide, because savings and investment are made by different economic agents on different grounds. People save for the purchase of expensive goods, for old age, for unforeseen circumstances, etc. The main factor determining the amount of savings is national income: the higher it is, the richer people are, the more savings they can afford.

In turn, firms in planning investment expenditures take into account the size of the real interest rate. However, an equally important factor is the rate of return that firms expect to receive from investments. If expectations are favorable, investment will be high despite the interest rate increase. And vice versa. If, for example, a Russian entrepreneur sees a thriving enterprise taken away from his colleague at the arbitrary of local, regional, or

of the federal government, he is unlikely to dare to make any significant investment, even if the interest rate is low.

Thus, an increase in households' savings (correspondingly, a decrease in their expenditures) will not necessarily be offset by an increase in investment expenditures. But then aggregate demand would fall and be lower than aggregate supply, leading to a fall in national production.

In this regard, the state is obliged to stimulate aggregate demand, achieving its coincidence with the potential GDP. Keynes and his followers proposed a set of measures for such stimulation, associated with monetary and especially fiscal policy of the state.

Thus, the main difference between the neoclassical and Keynesian approaches is that Keynesians believe that aggregate demand is the main factor of stable economic development, while neoclassics believe that aggregate supply is the main factor.

2. Structure of aggregate demand

Aggregate demand (Y_d) is broken down into household demand (C), investment demand of firms (I), government demand (G), and foreign demand - net export (X_p). Hence: $Y'_d = C + I + G + X_p$

Let us consider on what factors all these constituent parts depend aggregate demand.

A. Personal consumption expenditures (C):

Keynes assumed that the growth of households is a function of national income (Y). People consume part of their income and save the other part (we temporarily forget about paying taxes). The basic psychological law, according to Keynes, is that

In this case, national income is equal to GDP, because the value of the produced product is converted into income of the owners of the factors of production.

As income rises, people tend to increase their consumption, but not to the extent that income rises. At the same time, when income is zero, household spending is by no means zero: even if people have earned nothing in a given period, they consume at the expense of past savings and loans. Consumption that does not depend on national income is called autonomous consumption. Its size is influenced by accumulated wealth, consumer debt, household expectations, and other factors.

Thus, the consumption function looks like this:

$$C = C_0 + C_V Y_K,$$

where C_0 is autonomous consumption, C_V is the marginal propensity to consume.

The marginal propensity to consume shows by how many units consumption increases when income rises by one unit, or how much additional income people consume: $C_V = \frac{\partial C}{\partial Y}$. It is usually a fractional value, varying from zero to one.

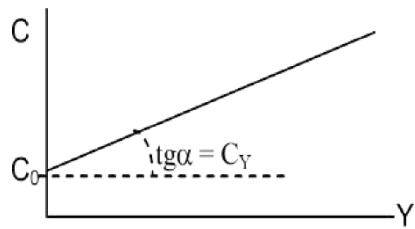
In simple models, the marginal propensity to consume is assumed constant - it does not change as income changes. In other words, each additional ruble of income leads to an increase in consumption by the same number of kopecks (Figure 7-1):

Figure 7-1. Marginal propensity to consume



Let's construct a consumption function of income by plotting the level of national income equal to the volume of national production - real GDP (Y) along the X axis, and the value of consumer spending along the Y axis (Fig. 7-2):

Figure 7-2. Consumption function



The slope of the function is equal to the marginal propensity to consume. Recall that when income is zero, consumer demand is not zero, because there is autonomous consumption. When it increases, the consumption function shifts upward.

The inverse of the marginal propensity to consume is the marginal propensity to save (S_V). It shows by how many units savings increase when income increases by one unit: $S_V = S/Y$. Since the marginal propensity to consume and the marginal propensity to save add up to one, then: $S = 1 - C$.

Knowing the consumption function, we can easily obtain the savings function. If we forget about taxes, national income is decomposed into household consumption and savings (topic 1, item 2):

$$Y = C + S$$

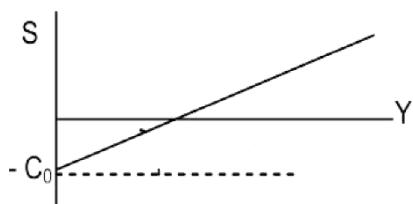
$$\text{Hence: } S = Y - C \text{ Since } C = C$$

+ $C_V Y$, then:

$$S = Y - C - C_V Y \quad S' = -C_0 - C_V Y$$

Consequently, the graph of the savings function will look like this (Fig. 7-3):

Figure 7-3. Savings function



The slope of the function equals the marginal propensity to save. When income is zero, savings are negative (people eat up their previous savings) and equal in modulo to autonomous consumption.

Let us return to the consumption function. If we take into account the taxes levied by the state, the consumption function takes the form:

$$C = C_0 + C_Y(Y - T)$$

In this case, T is autonomous taxes, i.e., taxes whose value does not depend on national income. In other words, autonomous taxes are constant at any level of income. Accordingly, $(Y - T)$ disposable income or after-tax income.

Assuming that T is an income tax or tax that depends on the amount of national income, we can write

$$t = t - Y,$$

where t is the tax rate calculated as a percentage of income. Then:

$$C = C_0 + C_Y(1-t)Y$$

Conclusions: consumer demand is the greater the national income, the marginal propensity to consume, and autonomous consumption; it is the smaller the higher the taxes.

B. Investment demand of firms (I):

This is, as mentioned above, the most volatile part of aggregate demand. It is its changes that most often influence the fluctuations of aggregate demand and, consequently, the volume of social production.

Depending on what factors cause investment demand, investments are divided into induced and autonomous. Investment is called induced if it is caused by an increase in demand for firms' finished goods. Therefore, induced investment is a function of national income: $I.. = f(Y)$.

The logic here is as follows: when national income increases, consumers have a steady additional demand. To meet it, firms increase their production capacity (capital)

make investments. The relationship between induced investment and national income growth is expressed by the formula:

$$L_i = ct - aY,$$

where a is a coefficient showing what investment is needed to produce one additional unit of output. This coefficient is called the gas pedal.

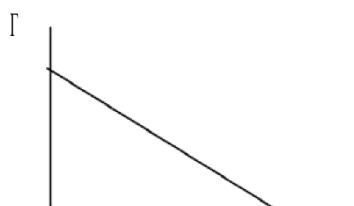
On the other hand, entrepreneurs often make investments even when the national income is fixed. These are investments in new technology and quality improvements. Such investments are the cause, but not the consequence, of GDP growth. Their value does not depend on GDP. That is why they are called autonomous.

Autonomous investment depends on the real interest rate (d).

The simplest investment function looks like this:

$I = e - d \cdot r$, where e and d are some given parameters. The parameter e reflects the amount of investment at a zero interest rate, and the parameter d reflects the sensitivity of investment to the interest rate: by how many rubles investment decreases when the interest rate rises by one point. On the graph, the investment function looks like this (fig. 7-4):

Figure 7-4. Investment function of the interest rate



Since autonomous investment does not depend on GDP, the corresponding function has the form (Fig. 7-5):

Figure 7-5. Investment function of real GDP



B. Government spending (G). The government buys products to produce public goods and public investment.

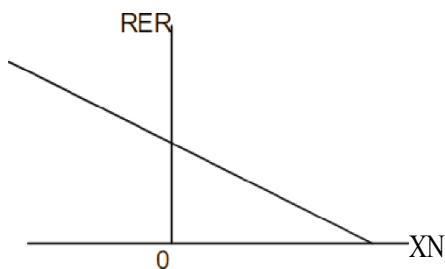
It is difficult to determine the factors influencing the volume of public expenditures. Therefore, in models they are usually treated as an exogenous value, independent of GDP (Figure 7-6):

Figure 7-6. The function of public expenditures on GDP



Г. YIST exports (X_N) is the difference between exports and imports ($X_N'X-M$). In "Aggregate demand and aggregate supply" (item 1) it was said that it depends on the real exchange rate (RER). If it is low, domestic goods are relatively cheap, which stimulates exports and reduces imports. And vice versa (Figure 7-7):

Figure 7-7. The function of net exports on the real exchange rate:



Foreign countries not only buy our goods, but also sell us theirs. Let us assume for simplicity that we buy only consumer goods abroad. The demand for them, like for domestic goods, depends on our national income: the higher it is, the greater our imports, correspondingly lower our net exports. Therefore, in general, net exports are a function of: $X_N'f(RER, U)$.

In simple models, net exports appear as an autonomous value, i.e., independent of GDP (Fig. 7-8):

Figure 7-8. The function of net exports from GDP:



Let us thus write down the resulting aggregate demand function:

$$Y_d = C(Y, T) + I(Y, r) + G + X_N(RER, Y)^1$$

3. Equilibrium in the Keynesian model of income-expenditure

Let us plot the aggregate supply (real GDP) or national income (Y) on the X-axis, and the aggregate demand or aggregate planned expenditures (d^1) on the Y-axis. Planned expenditures are the expenditures that all economic agents (households, firms, the state, and foreigners) wish to spend on goods and services produced in

GTJ3ZHe P]EZI]EZI] EZI !

A line leaving the origin at an angle of 45° contains all points where aggregate demand will be equal to aggregate supply, i.e. macroeconomic equilibrium is reached. On the contrary, there is no equilibrium when planned expenditures are higher or lower than national income.

Let's draw a planned expenditure line. As we know, planned expenditures are the sum of household consumption expenditures, firm investment expenditures, government expenditures, and net exports. Thus, the planned expenditure function:

$$d^1 = C_0 + C_1(Y) + I + G + X_N$$

For simplicity, let us assume that investment, government spending, and net exports are autonomous, i.e., independent of GDP (national income). In turn, the function of consumer spending: $C = C_0 + C_1(1-t)Y$. Consequently, the function of planned expenditures takes the form:

$$d^1 = C_0 + C_1(1-t)Y + I + G + X_N \text{ OR } d^1 = A + C_1(1-t)Y, \text{ where}$$

A is the sum of all autonomous (fixed) costs ($A =$ $+I + G + X_N$)

Hence:

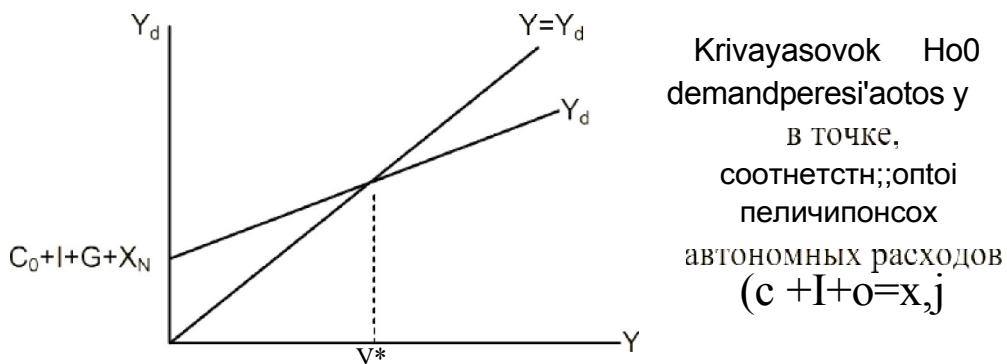
¹ The '+' sign means that the corresponding component of aggregate demand increases when the specified variable increases, while the '-' sign means the opposite.

1. The function of planned expenditures intersects the Y-axis at the point corresponding to the value of all autonomous expenditures;

2. Planned expenditures (aggregate demand) grow as national income grows only at the expense of consumer spending.

Connect the lines of aggregate demand and aggregate supply in one figure and see how the economy arrives at equilibrium (Figures 7-9):

Figure 7-9. The income-expense model ("Keynesian cross")



At all points to the right of the intersection of the two curves, aggregate demand is less than aggregate supply, or the planned expenditures of economic agents are less than national income. In other words, firms are unable to sell everything they produce. They have unplanned investments in excessive stocks of unsold products.¹ As a result, firms are forced to reduce production.

On the contrary, at all points to the left of the intersection of the two curves, aggregate demand is greater than aggregate supply. Here planned expenditures exceed national income. Firms cannot meet the increased demand, which induces them to increase output.

Finally, at the point where the two curves intersect, aggregate demand equals aggregate supply. This also means that here the planned

¹ If firms have produced products, but have not yet had time to sell them, then it is considered that they have so far sold products to themselves, i.e. they have made investments in inventories (topic "Gross Domestic Product," paragraph 1).

expenditure equals actual expenditure, respectively, and national income. In addition, at this point, planned investment equals actual investment, respectively, and savings. All of the above means that this point corresponds to equilibrium GDP (U^*).

In the income-spending model, equilibrium GDP is determined exclusively by aggregate demand. Here it is assumed that aggregate supply automatically "tightens" to aggregate demand, i.e. producers are able to provide any output in the presence of demand. Prices are assumed to be stable, i.e. we are on the horizontal - Keynesian - segment of the aggregate supply curve in the "AD-AS" model (topic "Aggregate demand and aggregate supply", paragraph 2).

Thus, the income-expense model describes the behavior of the economy in the short run.

The equilibrium GDP can be calculated analytically by equating the functions of aggregate demand and supply to each other.

NCTION COBOK PHOFO **G N**]30G3: $d'c+i+g+xn'c + co(1-t)y+i+g+xn$
with $CO+I+G+XN$ being autonomous expenditures (A). At the equilibrium point, aggregate demand and aggregate supply coincide ($d=Y$). Then:

$$Y = C_Y(1-t)Y + A \rightarrow Y = \frac{A}{1 - C_Y(1-t)}$$

The equilibrium GDP can also be determined using the "leakage-injection" model. Recall (Introduction to Macroeconomics, paragraph 2) that leakages include household savings, taxes, and imports: $S+T+M$. In contrast, injections consist of investments, government spending, and exports: $I+G+X$.

The equilibrium GDP, as we have just established, is:

$$Y = \frac{A}{1 - C_Y(1-t)} . \text{ Отсюда: } Y[(1 - C_Y(1-t))] = A .$$

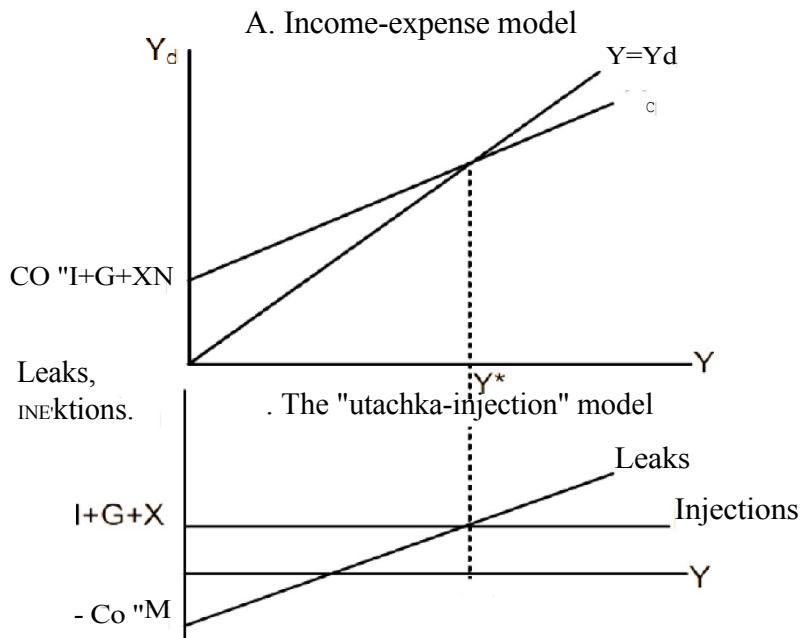
As we remember, A is all autonomous costs, i.e. $A=C+I+G+XN$. Therefore:
 $b(1-C, (1-t)C?ii + 1 b' + .$ Opening the bracket in the left part

of the equation and transferring C_o to the left side, we obtain: $Y - C = I + G + X - M$. Now add and subtract taxes to the left side. Then: $Y - C + T - T = I + G + X - M$. Keeping in mind that household savings are obtained by subtracting consumption and taxes from national income ($S = Y - C - T$ - topic "Introduction to Macroeconomics," para. 2), we have:

$$S + T + M = I + G + X$$

Thus, it is proved that at the equilibrium point the leaks are equal to injections. This can be expressed graphically as follows (Fig. 7-10):

Figure 7-10. Equilibrium GDP in the "income-spending" and "leakage-injection" models

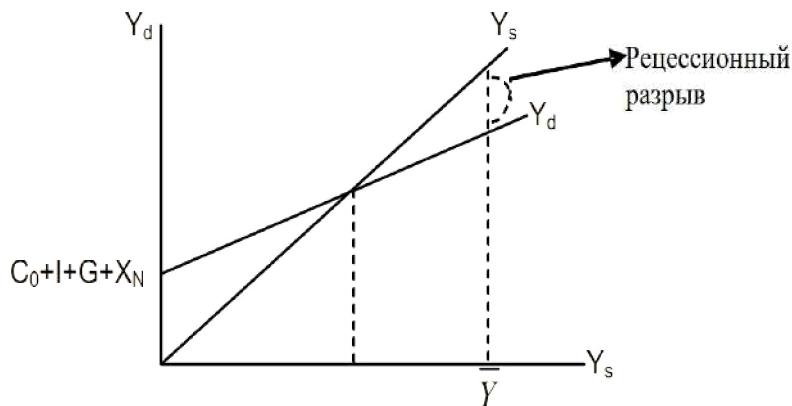


In Fig. 7-10B, national income or GDP is plotted along the X-axis, while leakages and injections are plotted along the Y-axis. Since investment, government spending, and exports are considered autonomous (constant) values, the line of injections runs parallel to the X-axis. On the other hand, leakages are not constant: at zero income they are equal to $(-C_o + M)$, and then they increase as income rises. The point is that of the leakages only imports are an autonomous quantity in our model, while household savings and tax payments turn out to be the larger the national income.

The equilibrium GDP (Y^*) corresponds to the intersection point of the leakage and injection lines just as it does to the intersection point of the national income and planned expenditure lines in Fig. 7-10A.

It should be kept in mind that equilibrium GDP is not necessarily equal to potential GDP. D. Keynes emphasized that, more often than not, equilibrium GDP will be lower. In Fig. 7-11, potential GDP (F) is to the right of equilibrium GDP (Y^*):

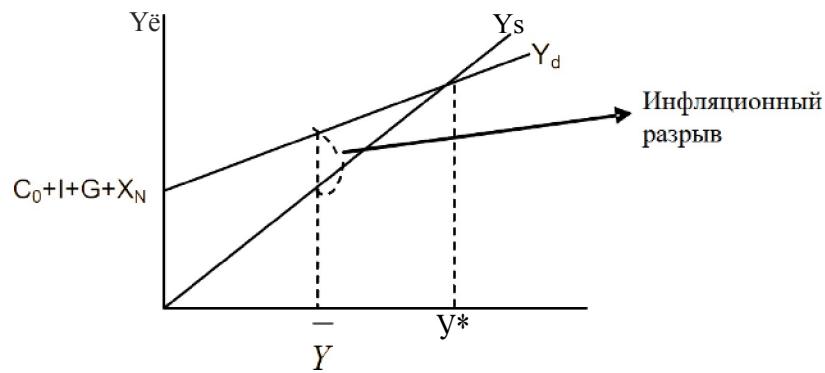
Figures 7-11. Lag of equilibrium GDP from potential GDP



As a result, there is a recessionary gap $(Y^* - F)$. Its value shows how much aggregate demand must increase (shift the curve Y_d upwards) for equilibrium GDP to reach potential GDP. Keynes attributed the leading role in stimulating aggregate demand to government policy.

The opposite situation is also possible, when the equilibrium GDP is temporarily higher than the potential GDP, i.e. the economy works with overload (Fig. 7-12):

Figure 7-12. Equilibrium GDP exceeds potential GDP



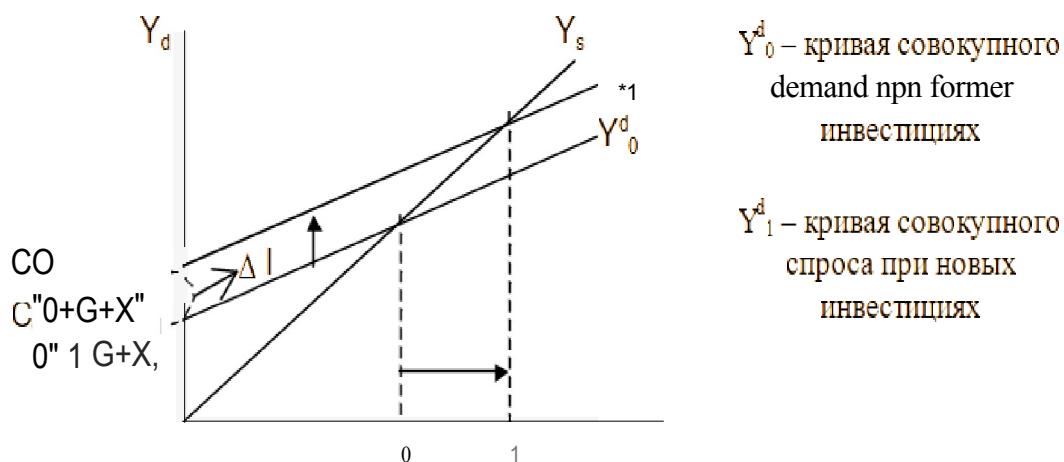
Such a situation is fraught with rising prices, i.e. there is an inflationary "azra" ($d-Y$). Its value shows by how much aggregate demand must be reduced (the id curve must be shifted downward) for equilibrium GDP

I was brought down to the level of the POTENTIAL.

4. Multiplier

Let any of the components of autonomous expenditures increase, e.g., investment (from $Ind II$). On a Keynesian cross, this would cause the aggregate demand curve to shift upward parallel to the previous curve by the amount of increase in investment (AI) (Figure 7-13):

Figure 7-13. Multiplier effect



The graph shows that aggregate demand, and consequently equilibrium GDP, increased as a result (from up to Y_0) by an amount significantly higher than the initial increase in autonomous expenditures. Why does this happen?

Logically, this phenomenon can be explained as follows:

Firms have increased their autonomous investment for some reason. Suppose they decided to buy new equipment worth 100 rubles. The money is spent, the equipment is produced. Thus, the increased investment demand initially caused an increase in GDP by the same 100 rubles. But the process does not end there. The machine workers receive these 100 rubles in the form of wages. Let the marginal

the propensity to consume is 0.5. This means that workers save half of their additional income, and the other half - 50 rubles. - spend (we do not consider taxes for the sake of simplification). This money is spent by machine builders, for example, on clothing. The increased demand is satisfied by garment manufacturers, increasing GDP by another 50 rubles. And everything repeats all over again: out of the received 50 rubles of wages garment workers save 25 rubles, and spend the other 25 rubles. Production grows by another 25 rubles. The last 25 rubles again turn into someone's income. And so on.

Thus, there is a chain of forward and backward linkages: spending - production - income - spending again - additional output - additional income, etc. As a result, the initial demand impulse causes, ultimately, a much larger increase in aggregate demand and GDP. In our example, GDP increases by: $100+50+25+12,5+6,25+\dots+0=200$ py6. This effect is called the "autonomous spending multiplier effect".

The autonomous expenditures multiplier (m) is a coefficient showing by how many rubles the aggregate demand and GDP (Y) change when autonomous expenditures (A) change by 1 ruble: $m=AY/AA$.

In this example, the growth of autonomous expenditures (investment expenditures) by 100 rubles led to the growth of GDP by 200 rubles, respectively, the multiplier is 2.

We need to determine the value of the multiplier of autonomous expenditures for the general case.

The GDP equation is known: $Y=C+I+G+XN$

The function of consumer spending: $C=C_0 + Cx(Y-T)$. Then: $Y=C_0+Cv(Y-T)+I+G+XN$, where C_0 , I , G , XN are autonomous expenditures; $C_0+I+G+XN'A$.

Then: $Y=C(Y-T)+A$

Let taxes (T) also be an autonomous value - independent of GDP.

Suppose the autonomous costs changed by AA. In this case we have two equations:

$$\begin{aligned} Y &= Cy(Y-T) + A \text{ - initial; } Y + AY = Cv(Y + AY - \\ &T) + A + AA \text{ - subsequent.} \end{aligned}$$

Let us subtract the first equation from the second one. After transformations we obtain:

The fraction $\frac{1}{1-C_Y(1-t)}$ is the required multiplier. Since the denominator of the multiplier is a fraction; the multiplier itself is always greater than unity. The value of the multiplier in this case depends on the marginal propensity to consume (Cv): the higher it is, the greater the multiplier.

Let us continue the analysis of the multiplier of autonomous expenditures. Assume that the tax levy (t) is not given, but the tax rate (t). Then the tax levy will depend on GDP (national income): $T=t \cdot Y$. The consumer demand function of households in this case takes the form: $C = +Cv(1-t)Y$.

A GDP function: $Y = Co + Cy(I-t)Y + I + G + XN'Cy(1-t)Y + A$, where A is all autonomous expenditures. Meaning:

$$Y = \frac{1}{1 - C_Y(1-t)} A \rightarrow \Delta Y = \frac{1}{1 - C_Y(1-t)}$$

Consequently, the complex multiplier of autonomous expenditures is:

$$\frac{1}{1 - g'_c(1-i)}$$

In this case, the multiplier is the greater the marginal propensity to consume and the lower the taxation ставка.

Let's introduce a foreign country into the analysis. It used to be assumed that net exports were autonomous - independent of GDP. However,

Net exports are the difference between exports and imports, and imports, as noted (paragraph 2 of this topic), are positively related to our GDP or national income. This dependence can be expressed as follows:

$M=MvY$, where Mv is the marginal propensity to import.

She shows, how much increases imports with national income grows by one unit: $Mv=AM/AY$.

Thus Thus, equation GDP takes the form: $Y=C+i+G+XN'C0+C(1-t)Y+i+G+X-MvY=Cy(1-t)Y-MAY+A$, where A all autonomous expenditures. Meaning:

$$\frac{1 - C_Y(1 - t) + M_Y}{1 - \epsilon^*, (1 - f) + .tf},$$

Then:

$$\frac{1}{x} \frac{1 - g''(1 - i + i')}{1 - i + i'}$$

We have obtained an expanded multiplier of autonomous expenditures, which will be the greater the smaller the marginal propensity to import.

Let us now assume that investment is not an autonomous value, but partially depends on GDP (item 2 of this topic). In other words, we introduce into the analysis, along with autonomous investment, also induced investment.

As a result, the total investment (I) becomes the sum of AUTONOMOUS (I_a) AND IND CURRENT INVESTMENTS (I_u): $I = I_a + I_u$.

Induced investment is positively related to GDP, and its value can be calculated by the formula:

$I_u = I_y Y$, where I_y is the marginal propensity to invest.

It shows how much investment increases when GDP (national income) grows by one unit: I_y / AY .

Consequently: $I_u = I_y Y$

As a result, the GDP equation takes the form:

$Y = C + I + G + X - N'C_0 + CJ(1-t)Y + I_a + I_Y + G + X - M_y Y = Cy(1-t)Y + I_y Y - MAY + A$, where A
- all autonomous expenditures. Meaning:

$$\overline{I - C_Y(1-t) - I_Y + M_Y}$$

$$\overline{1 - C_Y(1-t) - I_Y + M_Y}$$

Then:

$$\overline{\Delta A} = \overline{1 - C_Y(1-t) - I_Y + M_Y}$$

What we have before us is a supermultiplier of autonomous expenditures, which will be the greater the marginal propensity to invest.

In conclusion, let's compare the simplest multiplier of autonomous costs ($\overline{1 - C_Y}$) with a supermultiplier. The latter reflects the leakage from the product and income circuit due to taxes and imports, as well as investment injections into the circuit (topic "Introduction to Macroeconomics" paragraph 1). Therefore, the supermultiplier more realistically shows the changes in the economy that occur due to changes in any of the components of autonomous expenditures.

SELF-STUDY ASSIGNMENTS

1. Are the statements true?

A. The marginal propensity to consume cannot be equal to the marginal propensity to save;

B. dynamics of savings and the volume of investments are determined by the action of the same factors;

B. If the consumption function is known, it is always possible to graph the savings function.

2. "Interest rates are usually higher during an upturn than during a downturn. But the same can be said of investment spending. This means that high interest rates encourage investment and low interest rates discourage it." Refute this statement.

3. Explain the relationship between the AD/AS and income/expense models. Use these models to depict the following situations:

- A. Aggregate demand exceeds aggregate supply;
- B. Planned expenditures were lower than national income; C.
- Autonomous investment declined;
- Г. Prices in the economy have risen.

4. The function of planned expenditure: $Y=C+I$. Private consumption function: $C=100+0.8Y$. Investments are autonomous: $I=50$.

1. Derive a household savings function and graph it.
2. Find the equilibrium GDP. Show it in the figure.
3. Define leakages and injections. Make sure that the equilibrium GDP can also be determined through the equality of leakage and injection. Align the leakage and injection graphs in one figure.

5. Equilibrium level GDP: $Y=10000$. The function private consumption: $C=1000+0.6(Y-T)$, where T - taxes, equal to 1000.
e

Government spending is 1,500. Exports are 800 and imports are 900.

Calculate the equilibrium level of investment.

6. The function of private consumption in the economy: $C=20+0.8(1-t)Y$, where Y - GDP, t is the tax rate. The equilibrium GDP is 100, and $t=0.2$. Investment has increased by 2. How much will the equilibrium GDP increase?

7. The marginal propensity to consume is 0.8. Firms have increased investment by 100 billion rubles. By how many rubles will aggregate demand increase? What is the multiplier of autonomous expenditures?

8. Let the economy be described by the following system of equations and relations:

$$C=180+0.8(Y-T), I=190, G=250, T=150.$$

1. What is the value of the marginal propensity to consume in this model?
2. Draw the aggregate demand curve, show its slope, and determine the value of autonomous consumption.
3. Calculate the value of unplanned stocks of unsold products at producers with GDP equal to 3000.
4. Calculate the equilibrium GDP.

9. In the economy of a notional country:

$$Y=C+I+G+XN - \text{basic macroeconomic identity};$$

$$C=200+0.8(Y-T) - \text{consumption function};$$

$T = 500$ - taxes; $I = 400$ - investment; $G = 400$ - government spending;

$X = 300$ - exports; $M = 200$ - imports.

Calculate the equilibrium level of GDP.

10. For a country, we know the private consumption function: $C=1200+0.8(Y-T)$, government spending, investment and exports: $G=2000$, $I=800$, $X=700$, tax function: $T=100+0.25Y$, import function: $M=200+0.1Y$.

1. Determine the autonomous spending multiplier and the equilibrium GDP.
2. Output the leakage function, define the injections. Confirm the size of equilibrium GDP through the equality of leakages and injections. Show equilibrium GDP using leakage and injection graphs.
3. If potential GDP is 9000, which gap is recessionary or inflationary? Determine the size of the gap.

TEMA 8. FISCAL POLICY

1. The budget system of the Russian Federation. The state budget and its structure
2. Taxes and the tax system
3. Fiscal policy и macroeconomic management

1. Budget system RUSSIAN FEDERATION. State budget and its structure

The budget is a form of formation and spending of funds to ensure the functions of public authorities and local self-government. The formation and execution of the budget in our country is regulated by the Constitution of the Russian Federation, the Budget Code, other legislative and regulatory acts. In addition, the law on the federal budget for the corresponding year, laws of the subjects of the Federation, normative-legal acts of local authorities on budgetary issues are adopted annually.

The budget system of Russia consists of three levels of budgets:

- The first level - the federal budget and budgets of state extrabudgetary funds;
- The second level - the budgets of the subjects of the Russian Federation (republican budgets, the budgets of territories and regions, the budgets of Moscow and St. Petersburg) and the budgets of territorial state off-budget funds;
- the third level - local budgets.

These budgets operate autonomously - each of them has legally defined sources of income and areas of expenditure. An integral part of the budgetary process is

The state extra-budgetary fund is a fund of money formed outside the federal budget and the budgets of the subjects of the Russian Federation. It is designed to ensure the rights of citizens to pension, social insurance, unemployment insurance, health care, and medical care.

budgetary regulation, i.e. redistribution of resources between the budgets of different levels in order to equalize the revenue part of the budgets to the minimum necessary values.

The federal budget, budgets of subjects of the Russian Federation and local budgets together form **the consolidated budget** of Russia. With its help, federal, regional and local authorities carry out the distribution and redistribution of GDP. The size of the consolidated budget and especially its share in GDP are the most important indicators characterizing the degree of state intervention in the economy and significantly affecting other macroeconomic parameters.

In the course of the historical development of the market economy, we can clearly see a long-term trend toward an increasing share of public expenditures in GDP. In other words, an increasing share of national production is bought by the state. This is explained, above all, by the increasing role of public goods in the economic development of all countries.

At the same time, the share of public expenditures in GDP varies greatly from country to country. Thus, in the USA this share is less than 40%, in Japan - about 35%, in Western Europe - mostly about 50%, reaching up to 65% in Sweden. In Russia, according to official data, in 2002 the consolidated budget expenditures amounted to 31.1% of GDP. 31.1% OF GDP. Many economists consider this figure to be an understatement. In their opinion, the consolidated budget reaches 40% of GDP in our country, which is excessive for a poor country, hindering its development by undermining market mechanisms.

The construction of the budget is based on the social contract theory: households and firms pay taxes to the state, regional and local authorities, in exchange for which the latter undertake to provide society with a certain set of services. Accordingly, the budget consists of two parts: revenue and expenditure.

The leading element of the budget system is the **state (federal) budget** - the main financial plan for the formation and use of the centralized cash fund of the state. The federal budget for the next fiscal year is approved annually in autumn by the State Duma upon presentation by the government. The revenue part of the federal budget is formed from taxes and non-tax payments. The federal budget is financed by the following main taxes: excise duties, customs duties, value added tax, partial income tax, etc. Non-tax revenues mainly include revenues from the use of state property and foreign economic activity, as well as part of the profits of state unitary enterprises. At the same time the budget revenues do not include funds received from internal and external loans and sale of state property.

On the other hand, the federal budget makes expenditures related to the production of public goods of national importance (financing of social and cultural development and science, maintenance of public authorities and administration, law enforcement, defense, etc.), the financing of priority sectors of the economy, the implementation of targeted programs, the servicing of public debt, etc. At the same time, in the draft budget for 2004 it is planned to spend about 3.5 times more on the armed forces and law enforcement bodies than on health care, education and science.

State budget expenditures (as well as regional budgets) are divided into two main parts: debt service expenses - the so-called "interest expenses" and other expenses - non-interest expenses.

It should be emphasized that only interest payments on government loans are included in the expenditure part of the budget; expenses on the payment of principal are not included in the budget, but are made at the expense of surpluses or accumulated reserves, or additionally borrowed funds.

The excess of government expenditures over revenues constitutes **a government budget deficit**. Otherwise there is **a surplus**. If state revenues exceed expenditures except for interest expenditures, **a primary state budget surplus** is formed.

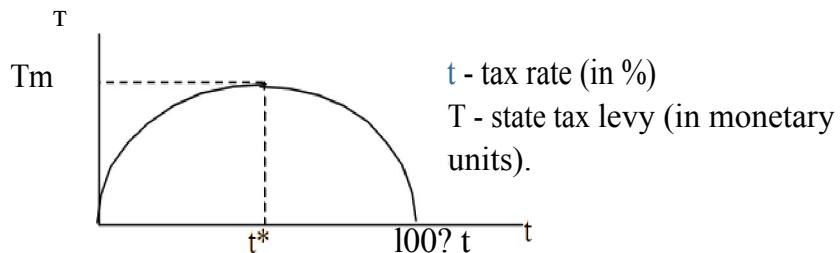
The state budget has a significant impact on all macroeconomic indicators, and therefore is an object of close public attention everywhere. For example, according to the European Monetary Union's financial stability pact, the budget deficit cannot exceed 3 percent of a country's GDP. The point here is that a large deficit has a negative impact on the economy.

The latter is due to the fact that state budget deficits can be covered in three ways: issuing more money into circulation, increasing government borrowing, and increasing taxes. The first source is fraught with inflation if the increase in money supply is not accompanied by an increase in production or a slowdown in the velocity of money circulation (topic "Inflation," paragraph 2). For its part, the issuance of loans increases the demand for borrowed funds, respectively - the interest rate, which in turn leads to a reduction in investment. This is the so-called "**crowding-out effect**": government spending crowds out private investment. A form of government borrowing is non-payments, when the state does not pay for purchased goods and services or pays late. Non-payments undermine the reproduction process, lead to higher prices, and distort the structure of the economy.

If the government tries to increase tax revenues by raising tax rates, it leads to a reduction in private spending, undermining incentives for productive activities. There are cases when an increase in tax rates is accompanied not by an increase, but by a decrease in state revenues, because production is reduced, many activities go into the shadow economy. At

the possibility of such a situation drew the attention of the American economist A. Laffer. He drew a curve of the dependence of the tax fee on the tax rate, which looks like this (Fig. 7-1):

Figure 7-1. The Laffer curve



The logic of the Laffer curve is as follows. Obviously, with a zero tax rate, the income of the state is also zero. Similarly, at a 100% tax rate no one will work legally, and again the state will be left without income. There is, therefore, an optimal tax rate (t^*) at which the state's revenue will be maximal (T_{max}). Exceeding this rate not only harms the economy, but also undermines the state budget.

The problem of obtaining a balanced state budget is very relevant for today's Russia. This problem, unfortunately, is not new to us: throughout the 1990s, the state budget was in deficit. In the first half of the 90s, the government mainly covered its deficit by taking loans from the Central Bank and thus solved its budget problems by putting more money into circulation, which led to high inflation. The logic of fighting inflation forced the government to switch over to covering its deficits by borrowing on the financial markets. Since 1995 it abandoned the use of Central Bank loans to cover the budget deficit.ⁱ Instead, a variety of government obligations, such as State

ⁱ adopted in 1998, the Budget Code expressly prohibits the use of loans from the Bank of Russia, as well as the acquisition by the Bank of Russia of debt obligations of the Russian Federation to cover the state budget deficit.

short-term bonds (GKO), Federal Loan Bonds (OFZ), State Savings Loan Bonds (SSL), etc.

At the same time, the problem of the budget deficit not only did not become less acute, but, on the contrary, significantly increased. To cover the deficit, it was necessary to sharply increase the placement of bonds, with a significant part of the proceeds from new issues going to the repayment of debts on previous series. As a result, most of the savings of households and firms through banks were invested in government securities, which led to a catastrophic shortage of borrowed funds for the real sector.

At the same time, the government debt was growing very rapidly, and by the first half of 1998 the problem of its repayment reached a critical acuteness. The situation was considerably aggravated by the outflow of foreign capital from the Russian financial market. Despite the emergency measures taken by S. Kiriyenko's government, it was not possible to cope with the budget deficit and solve the problem of the state debt repayment. This led to the government's refusal to pay its obligations in August 1998.

The economic growth that began after the August crisis, combined with a significant increase in world oil prices, led to an increase in budget revenues. As a result, in 1999 for the first time in many years the primary federal budget surplus was achieved at its insignificant overall deficit. In 2000-2003 the budgetary situation continued to improve: the federal budget was executed with a surplus. In particular, in 2002 the execution of the Russian budget was as follows (Table 7-1):

Table 7-1. Revenues and expenditures of the federal budget of the Russian Federation in 2002.

(in % of gdp)

dOtHings	
Income tax	1,6
Personal income tax	0,0
Taxes on goods and services, including:	8,9
- VAT	6,9
- excise taxes	2,0
Payments for the use of natural resources	2,0
Taxes on foreign trade and foreign economic transactions	3,0
Other taxes, fees and duties	0,2
Total taxes and payments	15,5
Non-tax revenues	1,4
Single social tax	3,1
Total income	20,1
EXPENSES	
Public administration	0,51
Judiciary	0,18
International activities	0,29
National Defense	2,70
Law enforcement	1,74
Fundamental Research и promotion technical progress	0,28
Government services to the national economy	1,30
Social services, including	3,03
- education	0,91
- culture and art	0,10
- media outlets	0,10
- Health and fitness	0,35
- social policy	1,57
Transfers to the pension fund at the expense of the unified social tax	3,1
Public debt service	2,04
Financial aid to budgets of other levels	2,91
Expenses of target budgetary funds	0,14
Other expenses	0,48
Total expenses	18,7
Budget surplus	1,4

A budget surplus means that the government does not need to borrow to cover the deficit, diverting funds from the financial markets. On the contrary, it allows the government to pay off old debts and build up a financial reserve (with

2004г. - Stabilization Fund) for insurance against unforeseen circumstances and future repayment of previous loans.

The year 2003 was very difficult in this respect, when only the external liabilities alone had to be repaid at about \$17.5 billion. In his time, Finance Minister A. Kudrin described this year's budget as very difficult and compared its implementation with Suvorov's crossing of the Alps.

However, the budget surplus achieved in 2000-02 allowed the government to accumulate some financial reserves. Thanks to it, as well as super-high world oil prices, our country was able to successfully pass the peak of payments on foreign debt. Loan payments, along with budget execution, significantly increased foreign investors' confidence in the Russian economy.

Problems remain, however. First of all, the federal budget is still heavily dependent on world energy prices: oil and gas revenues provide up to 40% of budget revenues. In particular, the government calculated the 2004 budget on the basis of an oil price of \$20 per barrel. Such a price will ensure a slight surplus of the budget. But a slight drop below this price will inevitably lead to a deficit.

The main innovation of the 2004 budget is the opening of the Stabilization Fund, which should contain money earned from favorable foreign economic conditions. Its main purpose is to create a safety margin in case of a sharp drop in world oil prices. The Stabilization Fund differs from the previous financial reserve in having fairly clear rules of formation and spending.

Not so long ago, the formation of the budget was hotly debated. State Duma deputies and a number of experts accused the government of deliberately borrowing future revenues by underestimating the size of GDP, the rate of inflation, world oil prices, tax levies, etc. According to critics, the government did this in order to uncontrollably

to dispose of the additional revenues actually received. The financial reserve was very opaque: no one could tell how big it was, where it was and how it was spent.

It is doubtful that the current Duma, which is essentially one-party, will be able to establish public control over public finances.

The state budget surplus has been decreasing in recent years. In 2001 it was 2.9% of GDP, in 2002 it dropped to 1.4% of GDP, remained approximately the same in 2003, and in 2004 it is expected to be only 0.6% of GDP.

This fact cannot be considered unequivocally negative, because the budget surplus is partly reduced by reducing the tax burden on the economy, which should stimulate the growth of entrepreneurial activity. The formation of the expenditure side of the budget, however, raises concerns. High oil prices allow the government not to worry too much about reducing expenditures. While in 2001 budget expenditures made up 14.8% of GDP, including 12.2% of non-interest expenditures, in 2002 they rose (without transfers to the Pension Fund from the Unified Social Tax) to 15.6% of GDP, of which 13.6% of GDP was non-interest expenditures (see Table 7-1).

Part of the increased spending is due to the need for loan repayments and economic reforms, although reforms in a number of crucial areas have recently been virtually halted. In particular, little has been done to optimize budget expenditures. In fact, the public finance management system inherited from the CCCP has not been changed. Expenditures are included in the budget because they were included in last year's budget, not because the money really needs to be spent for these very purposes. Despite the government's attempts to calculate the budget according to targets rather than the appetites of the agencies, the agencies still manage to overestimate their planned expenditures. As a result, according to experts, up to a third of budget expenditures

are unreasonable. A set of bureaucratic benefits, expensive and extremely inefficient, combined with an excessive number of bureaucrats, remains in place. The military reform is stalled.

An additional problem is the rational use of allocated funds. An effective budget cannot be built without controlling the expenditures of budget recipients. The Budget Code introduced **the treasury system of budget execution**. The latter means that the transfer of money to the budget recipients is done not through authorized banks, but through treasury accounts in the local branch of the Central Bank. Public authorities act, thus, as cashiers of all administrators and recipients of budgetary funds. Theoretically, this allows for control over the targeted use of public money. Nevertheless, in practice the allocated funds often do not reach their addressees, are distributed for bribes, and are simply stolen. A widespread phenomenon is the supply of products for budgetary needs, carried out without tenders.

Since 2002, the federal authorities have been trying to implement a reform of budget expenditures. Its essence is in the transition to planning and financing of the budget on the basis of targeted programs with a clear formulation of the expected results in all spheres. In this case, the budget recipients have more autonomy in spending money, while being fully responsible for the results achieved. The new system is called **Result-oriented budgeting** (ROB). In fact, it is about the introduction of the corporate management system in the management of public finances, with the only difference being that many results in the budget sphere are determined not by quantitative, but by qualitative indicators.

The reasonableness of the proposed reform is obvious: it is difficult to doubt the benefits of budgeting on the basis of targeted programs and

responsibility for their implementation over traditional budgeting

"The reform will be difficult to implement in practice if it is carried out solely from above and is not accompanied by a de-bureaucratization of management and public control over the activities of officials. However, we dare to assume that in practice the reform will be difficult to implement if it is carried out exclusively from above and is not accompanied by a de-bureaucratization of management and public control over the activities of officials.

Liberal economists see the way out in a drastic reduction of the powers of officials and government spending. In particular, advisor to the President of Russia A. Illarionov believes that the maximum allowable level of non-interest expenditures is 12% of GDP. According to the calculations of former Minister of Economy E. Yasin, the termination of the practice of "kickbacks" and the conduct of real open competitions in the procurement of products for state needs will provide budgetary savings of 1.5-1.7% of GDP. It is assumed that the freed funds will be more effectively used in the private sector.

2. Taxes and the tax system

Taxes are compulsory payments collected by the state from individuals and legal entities on the basis of special legislation. They perform the following functions:

- Fiscal function. Taxes form the source of budgetary revenues;
- The function is to redistribute resources among industries. Taxes stimulate some activities and limit others;
- The function of redistributing income among members of society and achieving "social justice. People with high incomes pay higher taxes, while the poorest, on the contrary, receive subsidies.

One of the greatest economists of all times, A. Smith, formulated the basic principles of taxation in the 18th century:

- The subjects of the state must participate in the maintenance of the government according to the income they receive under its patronage;
- The tax must be precisely defined in terms of the amount to be paid, the due date, and the method of payment;
- The tax must be collected at such a time and in such a manner as and when it is most convenient for the payer to pay it;
- The tax should be designed so that it takes as little as possible out of the payer's pocket beyond what it brings to the state. In the latter case, it is a matter of reducing the costs associated with collecting the tax.

Taxes are divided into direct and indirect taxes. Direct tax is paid directly from the source it is imposed on (income tax, income tax). Indirect tax is a tax that is paid to the treasury by some people but is actually paid by others. Examples are value added tax and excise taxes. These taxes are paid by sellers, but are actually paid by buyers because these taxes increase the price of goods.

The modern tax system in Russia has been formed at a fairly rapid pace since 1991. As the main model to follow was the taxation in the EC countries with their relatively high proportion of indirect taxes, especially VAT.

In December 1991, the BC of Russia adopted a package of tax laws, which laid the foundation of the tax system. In 1998-2000, the Tax Code, the main document regulating the construction of the tax system in our country, was adopted.

The first part of the code contains a description of the tax system, general rules on the payment of taxes, a list of taxes, provisions on tax authorities, etc. The second part contains specific tax collection mechanisms.

There is a three-level tax system: federal taxes, taxes of the subjects of the Russian Federation (regional taxes), and local taxes.

Federal taxes are established by The Tax Code and mandatory for payment in the entire territory of the Russian Federation. These include:

- value added tax;
- excise taxes on certain types of goods (services) and certain types of minerals;
- tax on profit (income) of organizations;
- capital gains tax;
- personal income tax;
- unified social tax;
- state fee;
- customs duty and customs charges;
- mineral extraction tax;
- tax on additional income from hydrocarbon production;
- Fee for the right to use wildlife and aquatic biological resources;
- forest tax;
- water tax;
- environmental tax;
- federal license fees.

Regional taxes are the taxes established by the Tax Code and the laws of the subjects of the Russian Federation and obligatory for payment in the territories of the respective subjects of the Russian Federation.

These include:

- corporate property tax;
- property tax;
- road tax;
- transport tax;
- sales tax;
- tax on gambling business;

- regional license fees.

Local taxes are those established by the Tax Code and by normative legal acts of representative bodies of local self-government and are mandatory in the territories of respective municipalities. They include:

- land tax;
- tax on property of physical persons;
- advertising tax;
- Inheritance or gift tax;
- local license fees.

Let's look at the main types of taxes. **Profit tax** is calculated according to the following scheme: enterprises must pay 7.5% of profits to the federal budget, 14.5% of profits to regional budgets, and 2% to local budgets. The total tax rate is thus 24%. For their part regional authorities have the right to remove the tax rate for certain categories of taxpayers in part, credited to the regional budgets. At the same time the amount of such a rate cannot be lower than 10.5%. Accordingly, taking into account the possible regional discount the income tax rate is 20%.

Since 2001, enterprises have been paying a **unified social tax**, which replaced the former contributions to four extra-budgetary funds: pension fund, social insurance fund, medical insurance fund and employment fund. This tax is calculated as a percentage of the wage fund and is included in production costs. Most of the tax goes to the federal budget and then to the pension fund. Another part of the tax goes to social insurance fund of the Russian Federation, and the third part is distributed between the federal and territorial funds of obligatory medical insurance. As for the employment fund, it is now integrated into the federal budget.

The fundamental innovation is that the unified social tax is regressive: the higher the income of the employee, the lower the tax rate (Table 7-3):

Table 7-3. Rates of unified social tax

The annual income of each of an individual employee (rubles)	Tax rates
Up to 100000	35,6%
100000-300000	35600 rubles + 20% from the amount over 100000 rubles.
300000-600000	75600 rubles + 10% from the amount over 300000 rubles.
Over 600,000	105600 rubles + 20% from the amount over 600000 rubles.

The idea of such a regressive tax is to encourage companies to legalize the actual earnings of employees, abandoning payments "in envelopes.

For their part, individuals pay a tax on personal income. Traditionally it was a progressive tax: the higher the income, the higher the tax rate. The maximum rate was 30%.

Since 2001 this tax has been paid at a flat rate of 13%. By lowering the tax so drastically, the government assumed that such a measure, combined with improved tax services, would make tax evasion unprofitable.

The main indirect tax is the value added tax (VAT). Its rate is 10% for food products and goods for children according to the list established in the Tax Code and 18% for all other goods. A number of goods, works and services (medical services, transportation of passengers by urban passenger transport, etc.) that are of particular social importance are not subject to VAT. Exporters do not pay VAT either. The latter has entailed the use by enterprises of various pseudo-export schemes that allow

The mechanism for charging VAT is as follows. Let the company buys raw materials, supplies, components, worth 100 rubles. On this amount is charged 20% (20 rubles) tax. This is VAT on purchased material goods, paid by the enterprise. Then the enterprise produces products worth 150 rubles. To this value is added 20% (30 rubles) of the tax. This is the VAT on sales paid by consumers. Subtracting the tax previously paid by the enterprise (30-20=10 rubles) from the tax received, we obtain the VAT actually paid by the enterprise to the budget.

Another indirect tax - excises - plays a significant role in the formation of the budget. Excise duties are indirect taxes that are set by the state as a percentage of the price of goods (ad valorem excise duty), or in rubles per unit of goods (specific excise duty). There is also a mixed system in which the excise tax is a certain fixed amount plus a percentage of the price. As a rule, excise taxes are applied to highly profitable goods in order to withdraw the excess profits received by producers to the state budget.

The amount of excise duty on goods for which tax rates are set as a percentage is calculated according to the formula:

$$P' = P + A \quad P = \frac{P'}{1+t} \quad A = P_t \cdot t,$$

where P' - price without excise duty; P - sales price including excise duty; A - the amount of excise duty; t - the rate of excise duty in %.

The list of excisable goods and excise rates are defined in the Tax Code. Excisable goods include alcohol and alcohol-containing products, alcoholic products, beer, cars, tobacco products, as well as gasoline and other petroleum products and natural gas.

A characteristic feature of Russia is a high share of indirect taxes and a relatively low share of personal income tax in the structure of budget revenues. The reason is that indirect taxes

It is relatively easy to collect, while income tax is difficult to collect because of the large number of taxpayers. Recently, due to economic growth, income tax receipts have increased significantly, as have tax receipts in general.

Nevertheless, the problems of improving the efficiency of the tax system remain very acute. These include, first of all, under-taxation (there are numerous tax evasion schemes) and unequal taxation (some enterprises pay the maximum, while others receive tax breaks).

The main directions for solving tax problems are related to the expansion of the tax base due to GDP growth and closing the loopholes of tax evasion, along with a reduction of tax rates.

A tax reform is underway in Russia. Its goals are formulated by the government as follows:

- continuation of the policy of further reducing the tax burden as one of the conditions for economic growth and diversification of the economy;
- simplifying the tax system and reducing the number of taxes;
- focus on taxes that stimulate the growth of profits, personal income, employment, and the rejection of shadow economic activity;
- Strengthening the fairness of the tax system by equalizing tax conditions for all taxpayers, including by eliminating ineffective tax incentives, and adjusting norms that distort the economic content of taxes;
- Improvement of tax administration as one of the conditions for increasing the level of collection of taxes and fees, as well as reducing the costs associated with compliance with legislation on taxes and fees.

The reform began on January 1, 2001 with the introduction of a single 13% rate of income tax and a regressive scale of the unified social tax. Another year later the income tax rate was reduced from 30% to 24%. Along with this in two steps the so-called "negotiable

"taxes," which were calculated as a percentage of revenues and were unparalleled in world practice. These taxes were a heavy burden on businesses, because .

them . . . to pay . . . independently regardless of The last of these was the road user's tax, which was abolished on January 1, 2003. The last of these was the road user's tax, which has been eliminated since January 1, 2003. liberal economists, these measures

contribute to the economy out of the shadows and promote economic growth.

As for budget revenues, the tax reform has had a contradictory effect on them so far. Thus, in 2002 the budget revenues from the profit tax noticeably decreased, but at the same time the revenues from the income tax increased. The latter was facilitated by economic growth and, consequently, an increase in personal income, as well as a certain shift towards legalization of incomes.

In the summer of 2002 the State Duma passed a bill to change the taxation of small businesses. Small business" is defined as an enterprise whose soda revenues do not exceed 15 million rubles, property value - 100 million rubles, the share of other organizations - 25% and which employs no more than 100 people. According to the new law there can be two systems of taxation with regard to small business: simplified taxation and taxation based on the principle of imputed income.

In the transition to a simplified system, VAT, profit tax, property tax and sales tax are abolished. Instead, a single tax is paid, which is either 6% of revenues or 15% of profits, according to the payer's choice. The single social tax is also canceled, but the payment to the Pension Fund in the amount of 14% of the payroll.

When establishing a tax on imputed income, it is first determined potential income that can be generated by the business. This income is taxed at the rate of 15%. The tax on imputed income is introduced by the laws of the subjects of the Russian Federation and can be applied to limited types of entrepreneurial activities (household services,

trade, catering) specified in the Tax Code. This tax replaces personal income tax, VAT, property tax, sales tax and unified social tax, but does not get rid of the need to pay 14% of payroll to the Pension Fund.

By easing the tax burden on small business, the government expects to give a major boost to its development. Being extremely mobile by nature and capable of reacting quickly to changes in market conditions, small business is able to serve as a motor for the growth of production and employment in our country.

Tax reform continues. In 2003 the government adopted an ambitious decision to reduce the tax burden in 2004-05 by 2% of GDP. According to the then Prime Minister M. Kasyanov, this will allow the manufacturing industry to obtain additional investment resources to increase productivity and product quality, which, in turn, will ensure an increase in economic growth.

To this end, from January 1, 2004 sales tax, which was previously calculated as VAT and supplemented it. In Moscow the amount of such tax was 5%. In addition, VAT was reduced from 20% to 18%. From January 1, 2005 is expected to change the scale of the unified social tax. The maximum rate is to be reduced to 26% if the annual income of an employee is up to 300 thousand rubles a year.

It is planned to compensate for the budget losses mainly at the expense of super profits of oil companies by increasing the mineral extraction tax and export oil duties.

At the same time, among the tax innovations, the redistribution of tax revenues from the regions to the central government causes concern. The government, together with the Duma, is reducing or eliminating taxes that form the revenue side of regional budgets (income tax, turnover taxes). This creates

a system in which the funds of donor regions go "into a common pot" and are then distributed by the center as it sees fit. This undoubtedly makes the government stronger, but undermines local incentives and, in addition, threatens to turn the federal state into a unitary one.

3. Fiscal Policy and Macroeconomic Regulation

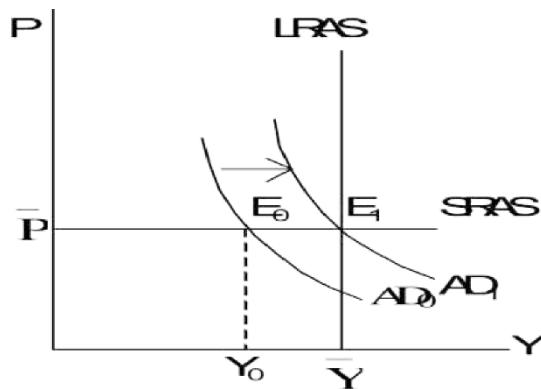
In terms of macroeconomic regulation, fiscal policy is the government's measures to change government spending and taxes in order to ensure production at the level of potential GDP and to overcome inflation.

A. Stimulative fiscal policy

This policy aims to overcome the cyclical downturn in the economy when actual GDP is lower than potential GDP. It involves stimulating aggregate demand by increasing government spending or cutting taxes or a combination of these measures.

Suppose the government decides to increase its spending. Using the "aggregate demand - aggregate supply" model, we see that this measure leads to an increase in aggregate demand. This shifts the AD curve to the right from the ADo position to the ADO position. Since the economy is underutilized and prices in the short run are assumed to be fixed (i'), the short run aggregate supply curve is horizontal (Figure 7-2):

Figure 7-2. Stimulative fiscal policy



As a result, the equilibrium GDP can grow from Y_0 to \bar{Y} , i.e. reach its potential level. It should be borne in mind that the growth of aggregate demand is affected not only by the initial increase in government spending, but also by the autonomous spending multiplier effect (topic "Analysis of aggregate demand", paragraph 4). This effect consists in the fact that an increase in government spending causes producers' incomes to rise. Producers spend part of their income, further increasing aggregate demand, and thus the income of other producers. Thus a chain reaction of increasing aggregate demand arises in the economy: growth of government spending - growth of income - growth of producers' expenditures

- a new growth of income - again a growth of expenses. And so on.

Ultimately, as was shown in the topic "Analysis of Aggregate Demand," the increase in aggregate demand (AU) is:

$$AU = m \cdot AG$$

m is the multiplier of autonomous spending, AG is the initial increase in government spending.

In turn, the multiplier of autonomous expenditures is calculated by the formula:

$$\frac{1}{1 - C}$$

where C is the marginal propensity to consume.

If the marginal propensity to consume is, for example, 0.8, then the multiplier of autonomous spending is 5. Thus, each additional ruble of increase in government spending causes an increase in aggregate demand by 5 rubles.

So, in the short run, an increase in government spending can improve the economy. We must not forget, however, that an increase in government spending leads to budget deficits, which undermine the economy in the longer run (see paragraph 1 of this theme).

As an example, we can refer to the United States, where a significant increase in government spending in connection with anti-terrorist operations (combined with tax cuts) has led to a very large federal budget deficit, reaching 5% of GDP. Today the U.S. economy is showing very high growth rates, but its sustainability is questioned by many experts.

Even more worrisome is the stimulation of the economy through government spending in Russia, because due to high corruption, budget money often simply does not reach its recipients. As a result, the budget bears increased obligations, but this has little or no effect on aggregate demand.

The government can stimulate aggregate demand not only by increasing its spending, but also by cutting taxes. In this case, households and firms receive additional funds, which they can use to increase their spending. This shifts the aggregate demand curve to the right, causing GDP to rise (see Figure 7-2).

The multiplier effect also applies. Suppose the government cuts taxes by 100 rubles, and the marginal propensity to consume is 0.8. Therefore, having saved 100 rubles on taxes, households increase their spending by 80 rubles, and the remaining 20 rubles they save. These 80 rubles turn into producers' income.

Of the money received, producers spend 64 rubles (80%), saving 16 rubles (20%). And so on.

So again, we see a chain reaction of increasing aggregate demand: lower taxes - higher spending - higher income - higher spending... In our example, aggregate demand increases ultimately by: $80+64+51,2+40,96+\dots+0=400$.

In general, the growth of aggregate demand (AA) can be calculated by the formula:

$$\Delta Y = \frac{1}{1 - MPC} * (-\Delta T)$$

where ΔT is the change in taxes.

The "minus" sign in the bracket indicates that when taxes decrease, when (ΔT) is a negative value, aggregate demand increases, and when they increase, it decreases.

The fraction $\frac{1}{1 - MPC}$ represents the tax multiplier ()

This is coefficient, showing at how much rubles changes in aggregate demand when taxes change by 1 ruble:

$$\frac{AU}{C}$$

In this example, the reduction of taxes by 100 rubles led to the growth of aggregate demand by 400 rubles, respectively, the tax multiplier is 4.

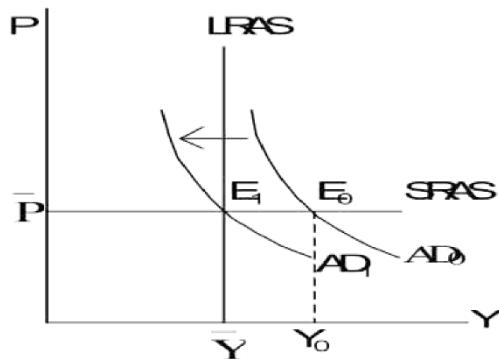
B. Constraining fiscal policy

It applies when actual GDP exceeds potential GDP, i.e., the economy is overstretched. Resources become scarce, which leads to an increase in their prices, which leads to an increase in the price of finished goods, i.e., inflation (topic "Aggregate demand and aggregate supply," paragraph 4). To fight inflation, the government restrains aggregate demand. This is achieved by reducing

government spending or an increase in taxes or a combination of both.

As a result, in Fig. 7-3 the aggregate demand curve shifts to the left from the AD position to the ADO position, which leads to a reduction of GDP to its potential level (from Y_0) at the same price level (\bar{P}):

Figure 7-3. Constraining fiscal policy



It should not be forgotten that the multiplier effects work in the opposite direction: a reduction in government spending or an increase in taxes causes a chain reaction of decreased spending by households and firms.

B. A combination of incentive and disincentive policies Suppose the government decided to increase its spending, while increasing taxes by the same amount to avoid a budget deficit. On the face of it, aggregate demand should remain the same, because the increase in government demand is offset by the reduction in private spending due to higher taxes. In fact, this is not the case. Let's take a closer look.

In this case, the change in aggregate demand will be simultaneously affected by both the autonomous (government) spending multiplier (upward) and the tax multiplier (downward). Let us recall the formulas of these multipliers.

Multiplier of autonomous expenditures:

1

Its action causes an increase in aggregate demand according to the formula:

$$AU = \frac{1}{1-C_y} \cdot SG$$

Tax multiplier:

$$= \frac{C_y}{1-C_y}$$

Its effect causes a decrease in aggregate demand according to the formula:

$$\Delta Y = \frac{C_y}{1-C_y} * (-\Delta T)$$

Since the marginal propensity to consume is less than one (topic "Analysis of aggregate demand," paragraph 2), the autonomous spending multiplier is larger than the tax multiplier. The latter means that an increase in government spending, balanced by an increase in taxes ($AG=AT$), will lead to an increase in aggregate demand.

The reason for this is that when government spending increases, aggregate demand immediately increases by a corresponding amount. On the contrary, when taxes increase, it first decreases not by the entire amount of income lost by households, but only by that part of it which was previously used for consumption ($-AT-Cv$); households did not spend the other part of the now-lost income anyway, but saved it.

Let's see what the change in aggregate demand would be in this case. Since it is also affected by an increase in government

the the the community, And the HdJIOGOB, to.

$$AU = \frac{1}{1-C_y} \cdot AG + \frac{C_y}{1-C_y} * (-AT)$$

WHEN $AG=AT$:

$$*Y - \frac{1}{1-C_y} \cdot (S) = \frac{1}{1-C_y} \cdot AG$$

Thus, when government spending and taxes increase by the same amount, aggregate demand does not remain the same, but increases just by the amount of the increase in government spending

(AY=AG). In other words, the multiplier of a balanced budget is equal to 1. This conclusion, made by the Norwegian economist, Nobel Prize winner T. Haavelmo, was called "Haavelmo's theorem.

F. The long-term effects and effectiveness of fiscal

POLICIES

This is a good time to think about it. Based on the theory we have just outlined, the secret to economic prosperity has been found. We must increase government spending by financing it with higher taxes. This will ensure a steady increase in aggregate demand and, consequently, GDP.

In fact, Haavelmo's theorem should not be understood as a guide to action. In fact, an increase in government spending only stimulates aggregate demand. GDP can rise only if the economy is underutilized (Figure 7-2). If the actual level of national production is close to the potential GDP, then instead of economic growth we will only get higher prices.

Long-term economic growth depends on the dynamics of potential GDP, determined by the amount of labor, capital and natural resources in the economy, as well as technological progress. This raises the crucial question of which fiscal

POLICY FOC D tJeCtivity MUST P]OLLABORATE. FOR DOLFJSOMETHING
to stimulate economic growth.

There is no consensus among economists on this issue. Some of them believe that the task of the state is to implement large-scale investment projects. This position is based on the idea that the state is better able than private property and the market to cope with the task of accumulating capital and stimulating technological progress. Another priority area of fiscal policy should be large-scale

social support for the population. The inevitable increase in government spending must be financed, according to these economists, by increased taxation of super-profits and large

SOURCES.

The author, however, finds the position of liberal economists more promising. The latter believe that a stimulative fiscal policy can only produce a short-term positive effect, but is detrimental in the long run, because inefficient government spending ultimately undermines the country's economic potential.

The following story, for example, argues in favor of this concept.

France at one time lagged behind England in the strength of its naval fleet. To close this gap, the French government greatly increased its orders for ships. This, in turn, led to an increase in demand for cannons, sails, wood products, etc. Aggregate demand increased in line with the multiplier effect, and national production grew as well. In addition, in a relatively short time, France became the owner of the largest fleet in the world. But a sailing fleet. In England, steam ships were already being built at the time.

The history of the CCCP, which perished precisely because comprehensive state control over the economy ultimately led to lagging behind the developed capitalist countries in technological progress, says much the same thing. Today's Russia offers many examples of inefficient spending of public funds.

Thus, unlike private investors, who cannot make money without meeting a genuine public need, the state often invests in projects that are, in the long run, just a waste of money. This is why liberal economists believe a drastic reduction in

government spending and taxes are a prerequisite for long-term economic growth.

The latter does not mean that the state budget should ideally aim at zero. First of all, there are public goods, the production of which can be financed only by the state or regional authorities. The controlling functions of public authorities are also very important. The creation of efficient market institutions is essential for a transitional economy. As for social expenditures, the state must never play the role of the breadwinner. Its task is to create conditions in which every person capable and willing to work could provide for himself.

There are also more specific debatable questions about the effectiveness of the state fiscal policy. Thus, a distinction is made between discretionary and non-discretionary fiscal policy. **Discretionary policy** means purposeful changes in public expenditures and taxes as a result of special government decisions. **Non-discretionary policy** manifests itself in automatic changes in these values due to fluctuations in GDP.

When pursuing a discretionary policy during an economic downturn, the state purposefully creates budget deficits by increasing its spending and cutting taxes. On the contrary, during a cyclical upturn, it equally purposefully creates a budget surplus by cutting spending and increasing taxes.

Critics of this policy focus their attention primarily on the time lags that arise. They can be internal or external. The **internal lag** is the time lag between a change in the economy and the economic policy response. **The external lag** is the time lag between the adoption of these measures and the time when they begin to produce results.

Fiscal policy is characterized by significant internal lags: if the government wants to change spending or

taxes, he has to wait for parliament to approve the budget for the next fiscal year. It is also possible to make changes by a special law, but again it must be adopted by parliament. At the same time, the external lags of fiscal policy are relatively small: once the decision on taxes or expenditures is made, it quickly affects the economy.

The existence of time lags undermines the effectiveness of fiscal policy. Let the economy work with overload, and the government plans to implement a restraining policy. But until the appropriate measures are approved, until they begin to operate, the economy may well pass the phase of recovery and find itself in the phase of decline, when it is necessary to carry out the opposite policy. In such circumstances, the measures taken earlier will only aggravate the crisis.

Advocates of discretionary policies admit that, because of the lags in time, one must be careful when designing economic measures. But it does not follow, in their view, that such policies should be abandoned altogether, especially in the midst of a long and deep recession.

In non-discretionary policies, government spending and taxes change automatically due to the action of so-called "built-in economic stabilizers. A built-in stabilizer is an economic mechanism that smoothes out fluctuations in GDP without making special decisions. The presence of built-in stabilizers allows, thus, to reduce time lags.

Examples of built-in stabilizers are income taxes, government welfare payments, and employee profit-sharing systems. Thus, during a recession, workers' incomes fall, but the taxes they pay fall at the same time. Under a progressive tax system, taxes are reduced more than incomes are reduced. On the other hand, during a recession, government spending automatically increases by

unemployment benefits, poverty benefits, etc. Finally, "profit-sharing" systems link wages to firms' profits. Accordingly, as profits decline, so do firms' wage costs, and thus their costs in general.

The achievement of the expected results of fiscal policy, as well as of economic policy in general, depends largely on the extent to which people believe that the government will actually implement the measures it has promised them.

For example, to encourage private investment, the government promises not to raise taxes. Investors may fear, however, that once investments are made, the government will be tempted to add to the budget through taxes. As a result, investment will remain small. Another example. It has been said above, that since 2001 a single income tax rate of 2% has been established in Russia, designed to encourage the full declaration of income received. But the latter will only be possible if taxpayers believe in the invariability of the tax rate, after the income will be disclosed.

Thus, if individuals are convinced of the firmness and consistency of government policy, they modify their own behavior accordingly, which multiplies the effectiveness of government measures. And vice versa.

SELF-STUDY ASSIGNMENTS

1. The budget revenues of a notional country are 1,000. The non-interest expense is 950, the cost of servicing the national debt is 100, and the repayment of principal is 150. Calculate the size of the primary and total government budget deficit (surplus).

2. There is data about the economy and the state budget of a given country in a given year:

GDP	500
Taxes to the state budget	80
Non-tax revenues of the state budget	10
Expenditures on public administration	5
Defense spending	15
Non-interest expenditures of the state budget	60
Expenses for the payment of the principal amount of the state debt	20
Expenditures on public debt servicing	20
External loans	5
Domestic loans	10
Revenues from privatization of state property	3

Calculate the size of the primary and total state budget deficit (surplus) in absolute numbers and as a percentage of GDP.

3. Describe the main stages and directions of tax reform in Russia. Do you believe that the reform will make the tax system more effective? Justify your point of view.

4. Let the equilibrium GDP in the economy be lower than the potential GDP. The government increases its spending or cuts taxes. Explain with the help of a graph how this will affect the economy. What would be the effect of continuing such a policy when the economy reaches full employment?

5. Let the marginal propensity to consume be 0.8. By how many rubles will aggregate demand change if the state increases its spending by 1,000 rubles? How will aggregate demand change if the state increases (reduces) taxes by the same amount instead of changing spending?

6. The equilibrium GDP in the economy was 250. The government increased the taxes levied on individuals by 10, while increasing its spending by the same amount. What will be the equilibrium GDP if the marginal propensity to consume is 0.75? In answering this question, assume that the economy is operating underutilized and that the short-run aggregate supply curve is horizontal. Explain why the latter caveat is important.

7. At the beginning of 2006, the size of the stabilization fund in Russia exceeded 1.5 trillion rubles. Many people suggest that this money should be spent on the development of the national economy, assistance to the poor, etc. It is known that an increase in government spending through the multiplier effect leads to a much greater increase in GDP. Why, however, does the Ministry of Finance oppose these plans? What results will the use of the Stabilization Fund actually lead to in the current conditions of Russia?

8. The aggregate demand function: $Y=240-10P$. Short-term aggregate supply function: $P=20$. The potential GDP is 50. Calculate the equilibrium price and GDP levels. Will the economy be in long-run equilibrium?

What will the equilibrium price and GDP levels be if the government increases its spending by 2 and the marginal propensity to consume is 0.75? How much must government spending increase for GDP to reach its potential level?

Illustrate the solution with a graph.

9. Initially, the economy was characterized by these data:

The economy functions underutilized, and the short-run aggregate supply curve is horizontal. The marginal propensity to consume equals 0.8.

Investment function: $I=200-25r$, where r is the real interest rate, equal to 4%.
The equilibrium GDP is 10000.

Trying to stimulate the economy, the government increases its spending by 100. The increase in spending is covered by loans. As a result, the interest rate rises to 5%. How will aggregate demand and GDP change if prices remain stable? Show the crowding-out effect of private investment. How do these results relate to the multiplier effect?

Illustrate the solution graphically.

TEMA 8. PERFECT COMPETITION

1. Types of market structures. Signs of perfect competition
2. Income of a competitive firm
3. Firm equilibrium in the short run
4. Firm and industry equilibrium in the long run

1. Signs of perfect competition

Beginning with this topic, we begin with an analysis of the different types of markets. There are the following types of market structures (forms of market organization): monopoly, oligopoly, monopolistic competition, and perfect competition. The first three types of market structures will be discussed in the next topic. For now we will focus on perfect competition.

Perfect competition is a market structure in which there are so many buyers and sellers that none of them, changing the volume of their supply or demand, is able to influence the market price. The latter means that there is no mutual influence of some economic agents on others: any decision of an individual seller or buyer has no effect on the position of his environment. The price of a commodity in a perfectly competitive market is determined by the interaction of aggregate market demand and market supply; individual sellers and buyers accept it as given, adapt to it, but are unable to change it.

Signs of a perfectly competitive market:

- Each of the very large number of sellers and buyers occupies such a small share of the market that he cannot change the market price by his behavior, but he can sell or buy as much of his produce as he wants at that price. For example, an acquaintance of the author living in Volgograd Province asked how much tomatoes cost in Moscow markets. Her curiosity was not idle, she was going to bring a truckload of Volga tomatoes to Moscow. At the same time, the newcomer

The businesswoman understood that her entry into the market with several tons of tomatoes would not change their price, i.e. she felt she was a perfect competitor in the tomato market. Likewise, each of the millions of individual buyers wondering about the price of tomatoes today also understands that once they enter the market, the price of tomatoes will remain the same;

- Complete homogeneity of products. The absence of trademarks. The products of different producers, thus, are absolutely the same in the view of buyers. Returning to the example of the vegetable market, we assume that the tomatoes of all sellers are exactly the same and the sellers themselves are the same in the eyes of buyers. We can also use the examples of the currency and stock markets, where dollars or Gazprom shares are no different for different sellers;

- The possibility of free entry and exit from the market. There are no barriers to entry into the industry. Likewise, there are no difficulties associated with the termination of operations in the market. This is ensured by complete mobility of factors of production between industries and between firms;

- Perfect knowledge of the market by sellers and buyers. Here it is assumed that the cost of both buyers and sellers to find market information is zero. On the other hand, with perfect knowledge the transition from one seller (buyer) to another costs nothing to market subjects.

Obviously, perfect competition is as abstract as absolutely pure water. Nevertheless, it should be studied because some real markets can come quite close to a perfectly competitive state.

2. Income of a competitive firm

The gross income or revenue of a firm (TR) is the product of the price of a good (P) by the volume of output (sales) (q):

$$TR = P \cdot q$$

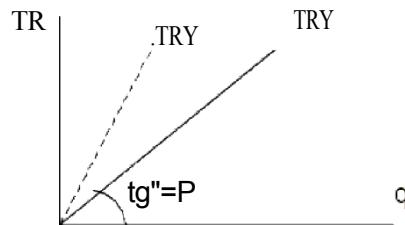
The average revenue of a firm (AR) is the quotient of revenue divided by sales volume:

$$AR = \frac{TR}{q} = P$$

Consequently, average income is simply another name for the price of a commodity.

Under perfect competition the price is determined by the market, and a single firm, occupying a negligible share of the market, accepts it as a given (*is a price taker*), *i.e.* can sell any quantity of its products at a fixed market price. Therefore, the competitive firm's output revenue function is linear, with the slope tangent of the line TR equal to the price of the product (Figure 8-1):

Figure 8-1. Revenue of a competitive firm



Accordingly, as the price increases, the slope increases, and the revenue curve shifts from TR_0 to TRY . And vice versa.

The firm's marginal revenue (MR) is the incremental gross income with an increase in sales by one unit:

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We can also say this: the marginal income is the additional income that a firm receives from the production of an additional unit of output.

If you know the output revenue function ($TR=f(q)$), the function

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$$k4 R - TR' - \underline{\quad}$$

Since the price is set by the market, and an individual firm can sell any quantity of its product at that price, the market demand curve for the firm's product is a horizontal line: the slightest price increase by the firm causes the demand for its product to drop to zero, as buyers go to other sellers. It follows that the marginal income of a perfectly competent firm is equal to the price of the goods: $MR=P$.

Let's see this with an example. Let the store sells beer for 10 rubles per bottle. This means that each subsequent bottle sold increases the store's revenue by exactly the price of the bottle. Let's make a table of the store's revenue and marginal revenue as a function of the number of bottles sold (Table 8-1):

Table 8-1. Revenue and marginal revenue of a competitive firm

q	P	TR	MR
0	10	0	
1	10	10	10
2	10	20	10
3	10	30	10
4	10	40	10
5	10	50	10

The demand line for the product of a competitive firm looks like this (Figure 8-2):

Figure 8-2. The equilibrium market price and demand curve for an individual firm's product

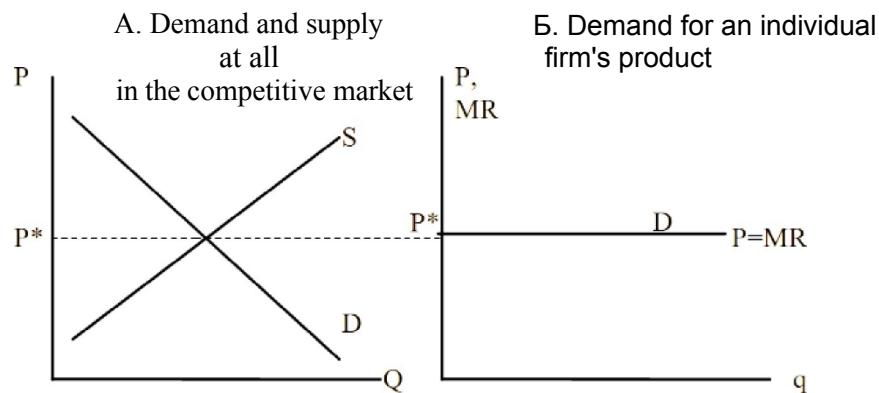


Figure 8-2A shows the supply and demand curves in the market for a given commodity. There are hundreds of sellers and thousands of buyers facing each other,

respectively, the values of supply and demand (Q) are measured by many thousands, perhaps millions of units of production. As a result of the interaction of supply and demand is formed equilibrium market price of goods (P'). In Figure 8-2B we observe the position of the individual firm, which is a grain of sand in the market scale. The firm accepts the market price as a given and is able to sell any quantity of its product at that price. In other words, buyers can buy any quantity of the firm's product at the equilibrium market price: the market demand curve for the product of a single perfectly competitive firm is a horizontal line.

3. Firm equilibrium in the short run

A. Condition of equilibrium

In market theory, **a short** period is when the number of firms in an industry and the amount of capital each firm has is fixed, but firms can change output by changing the number of variable factors, in particular truda.

The goal of the firm is to maximize profit. **Profit** (P) is the difference between the revenue (TR) and the total costs of the firm (TC):

$$P=TR-TC$$

Both the revenue and the cost of the firm are output functions (q). Since in the revenue function ($TR=P q$) the market price is beyond the control of the perfectly competitive firm, the task of the latter is to determine the output at which its profits become maximal.

A firm maximizes profits when its marginal revenue becomes equal to its marginal cost:

$$\mathbf{MR=MC}$$

The equation $MR - MC$ as a condition for profit maximization can be justified logically. Each additional unit of output brings the firm some additional revenue (marginal revenue), but also requires additional costs (marginal cost). If the marginal

income exceeds marginal cost at some output, then the firm makes more profit by producing one more unit of output. In contrast, if marginal revenue at a given output is lower than marginal cost, the firm can increase profits by reducing output by one unit. Finally, if marginal revenue is the same as marginal cost, no change in production can increase profits-the output achieved is optimal. The firm is in equilibrium - it does not need to increase or decrease its output to maximize profit.

Since the marginal revenue of a perfectly competitive firm is equal to the price of the product, the above equation takes the form:

$$P=MC$$

If a firm's total (variable) cost function is continuous and differentiable, then to find the equilibrium output of a perfectly competitive firm we must first find the marginal cost function (by taking the derivative of the total or variable cost function of output) and then equate it with the price of the good.

B. How the firm maximizes profits

Let us use a hypothetical example of how a competitive firm reaches an equilibrium point. Let us give the firm's fixed and variable costs and the price at which it sells its goods. On this basis, we can calculate changes in the firm's average and marginal costs, revenues, and profits as a function of changes in its output (Table 8-2):

Table 8-2. Profit maximization of a competitive firm

q	FC	VC	TC	AFC	AVC	AC	MC	P=MR	TR	Π
0	60	0	60					30	0	-60
1	60	32	92	60	32	92	32	30	30	-62
2	60	52	112	30	26	56	20	30	60	-52
3	60	64	124	20,0	21,3	41,3	12	30	90	-34
4	60	72	132	15	18	33	8	30	120	-12
5	60	82	142	12	16,4	28,4	10	30	150	8
6	60	100	160	10,0	16,7	26,7	18	30	180	20
7	60	124	184	8,6	17,7	26,3	24	30	210	26
8	60	154	214	7,5	19,3	26,8	30	30	240	26
9	60	194	254	6,7	21,6	28,2	40	30	270	16
10	60	250	310	6	25	31	56	30	300	-10

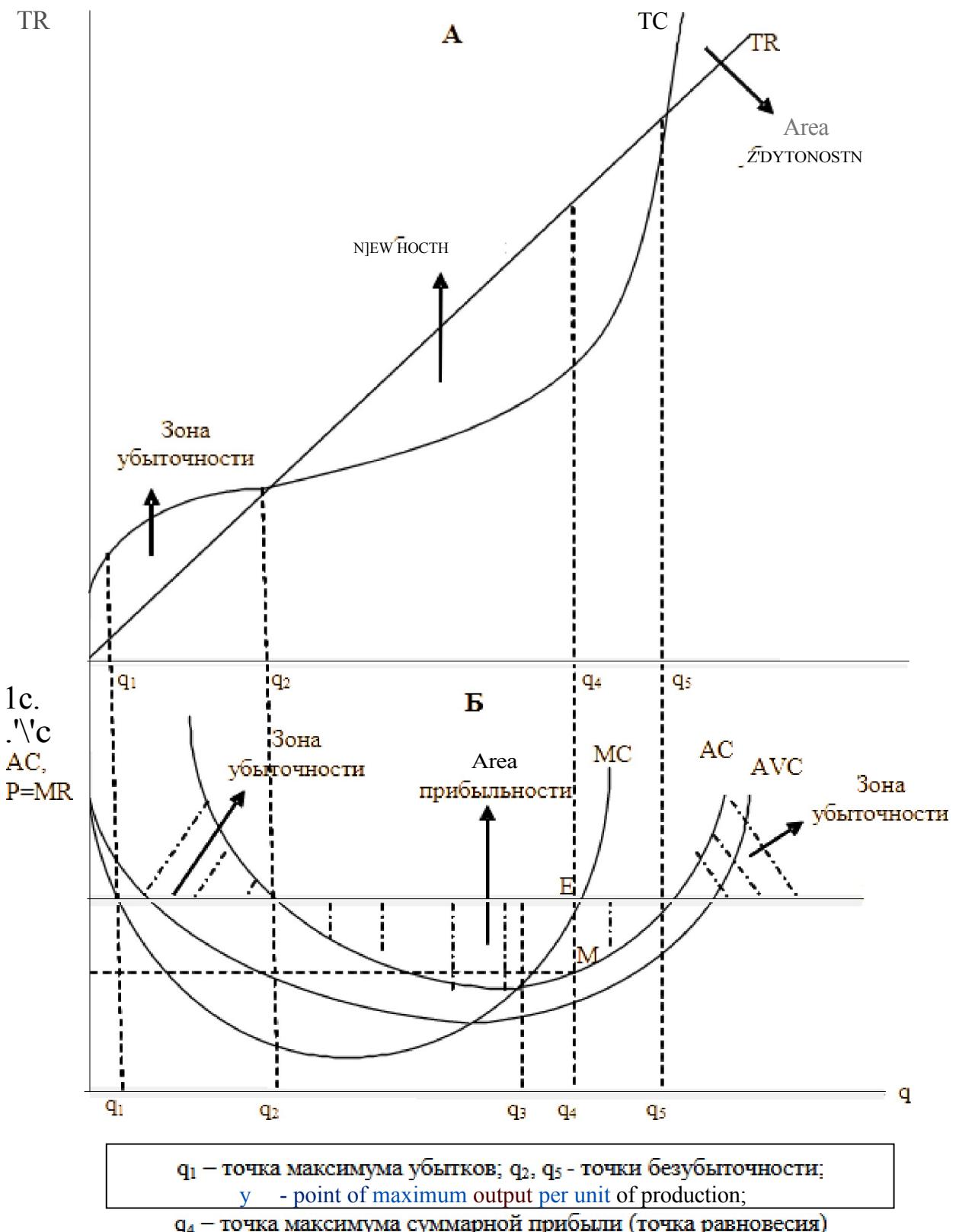
In this case, the marginal costs first decrease and then increase, i.e., we are faced with complex cost functions (topic 7, item 4B).

Suppose the firm accidentally stops to produce 5 units. The marginal revenue from producing one more unit (aka the price of the product) is 30, while the marginal cost is only 18. Therefore the firm increases output, and its profit increases by 12 (from 8 to 20). Let the firm initially choose the output of 9 units. The marginal income is, as always, 30, and the marginal cost is 40. The excess of marginal cost over marginal income is a signal to reduce production to 8 units, which increases profit by 10 (from 16 to 26). Finally, when producing 8 units of product, marginal revenue coincides with marginal cost ($30=30$), and profit is maximum (26). This is the output at which our firm stops.

The attentive reader may argue that in the above example the exact same profit is obtained with the production of 7 units of goods. The point, however, is that our calculation of marginal cost is only an approximation. Exactly, marginal cost is calculated as the incremental total (variable) cost with very little change in output. Imagine that in producing 7.99 units of a product, the marginal income is still slightly higher than the marginal cost. So it is profitable to produce another one hundredth of the commodity, after which the marginal income and marginal cost will equalize. In other words, the assumption used here is that the product is infinitely divisible: one more gram of oil, one more nail, or one more car can be produced in their many thousands of outputs.

The equilibrium point of a perfectly competitive firm can be shown by combining the functions of revenue and total cost on the one hand, and the functions of marginal revenue (price) and marginal cost on the other hand (Figure 8-3):

Figure 8-3. Equilibrium of a perfectly competitive firm



As production increases from zero to q_i , each successive unit of output increases the firm's loss because in this interval

marginal cost exceeds marginal income (Fig. 8-ZB). Correspondingly, at output q_1 the losses reach the maximum. In Fig. 8-HA we see that at output q the distance between the functions TC and TR is maximal—the total cost exceeds the firm's revenue by

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The firm continues to increase output and enters the zone where marginal revenue is higher than marginal cost ($MR > MC$ in Fig. 8-SB). In this zone *additional units of output* begin to make a profit. However, because of the weight of past losses, total profits are still negative until output q is reached, at which the decreasing average total cost (total cost per unit of output) becomes equal to price. At this point, called the break-even point, profits (losses) are zero. In Figure 8-KA, the break-even point is the point where revenue becomes equal to total cost.

Having passed the break-even point, the firm leaves the loss-making zone and enters the profit-making zone, because after q is released, the average total cost is lower than the price in Figure 8-ZB. At the same time, when q_1 is released, the average total cost is minimal, i.e., the difference between the price and the average total cost is maximal. The latter means that at output q the profit per unit produced is maximal.

The firm, however, continues to increase production, for its goal is to maximize total profit. This is achieved at output q_4 , when the marginal income in Figure 8-ZB is equal to the marginal cost. The firm's revenue ($TR = P \cdot q$) at this point equals area $P \cdot Eq_4O$, and total cost ($TC = AC \cdot q$) equals area $ONMq_4$. Thus, the firm's maximum profit ($P = TR - TC$) is area $P \cdot EMN$.

At output q_4 profit is maximal and in Fig. 8-CA, because at this output the distance between the functions of revenue and aggregate

costs becomes maximum - revenue exceeds costs for M tKCIMdJIbHO WHOLE WELICHIN .

If output q_4 is surpassed, however, profits will begin to decline as marginal costs exceed marginal revenue in Figure 8-ZB. Nevertheless, profits will remain positive until output q_5 , at which time the increasing average total cost reaches the price level. We have a second break-even point, beyond which the loss zone begins.

In Figure 8-CA, the second break-even point, reached with the same volume of output (q), is the point where revenue again becomes equal to total cost.

B. How the firm minimizes losses

Consider a very important situation. Let the cost data remain the same as in Table 8-2, but suppose that the price of the good in question has fallen from 30 to 24 for some reason. As a result, the firm begins to incur losses at any output (Table 8-3):

Table 8-3. Minimizing the loss of a competitive firm

q	FC	VC	TC	AFC	AVC	AC	MC	P=MR	TR	Π
0	60	0	60					24	0	-60
1	60	32	92	60	32	92	32	24	24	-68
2	60	52	112	30	26	56	20	24	48	-64
3	60	64	124	20	21,3	41,3	12	24	72	-52
4	60	72	132	15	18	33	8	24	96	-36
5	60	82	142	12	16,4	28,4	10	24	120	-22
6	60	100	160	10	16,7	26,7	18	24	144	-16
7	60	124	184	8,6	17,7	26,3	24	24	168	-16
8	60	154	214	7,5	19,3	26,8	30	24	192	-22
9	60	194	254	6,7	21,6	28,3	40	24	216	-38
10	60	250	310	6	25	31	56	24	240	-70

In this case, the firm still chooses output (7 units) with marginal revenue equal to marginal costs, because in this production the losses are minimal (16); profit maximization

means, in this case, minimizing losses. The firm is faced with,

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losses.

To answer this question we need to recall the theory of fixed and variable costs (topic 7, item 3). Recall that fixed costs are costs that do not change with changes in output; these costs are incurred by the firm at any output, including zero output. Variable costs, on the other hand, are zero at zero output, and then they increase with

JZOSTOM N]OPRODUCTION.

The division of costs into fixed and variable relates to the short period. This is due to the fact that in a short period, some costs are fixed and can not be changed. These usually include depreciation of fixed assets (machines, machinery, equipment, buildings, etc.), rent, interest on loans, etc. For example, if a lease is signed or a loan is taken, the same rent and interest must be paid regardless of whether the firm is operating at full capacity or has suspended its activities altogether. On the other hand, variable costs-usually the costs of raw materials, wages, electricity, etc. - change in the short run along with changes in production.

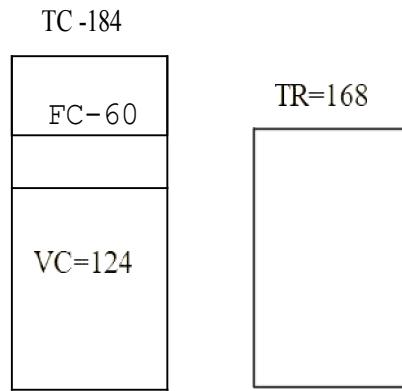
In the long term there is no division of costs into fixed and variable; all costs are variable. In particular, after some time has passed, the firm may renegotiate a lease, buy new equipment or sell old equipment, or take out a new loan.

With all of this in mind, let us try to answer the question of whether our firm should close down or whether it would still be better for it to continue operating. In the short run, the firm would prefer to stay in business, because even if it closes, it will save only on variable costs (they will become zero), but fixed costs will still have to be incurred. In our example, the fixed costs are 60. So with zero output (the firm

closed) the loss will be 60. Therefore, the firm continues production in a short period to reduce its losses, because at the production of 7 units of goods the loss is only 16.

The situation is shown schematically in Figure 8-4:

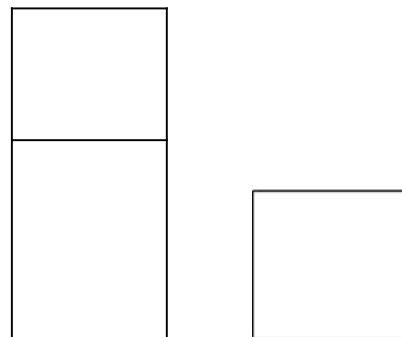
Figure 8-4. Costs and revenues of the firm at optimal output (the firm remains in the market)



In this case, revenue (168) fully covers variable costs (124) and partially covers fixed costs (60). Therefore, the firm remains in the market.

In the short run, the firm will close only if the price falls even further and is below the average variable cost. The latter would mean that the firm's revenues would not cover not only total costs, but even variable costs (Figure 8-5):

Figure 8-5. Costs and revenues of the firm at optimal output (firm suspends operations)

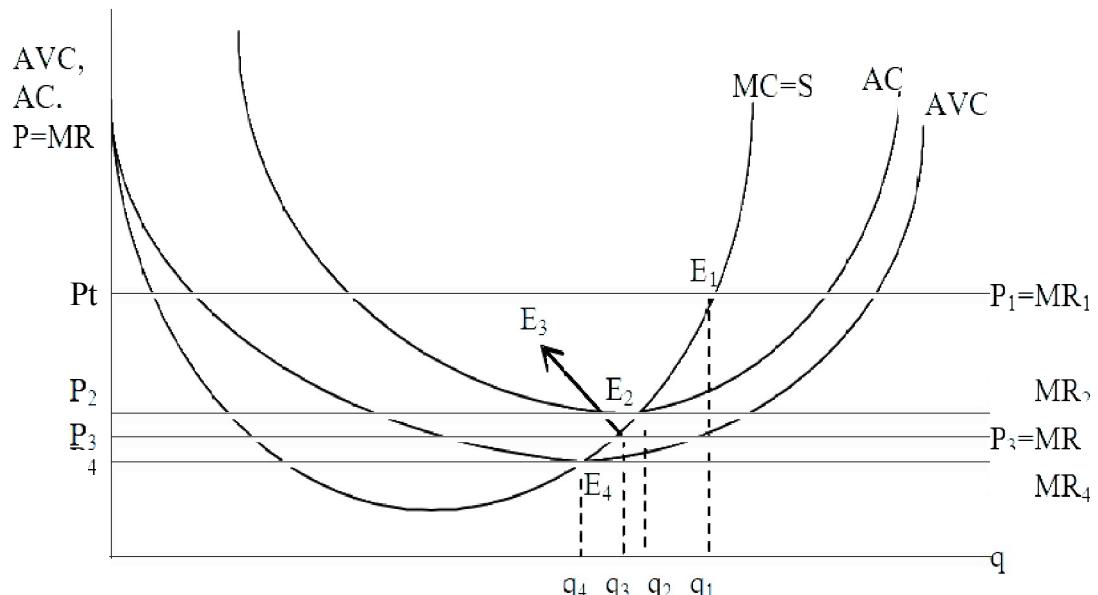


Under such conditions, continued production only increases losses, and the firm stops production.

In the long run, the firm can change any of its costs. For example, it may try to enter into a new lease on more favorable terms, improve the technological process, change the amount of capital used, etc. If all these measures do not result in profits, the firm will have to leave the industry permanently.

Let us now illustrate all these considerations graphically (Fig. 8-6):

Figure 8-6. "Escape point" and the supply curve of a competitive firm



E_e - escape point; P₁, E₁, E₂, ..., E₄ - the supply curve of a competitive firm (MC=S)

Let the initial price be P_i . The firm chooses the output q_i at which the marginal income (price) is equal to the marginal cost: $MR=P=MC$. This equality is achieved in E_e . Since at this output q the price exceeds the average total cost, the firm makes an economic profit.

If the price falls to P_2 , the point of intersection of the price and marginal cost lines will be E_2 , and the firm will reduce output to q_2 . However, at E_2 the price is also equal to the average total costs. The latter means equality of revenue and total cost. Therefore at the price of P_t

' The proof is very simple: $P=AC \rightarrow P-q=AC \rightarrow TR=TC$

economic profit is zero. The latter does not mean that the firm is on the verge of bankruptcy, because economic profit is, in fact, superprofit. Its disappearance does not affect the firm's normal accounting profit, which covers implicit costs (Topic 7, Section 1). We should not forget that when we talk about costs, we are always referring to economic costs, which include both explicit and implicit costs.

But let us assume that the price has fallen even lower, to the level of R_0 . Choosing the volume of output (q), the firm still follows the rule: the marginal income (price) must be equal to the marginal cost, which is achieved at E_r . The problem, however, is that with such a low price the firm is doomed to economic losses at any output: the average total cost curve (AC) is always above the price line. Accordingly, maximizing profits in this case means only minimizing losses, because at higher or lower outputs the losses will be even higher. This is precisely the case we have just considered on the basis of the data in Table 8-3.

As mentioned above, the firm is faced with the question of whether to close or continue operating. In the short term, the firm will prefer not to leave the market, putting up with the losses. The fact is that if it stops production, the losses will increase, because the fixed costs will still have to be borne. The important thing is that the price P_t exceeds the average variable cost (AVC) for output q_z , and the firm can use this difference to partially cover losses that arise from fixed costs.

It follows that the firm will operate in a short period until the price falls below the minimum of average variable costs (t. E4). Three price falls below P_4 and there is no point in continuing, because the price will not even cover the average variable costs, which means that the production of each subsequent unit of product will only increase

losses. Therefore, the point of minimum average variable cost is called "a point of escape."

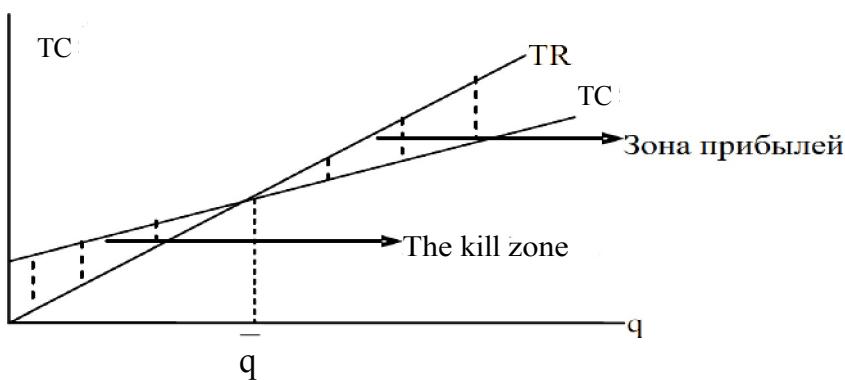
To summarize. When the price falls below the AVC minimum, the firm's output falls to zero. At higher prices, the firm continues production, at least for a short period. The output is determined by the point of intersection of the price line with the marginal cost curve. For example, at price P_4 , the point of intersection is t_4 . E $_4$, output will be q_4 . At price P_t , the point of intersection will be t_4 . E $_t$ and output is q_t . And so on. So the marginal cost curve above the point of minimum average variable cost contains all the points reflecting the change in output of the firm due to changes in the market price. It is therefore the supply curve of a perfectly competitive firm in the short run (curve $MC=S$ in Figure 8-6).

The market supply curve of all firms is obtained by horizontally summing the supply curves of individual firms.

G. Simplified cost functions and break-even point Connect the revenue and total cost lines in one figure

(Figure 8-7). We will rely on simplified cost functions when marginal costs are constant, so that the total cost function is linear (topic 7, item 4B). This is the type of cost that is most often considered in practical research.

Figure 8-7. Break-even point



The figure shows that with zero output the firm's revenue is also zero. As for total costs, they are at zero output

is not zero, because fixed costs have to be incurred anyway. Consequently, at zero output the total cost is the same as the fixed cost (FC). Hence, it follows that at zero output the firm incurs a loss in the amount of fixed costs.

Then, as output increases, the lines of revenue and total cost converge, intersecting at some point. At this point, called the break-even point, the revenue equals the total cost, so the firm's profit is zero. The breakeven point is equal to output . If actual output is less than this point, the firm will suffer a loss, because costs will exceed revenue (the size of the loss will be equal to the distance between the lines TC and TR). If the output is greater, the revenue will exceed the costs, and the firm will make an economic profit (its size will be equal to the distance between the lines TR and TC).

Since at the break-even point revenue equals total cost ($TR=TC$), it follows that price equals average total cost ($P=AC$).

As for the profit maximum, it is reached in this case with infinitely large output.

You can calculate the breakeven point using the formula:

$$q = \frac{P}{P - AVC}$$

For example, the firm sells goods for 5 rubles apiece. Average variable costs are constant and equal to 3 rubles. Fixed costs are 200 rubles per day. Then:

$$\bar{q} = \frac{200}{5 - 3} = 100$$

In other words, if a firm sells 100 units a day, it will make ends meet, although it will not make an economic profit.

The situation can also be presented in the form of a table (Table 8-4):

Table 8-4. Break-even point

q	TR	FCVC (AVC-q)	TC	Π
-----	----	--------------	----	-------

0	0	200	0	200	-200
1	5	200	3	203	-198
2	10	200	6	206	-196
3	15	200	9	209	-194
98	490	200	294	494	-4
99	495	200	297	497	-2
100	500	200	300	500	0
101	505	200	303	503	2
102	510	200	306	506	4

If actual sales exceed the break-even point, each additional item sold generates an economic profit equal to the difference between the price and the average variable cost.

4. Firm and industry equilibrium in the long run

In the long run, unlike in the short run, all inputs are variable. As a result, the firm has a greater opportunity to change the level of output than in the short period. On the other hand, the number of firms in an industry can change in the long run. Both of these factors affect the achievement of long-run equilibrium in a perfectly competitive market.

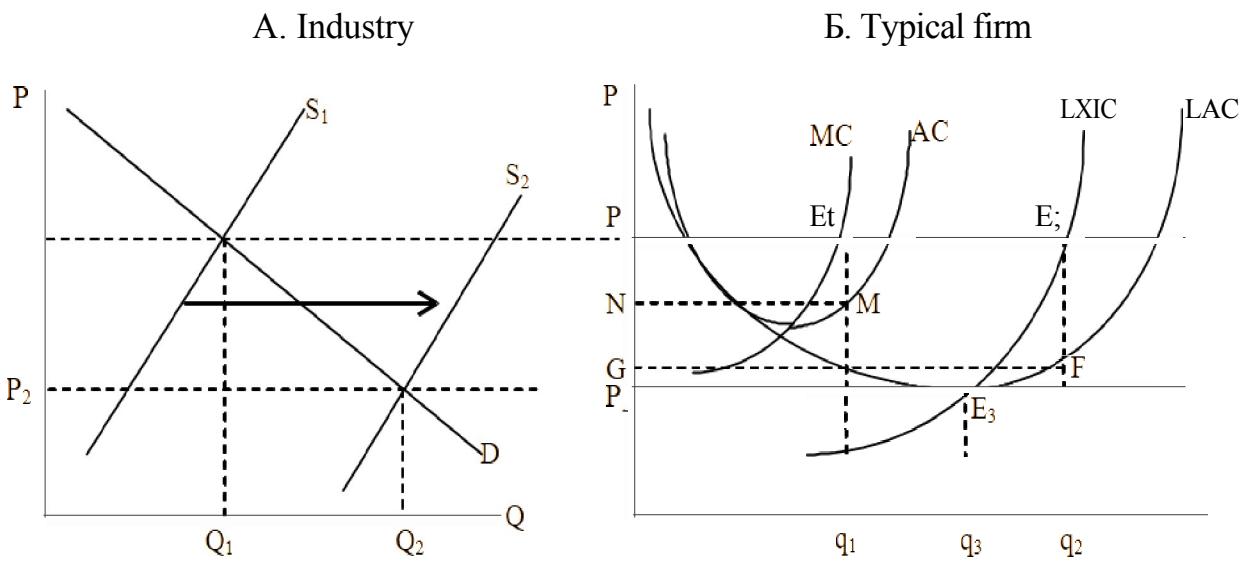
An industry in this case is understood as a set of producers - firms offering perfectly homogeneous goods for sale.¹ An industry is in long-term equilibrium when no firm seeks to enter or leave the industry and when

¹ It is clear that a perfectly competitive industry is as abstract as a perfectly competitively market. Realistically existing automobile industry, oil industry, etc. - produce and sell different goods, although they are more or less close substitutes.

none of the firms operating in the industry seek to either increase or decrease their output.

Suppose a very large number of typical firms with the same marginal and average cost functions operate in an industry. In choosing its level of output, the competitive firm is guided by the market price (Figure 8-8):

Figure 8-8. Long-term equilibrium of firm and industry



MC - short-term marginal cost curve of the firm; AC - short-term average cost curve of the firm; LMC - long-run marginal cost curve of the firm; LAC - long-run average cost curve of the firm:

In a short period at market price P_i (Figure 8-8A) the firm chooses output (q_i) corresponding to the intersection of the price line and the short run marginal cost curve (MC - Figure 8-8B). In doing so it makes an economic profit equal to the area P_iEiMN !

In the long run the firm has an opportunity to increase production. To maximize profits at the same price (P_i) it chooses output (q_i), in which the price is equal to the long-run marginal cost (LMC). As a result, at price P_t the firm increases its economic profit, which now corresponds to the area P_iE_iFG .

¹ If you don't understand why this is the case, go back to paragraph ZB of this thread.

However, all other firms also increase their production, which leads to an increase in market supply (a shift of the supply curve to the right in the left graph) and a decrease in price. On the other hand, new firms, attracted by economic profits, enter the industry, which further increases supply. This increase in supply continues until the supply curve moves from position S_1 to position S_2 (Figure 8-8A). The price then falls to the level of P_2 , i.e., to the level of the minimum long-run average cost of a typical firm (Figure 8-8B). Thus, the economic profits generated by the typical firm disappear. New firms stop entering the industry, and incumbent firms lose incentive to reduce or expand production. The long-run equilibrium is reached.

Conclusion: under conditions of perfect competition, when firms are free to leave and enter the industry, the typical firm is not able to make economic profits (super profits) in the long run.

SELF-STUDY ASSIGNMENTS

1. The firm's fixed costs are 24 rubles, and its variable cost function is: $VC=2q$. The firm can sell any number of products at a price of 4 rubles apiece. Calculate the break-even point of the firm. Show it on the graph.

2. Let functions aggregate и variables costs are linear. Show on the graph how the breakeven point would change if:
 - (a) Fixed costs will increase;
 - b) average variable costs will rise.

3. Let the marginal cost first decrease and then increase, so the variable and total cost functions are not linear. Connect the revenue and total cost functions in the same figure. Show break-even points, points of maximum profit, and

of maximal losses. Prove that at the points of maximum profit and maximum loss the following equality is true: $MR=MC$.

4. Let the marginal cost be constant (equal to the average variable cost, respectively). Plot the price, marginal cost, and average total cost curves on the same graph. Show the breakeven point. Prove that profit will be maximal if output is infinitely large.

5. The management of the business school incurs the following costs: room rental = 5,000 cents; teachers' fees = 5,000 cents; equipment costs = 2,000 cents; purchase of textbooks = 100 cents per trainee. Tuition, including textbooks, is CU300 per participant. How many trainees do you need to attract to cover all accounting costs? What would the accounting profit be if 80 trainees were attracted? Would the economic profit be greater or less than the accounting profit? What costs would have to be taken into account (in addition to those mentioned) to calculate the economic profit?

6. The firm's fixed costs are 12 and its variable cost function is: $VC=q^2$. The firm can sell any number of products at a price of 8 rubles per unit. In fact, the firm produces and sells 5 units of products.

Calculate the firm's profits. Is this output optimal in terms of profit maximization? Which output will maximize the firm's profits?

Calculate the break-even points of the firm.

Illustrate the solutions graphically.

7. There is a table showing the dependence of coBOK PnK costs on release:

q	0	20	40	60	80	100
TC	30	80	100	130	180	240

What will be the marginal cost for these output volumes? If a competitive firm can sell any number of products for 2.5 rubles apiece, what will be its output and what profit will it make? Illustrate the solution graphically.

8. A perfectly competitive firm has a variable cost function: $VC=2q^3-20q^2+60q$. Below what level must the market price fall for the firm to stop producing in the short run? Illustrate the solution graphically.

9. Based on his experience, the entrepreneur has established the following relationships between costs and output (q):

$$\begin{aligned} \text{Depreciation} &= 3 \text{ Wages} = 4q \\ &+ 1 \end{aligned}$$

$$\text{Raw materials} = q^3 - 3q^2 + 4q$$

1. From here derive the functions: total cost (TC), fixed cost (FC), variable cost (VC), average total cost (AC), average fixed cost (AFC), average variable cost (AVC), and marginal cost (MC).

2. Let the market price of the product be 8, and the entrepreneur cannot influence it by changing the volume of his production. How many products must the entrepreneur produce to maximize his profit? What will be the total value of his profit? Profit per unit of production? Will he continue production in the short and long run?

3. Calculate the price elasticity of supply at the equilibrium point of the firm.

10. There are 100 firms in the industry with the same costs depending on the volume of production. The total cost function of each firm is $TC = q^2$.

Function market demand for produced by produced by all
of the product produced by all firms:

$$Q = 200 - 50p$$

1. Calculate the equilibrium market price and the equilibrium volume of supply and demand.
2. How much production will each firm produce and how much profit will it make?
3. How much profit will all firms in the industry make?

ANALYSIS OF THE RIGHT SITUATION

A fishing boat can enter and leave the port only at high tide between 6 and 7 o'clock. In practice, the vessel has 24 hours to travel to and from the fishing area and to catch the fish itself. The fishing area is 30 miles from the port. The faster the boat gets there, the more time she can spend on fishing. At the same time, the fuel consumption depends on the speed:

Speed (mph)	Fuel consumption (gallons per 60 miles)
6	10
7	11
8	13
9	16
10	20
11	25
12	31
13	38

No fuel is used while fishing. The price of fuel is \$1 per gallon. All other expenses are independent of speed. Each hour of fishing produces \$10 worth of fish. What speed should the vessel choose if its owner wants to maximize profits? Justify the answer.

COMPUTER LAB SESSION: COST FUNCTIONS AND OUTPUT OF A COMPETITIVE FIRM

Part 1

Background Information:

The firm's fixed costs (FC) = 20. Variable cost function: $VC=4q$. Market price = 8.

Assignments:

1. Enter in the table the values of output (q) from 0 to 10, FC, VC, TC, AFC, AVC, AC, MC, $MR=P$, TR, and P. Determine the breakeven point.
2. Plot FC, VC, TC, and TR from output. Determine the breakeven point on the graph. At which output is profit maximized?
3. Plot graphs AFC, AVC, AC, MC, and $MR=P$ from output. Determine the breakeven point on the graph. At which output is profit maximized?

Part 2

Background Information:

There is data on the dynamics of fixed and
variable costs of a perfectly competitive firm:

q	FC	VC	TCA	AFC	AVC	AC	MCC	MS2	MC\$	1	TR1	/ \$	Ru	TR2	2
0	60	0													
1	60	38													
2	60	60													
3	60	72													
4	60	80													
5	60	90													
6	60	108													
7	60	140													
8	60	192													
9	60	270													
10	60	380													

Assignments:

1. Fill out all columns except six the last six. At The marginal costs must be calculated in three ways:

1-y - according to the formula: !!! g

$$2-y - by the formula: \quad ' = \frac{TC_3 - TC_1}{q_3 - q_1}$$

3-y - according to the formula: !!!!! - ????? "

In the latter case, keep in mind that the variable costs are given by the function: $VC = q' - 11q + 48q^2$

2. Let the market price (P_i) be 41. Determine the firm's revenue and profit for each volume of output. Determine the break-even points. Which output will give the firm the maximum profit?
3. Let the market price (P_2) be 24. Determine the firm's revenue and profit for each output. Which output will the firm choose?
4. Plot TC , TR_i ($TR_i = P_i \cdot q$), and TR_2 ($TR_2 = P_2 \cdot q$) as a function of output.
5. Construct graphs of AVC , AC , MC and P_i and P_t as a function of output. Confirm the optimal outputs using the graphs.
6. Below what level must the price fall for the firm to stop production in the short term?

TEMA 9. MONEY AND BANKS

1. Money and monetary aggregates
2. Banking and the emergence of paper money
3. Two-tiered banking system: Central bank and commercial banks
4. Money creation by banks

1. Money and Monetary Aggregates

A. What is Money

It is wrong to identify money only with the bills we carry in our wallets.

In fact, money is any good capable of performing three functions:

1. The medium of circulation. Through money, commodity exchange is carried out. Thus money makes it possible to avoid barter (direct exchange of goods for goods), respectively, reduce the cost of circulation (transaction costs).

In today's economy, payments are made in three ways:

(a) In cash;

b) by means of entries in bank accounts;

b) through documents certifying the indebtedness of one person to another.

Accordingly, there are three types of means of payment: cash, current accounts, and promissory notes. The first two types of means of payment are created by banks, and the last one is created by both banks and the non-bank sector.

2. The means of measuring value. Through money is expressed

THE COST OF ALL OTHER MERCANDISE.

In the absence of money, the value of each good would have to be measured in each of the other goods. For example, the price of a car is X suits or Y kilograms of meat or Z liters of milk, etc. As a result

there would be a gigantic number of relative prices in the economy, which is extremely inconvenient. Thus, the use of money as a means of counting simplifies exchange many times over.

B periods high inflation, it is used as a means of
is used national currency, and B as
measure of value is a foreign currency.

3. A means of saving. In this case, money is not spent immediately, but is saved for future purchases. To fulfill this function, money must retain its value.

Not only money, but also other assets are capable of preserving value. However, money has the advantage of liquidity. Liquidity is the ability of an asset to be exchanged quickly and without loss for other assets.

In times of high inflation, the function of savings is performed by foreign currency.

E. From the History of Money

Initially, in the historical development of human society, there were two kinds of money. On the one hand, this role was played by goods that had their own value as commodities - the so-called "commodity money. In some places, cocoa was money. In other places it was grain, honey, cattle, furs, dried fish, salt, iron, etc. Commodity money was not only used as a medium of exchange, but was also sold and bought as ordinary commodities.

On the other hand, there was symbolic money. They were pieces of glass, shells, dog teeth, stones of a certain shape, etc. The distinguishing feature of symbolic money was that its purchasing power exceeded the cost of producing it or its value in alternative uses. For example, heavy stones with holes in the middle, which were money on the island of *Ru* in the Pacific Ocean, were hardly of significant value as an object of consumption or a means of production. Modern paper money

are also symbolic because their purchasing power far exceeds the value of the paper on which they are printed.

The existence of symbolic money suggests that money could, in principle, be any good that people agree to accept in payment for goods. It is only necessary that the object purporting to be money be relatively rare in a given locality, since no one would be willing to give up his goods in exchange for something lying around freely under his feet. The consent to use some good as money can be the result of historical and religious traditions or the decision of the authorities. Specially shaped stones can serve as money no worse than gold bullion, if everyone agrees to use them in settlement. In the same way we give our goods and services for modern paper money, only because we are sure that any other seller, in his turn, would be glad to take it from us. This behavior is reinforced by the authority of the state, which is obliged to accept the banknotes it issues for payment and which itself accepts them when it collects taxes. This does not mean, however, that the government can only enforce the use of paper money and should not be concerned about people's confidence in money. The latter is achieved by a prudent monetary policy (the topic of "Monetary Market and Monetary Policy").

But back to history. Over time, the role of money was assigned to noble metals. Until the 18th and 19th centuries the silver standard dominated in Europe (there was too little gold), and then gold became the main monetary commodity. The convenience of using gold was due to its special natural properties: divisibility, safety, homogeneity, portability (great value for a small volume and weight).

Initially gold and silver bars were used for exchange, but it was not very convenient because each time the bars had to be weighed and their purity had to be determined. In an effort to cut costs

In order to make it possible for them to circulate, and to enrich themselves at the same time, the sovereigns began to mint coins, indicating the weight and the grade on them.

Gold and silver coins were partly symbolic money because their value in exchange exceeded the value of the metal needed to produce them. The difference constituted the income of the sovereigns of the so-called enorage.

In the pursuit of the senorage, the rulers rigidly guarded the monopoly to minting money at their territory, pursuing counterfeiters.

But the use of coins was also not entirely convenient, for they wore out from circulation. So gradually gold and silver were replaced by paper money. It began like this.

A certain merchant leaves to trade. He needs coins to complete his transactions, but the merchant is afraid to take them with him, for he might be robbed on the highways. Therefore, the merchant surrenders his gold and silver to the goldsmith for safekeeping, and in return he receives a personal receipt for this amount. Because merchants' business partners trusted these receipts, they could be used instead of coins in transactions. All that was needed was to give the partner a letter to the jeweler, asking him to give the bearer of the letter gold as a deposit. Such a letter served as a check (The stock market, p. 2). Debentures of jewelers thus became the first paper money.

Over time, jewelers turned into bankers who not only accepted deposits, but also issued loans. When bankers accepted gold and silver as deposits, they issued their own promissory notes, banknotes, which became a more modern form of paper money. Eventually, the Central Bank took over the function of issuing national banknotes: this is how national paper money, the Central Bank's promissory notes, came into being.

So, in essence, paper money is a promissory note. B 19-
In the early 20th century they were receipts for gold because they were subject to

unconditional exchange for it. But the disadvantage of the gold standard is that the amount of money in the economy is not related to economic development, but depends on the flow of gold into the country, in particular - on the productivity of gold mines. When gold production increases, there is more money, and prices go up. Correspondingly, when gold production falls, the money supply shrinks and prices fall. But such sudden jumps in prices up and down are always detrimental to the economy, because they complicate business planning and contribute to an unwarranted redistribution of income (theme "Inflation," paragraph 3).

So now paper money is not exchanged for gold anywhere. Their quantity in the economy is determined by the policy of the Central Bank, and their resistance to depreciation is determined by the entire stock of goods.

B. Monetary aggregates

Money is a liquid asset, but the liquidity of the individual components of the money supply is not the same. Let someone keep 1000 rubles in his wallet, have 5000 rubles in a current bank account, and 10000 rubles in a term savings account. All of this is certainly money, but money is different. The difference is that cash can be used at anytime and anywhere, and to use a current account you have to go to a bank or find a store that accepts plastic cards. As for the savings account, it is not easy to decide to close it before the deposit period expires, because in this case you lose interest.

Groupings of liquid assets with approximately the same level of liquidity are called **monetary aggregates**. It is the prerogative of the country's central bank to define them. In market economies, monetary aggregates are largely similar, although there are some differences due to the level of economic development and national characteristics.

In Russia, the first monetary aggregate is called MO and includes cash in circulation. The next aggregate is called M1. It consists of cash (MO) plus funds in rubles held in

demand deposits of the population, as well as settlement and current accounts of enterprises, organizations and local budgets. It is followed by the aggregate M2, which includes M1 plus term savings deposits (deposits placed for a certain period of time) in rubles. The latter aggregate is called MZ (broad money) and includes, in addition to M2, the funds for which banks have issued certificates of deposit, as well as government bonds. In addition, this aggregate sometimes includes deposits in foreign currency (in the ruble equivalent).

There are two other things to note:

First, each next aggregate includes a wider range of assets compared to the previous one. It makes no sense therefore to say: "aggregate M1 plus aggregate M2", because M2 includes Mi.

Second, monetary aggregates are arranged in descending order of liquidity. The most liquid aggregate is M1. The Bank of Russia includes in aggregate M1 all monetary assets, which can be used as a means of circulation. On the contrary, aggregates M2 and M3 contain assets, which are not directly used in transactions - the so called "almost money". Thus, as the aggregates increase, they include assets that are less and less able to perform the function of circulation, but better and better performing the function of saving (preservation of value).

The structure of the money supply in our country as of February 1, 2004 is shown in Table 8-1:

Table 8-1. Monetary Aggregates in Russia

Name unit	Unit size (in billion rubles).	Assets included in the aggregate
MO	1130,6	Cash in circulation
M1	2127,1	- MO; - demand deposits; - Current and settlement accounts
M2	3214,1	- M1; - term savings deposits
MH	3946,0	- M2; - certificates of deposit; - government bonds; - currency deposits

The structure of the money supply in Russia and in countries with developed market economies is, of course, different. In particular, the shares of aggregates MO and M1 in the structure of MH are relatively high. This can be explained by the fact that the number of assets able to keep their value for a long time is rather limited in Russia, especially in the conditions of inflation and distrust of banks. In addition, the adherence of Russians to cash reflects the spread of the shadow economy in our country with its desire not to conduct settlements through banks. Nevertheless, the share of cash in the total value of aggregates M2 and MH in Russia is gradually decreasing, which indicates the recovery of the monetary system and the economy as a whole.

It has been observed that economic parameters in all countries are most responsive to changes in the M2 aggregate. That is why it is most often taken as the basis for measuring the money supply in the economy.

2. Banking and the emergence of paper money

Let's look at how paper money came into being. Their emergence is closely connected with the activity of banks. Therefore, it is necessary to understand the principles of balance sheet construction in banks. In addition, understanding these principles will allow a better understanding of the functioning of the modern banking system.

The balance sheet consists of two parts - the liability and the asset. **The liability** shows the sources of funds (where the funds came from) or liabilities of the bank. **The asset** shows the use of funds (where the funds went) or liabilities to the bank. Because both parts of the balance sheet are about the same funds, the liability always equals the asset.

Let's try to make a balance sheet of a notional bank. For this purpose it is necessary to recall the story of the goldsmiths told in the previous paragraph. Let the goldsmith accept 100 gold coins from a merchant for safekeeping, putting them in his safe. Instead of gold, he gave the merchant receipts for this amount as proof of the deposit. As a result of this operation, the goldsmith's balance was as follows:

Active	Passive
100 - Gold in reserve	100 - Jeweler's Receipts

The receipts issued by the jeweler are accounted for in the liability, because they show the source of the gold and are at the same time an obligation of the jeweler to the depositor. On the other hand, the assignment to the reserve is the way the gold is used. Therefore real gold is accounted for as an asset.

Over time, jewelers turned into bankers. By accepting gold as deposits, bankers gave their depositors their debentures in banknotes. The latter changed hands freely, thereby serving as paper money. People accepted banknotes, because they were sure that they could exchange them for gold at any time. The balance sheet of a bank which accepted 100 gold coins as a deposit and issued banknotes to that amount looked like this:

Active	Passive
100 - Gold	100 - Banknotes

Note that money issued by a bank, being its liability, is always shown in the liability side of the bank balance sheet.

At the same time, banks not only accepted deposits, but also gave loans. Let the bank agree to lend 20 gold pieces. Very often, however, even in ancient times, borrowers did not want to borrow in coins for the same reason that merchant depositors preferred the jeweler's notes of debt to real gold. Therefore, loans were made not in gold, but in receipts for the amount of the loan - new banknotes. In this case the gold remained in the safe, and the bank balance became so:

Active	Passive
100 - Gold in reserve	100 - Banknotes
20 - Credit	20 - Banknotes

THERE HAS BEEN A REVOLUTION IN BANKING!

Previously there were 100 gold coins in circulation. Then they were deposited and thus disappeared from circulation. Instead of them, however, banknotes of the same amount are used in calculations - paper money. As a result, the money supply in the economy did not change at this stage, but money changed its form: banknotes instead of coins. But then credit was issued in new banknotes, not backed by gold in any way. Nevertheless, in appearance these new banknotes were no different from the previous ones; they were also readily accepted for payment.

The banker discovered a magical property: he could create new money from nothing, with the stroke of a pen, issuing credit! Nevertheless, fear had to pay for this magic: what if all the banknote holders demanded to exchange them for gold at the same time? But usually all was well. People trusted banknotes, so they changed hands freely and were rarely returned to the bank.

Of course, it is possible to assume that the borrower, who took a loan in banknotes, paid with them to his business partner, who, in turn, presented them for exchange for gold. In this case, 20 gold notes left the bank, and the balance acquired a look:

Active	Passive
80 - Gold	100 - Banknotes
20 - Credit	

The logic of the balance in this case is this. The question is: where did the gold come from? Answer: from the depositors, as evidenced by the bank's debentures - banknotes. Question: Where did the gold go? Answer: partly in reserve, partly on credit.

In our example, the banknotes are only 80% gold backed. This is - the principle of partial reserves, which underlies the whole banking business. In Section 4 of this theme it will be shown that the liabilities of modern commercial banks to depositors far exceed the size of bank reserves, although these reserves are now embodied not in gold.

Returning to our story, let's assume that a conscientious borrower returned the loan taken in gold, and even with interest (let's say 10% of the loan amount - 2 coins). After that, the balance was as follows:

Active	Passive
102 - Gold	100 - Bills
	2 - Profit

We can summarize: the honest work of a banker earned 2 gold pieces, the source of which is bank profits. Life does not end there, however. New loans will be issued, and consequently new banknotes will be in circulation. The bank can increase its profits through more lending. For instance, our conventional banker, having deposited 100 gold coins, could lend not 20 but 30 or even 50 gold pieces. The main thing here, of course, is not to burrow, constantly keeping in mind the risk of presenting banknotes for exchange for gold.

In modern conditions, the Central Bank controls the number of loans issued by commercial banks.

3. Two-tier banking system: the Central Bank and commercial banks

A. The balance sheet of the Central Bank and the monetary base

A market economy is characterized by a two-tier banking system. The first level is the Central Bank of the country, which regulates the money supply in the economy. The aggregated balance sheet of the Central Bank looks like this:

Active	Passive
Gold and foreign currency reserves	Cash in circulation
Securities	Commercial bank accounts
Loans to commercial banks	Government Accounts
Loans to the government	Equity
Other assets	Other liabilities

To understand the balance sheet of the Central Bank, it is necessary to recall the general principles of construction of the bank balance sheet, outlined in the previous paragraph.

In the olden days, when bankers accepted gold as a deposit, they gave depositors their promissory notes - banknotes, which played the role of paper money. Accordingly, the accepted gold was recorded as an asset of the bank, while the banknotes were recorded as a liability.

Modern central banks do much the same thing. They buy gold, foreign currency, and government securities, and they pay with their debt, which is cash. Because cash in circulation is a liability of the central bank, it is recorded as a liability on its balance sheet. In turn, gold and foreign exchange reserves, as well as government securities purchased by the Central Bank, serve as collateral for cash. Therefore they are reflected in the asset side of the balance sheet of the Central Bank.

Like all banks, central banks make loans. But they do not lend to firms and households, but to commercial banks and the government. Lending is one way that the central bank uses its resources. On the other hand, receiving credit means that the borrower has an obligation to the Central Bank. For these reasons, loans issued are shown as an asset on the balance sheet of the Central Bank.

In the previous paragraph it was said that banks did not lend directly in gold, but in bills for the amount of the loan. Similarly, the Central Bank can lend to borrowers with its banknotes - cash. In this case, the issuance of credit is accompanied by an increase in cash in circulation, indicated in the passive part of the balance sheet of the Central Bank.

Hence it follows, that cash money in circulation today is secured by not only foreign exchange reserves и The Central Bank's reserves are not only gold and foreign currency reserves, but also securities held by the Central Bank, as well as loans issued by it and liabilities of borrowers to the Central Bank.

There is one more line in the CB's assets - other assets. They are mainly represented by a variety of bank assets: buildings, equipment and other fixed assets.

Let us now turn to the liabilities. Commercial banks and the government not only borrow money from the Central Bank, but also keep their funds with it. Funds in the banks' and government's accounts with the Central Bank are liabilities of the Central Bank and are recorded in its liabilities.

Like any bank, the Central Bank has its own capital. It is the source of the Central Bank's funds, and therefore an element of the liability.

The Central Bank can attract borrowed funds from various creditors, including foreign ones. They are accounted in the column "other liabilities". The profit of the Central Bank is also recorded there.

As an illustration, let us look at the consolidated balance sheet of the Bank of Russia. As of February 1, 2004 it looked as follows (in millions of rubles):

Active		Passive	
Precious metals	48 699	Cash in contact	1 199 111
Funds and valuables foreign currency papers currency, placed with non-residents	1 172 038	Funds in accounts with Bank of Russia Of which:	1 423 572
Loans and deposits Of these:	187 982	- governments of the Russian Federation	437 557
- issued by the credit resident organizations	72	- creditors of resident organizations	732 532
- issued to the government to service foreign debt	176 648	Funds in settlements	18 076
Securities Of these:	1 503 305	Other liabilities	57 411
- securities INTO THE INVESTIGATIVE EMITIoNS	1 197 567	Capital	290 782
- government securities of the Russian Federation	273 951		
Other assets Of these:	76 928		
- fixed assets	56 038		
Total assets	2 988 952	Total liabilities	2 988 952

A number of circumstances attract attention. Firstly, gold and other precious metals themselves constitute a very small share of the foreign exchange reserves of the Bank of Russia. The main part of them is represented by foreign currency.

Secondly, the Bank of Russia does not keep dollars and euros in cash in its vaults, but invests them in first-class securities of foreign countries and opens accounts in foreign banks. Such a policy is quite reasonable, because the Bank of Russia receives a certain interest on its investments.

Thirdly, the Bank of Russia's loan portfolio has a very small share of loans to resident credit institutions, or, more simply, to commercial banks .

There are two reasons for it, The mechanism of crediting commercial banks by the Bank of Russia has not been fully worked out.

Secondly, banks' demand for credits is not very high lately, because banks have sufficient . own funds. The

overwhelming majority of its loans were issued by the Bank of Russia to the Russian government to service its foreign debt. At the same time, in addition to direct lending, the Bank of Russia also buys government securities.

Fourthly, in the liabilities we see the item "funds in settlements", which has not been mentioned before. It arises, for example, in connection with the settlements of commercial banks with each other, carried out through the Central Bank. Suppose bank A transfers money to bank B. This money ends up temporarily in the Central Bank, which acts as a sort of post office, and is recorded as a liability of the Central Bank in the liabilities side of the balance sheet.

The functions of the Central Bank and the instruments it uses to regulate commercial banks and the economy as a whole will be discussed in more detail in "Money Market and Monetary Policy".

In any country, the basis of the monetary system are banknotes of the Central Bank - cash in circulation. It follows from the above that money comes into circulation in two ways:

First, the Central Bank pays with them when buying gold, foreign currency and securities.

Second, the Central Bank lends them to commercial banks and the government.'

Part of the cash issued by the Central Bank is returned to it in the form of deposits of commercial banks and thus

'A simplification is made here. For more details about the mechanism of monetary issue, see "The Money Market and Monetary Policy," p. 1.

leaves circulation. Cash in circulation plus the funds of commercial banks in accounts with the Central Bank constitute **the monetary base**.

By increasing its assets, the Central Bank creates the monetary base, and by decreasing them, it decreases it.

B. For those who want to know more: the narrow and broad monetary base

A distinction is made between "narrow" and "broad" monetary base. The distinction is due to the fact that commercial banks open a variety of accounts in the Bank of Russia. First of all, banks, attracting deposits from firms and households, are obliged to keep some of these funds in special reserve accounts in the Central Bank. The sum of cash in circulation and mandatory reserves of commercial banks in the Bank of Russia constitute **a narrow monetary base**.

Commercial banks open correspondent accounts in the cash and settlement centers of the Bank of Russia for settlements through the Central Bank. These accounts are used to make transfers from one bank to another, payments to budgets and non-budgetary funds, as well as banks' settlements with the Central Bank.

In addition to reserve and correspondent accounts, banks open deposit accounts with the Central Bank. In this case, they act as ordinary depositors, placing their free funds for a certain period at interest.

Another way to invest temporarily free funds is the purchase by commercial banks of bonds of the Bank of Russia, which also bring some interest income.

Finally, there are obligations of the Bank of Russia to repurchase securities. They arise because the Bank of Russia sells government securities to commercial banks, undertaking to buy them back after a certain period of time at a higher price. This is another instrument of lending to the Bank of Russia by commercial banks.

The amount of cash in circulation, mandatory reserves, funds on correspondent and deposit accounts of commercial banks with the Bank of Russia, the value of the Bank of Russia bonds purchased by commercial banks

banks and obligations of the Bank of Russia to repurchase securities constitute **a broad monetary base**.

B. Commercial banks and their functions

The second level of the banking system consists of commercial banks. All banks except for the Central Bank are considered commercial banks regardless of their form of ownership. In other words, Sberbank of Russia, the controlling stake of which belongs to the Central Bank, is a commercial bank just like any private joint-stock bank.

The strategy for the development of the banking sector, worked out jointly by the RF Government and the Bank of Russia, envisages a reduction of state participation in the capital of commercial banks. First of all, it is planned that the state will withdraw from the capital of those banks where its share does not exceed 25%. In those banks where the government owns over 25% of their capital the expediency of its further participation will be evaluated. Then a list of banks where the state will sell its share will be compiled and a mechanism of withdrawal from their capital will be worked out.

According to the nature of operations, commercial banks are divided into universal and specialized. **Universal banks** are banks that perform a wide range of banking operations and services. **Specialized banks** are those that focus on specific operations. These include, in particular:

- Savings banks, which mobilize free funds of the population and provide them with loans for the purchase of consumer goods;
- Investment banks engaged in financing and long-term lending to the real sector - industry, trade, transport and agriculture. They act as agents in the initial placement by firms of their securities, they themselves purchase shares and bonds of firms;

- Mortgage banks that provide loans secured by real estate - land and buildings;

- Banks specializing in export-import operations;
- And others.

In Russia, universal banks are the most common, although recently a number of banks tend to focus on certain operations, for example - on consumer lending to the population.

All banking operations can be divided into three groups: passive, active and services.

1. Passive operations are operations, as a result of which the bank attracts additional funds. The sources of these funds are reflected in the liabilities of the bank balance sheet. There are four types of passive operations:

- The issuance of securities. When a bank issues its shares, it raises funds from shareholders who become co-owners of the bank. When a bank issues bonds, it receives funds from their buyers, who lend money to the bank. Accordingly, the amount of share capital and the value of bonds issued by the bank are shown on the liabilities side of the balance sheet.

One of the serious problems hindering the development of the banking system in Russia is the lack of capital. Small banks dominating today in our country are poorly able to cope with lending to production. In this connection, the Bank of Russia plans to raise the minimum equity capital for newly created banks to 5 million euros (in the ruble equivalent) by 2007;

- Contributions from profits to the formation of bank funds. Part of the profits received after taxes is not distributed by the bank among shareholders, but is directed to reserves, capital increase, etc. Thus, the profit left in the bank increases the own funds of the bank and is reflected in the liabilities as a source of these funds;

- Obtaining credits and loans. The most important role here is played by interbank loans. In our country, banks lend to each other for up to three months, but very often they practice ultra-short loans - for 1-2 days. In a number of cases banks can also count on loans from the Bank of Russia, although the mechanism of such lending is not fully worked out. Since October 2003 the Central Bank has started to carry out the so called "short-term loans" on a regular basis.

"Lombard credit auctions" among commercial banks. The winners of these auctions receive loans secured by government securities. In addition, lending through auctions can also be carried out in the form of repurchase agreements (repurchase agreements). In this case, banks sell government securities to the Central Bank, with the obligation to repurchase them back after a certain period of time at a higher price. The difference between the purchase price and the sale price forms the interest for using the Central Bank's money. In addition, during 2002 - 2003 the Bank of Russia provided commercial banks with loans. The Bank of Russia extended intraday and overnight settlement credits to commercial banks, as well as entered into "currency swap" transactions with them, which actually represent the issuance of overnight credits

Under the Foreign Currency of the W o r l d ;

- Deposit operations. Through such operations, the bank attracts deposits from individuals and legal entities. Being the bank's obligation to the depositors and at the same time the source of bank funds, deposits are shown in the liabilities side of the balance sheet. At that, deposits make the overwhelming part of the bank's liabilities.

A distinction is made between time deposits and demand deposits. In the first case, deposits are made for a strictly defined term, and their early withdrawal entails financial losses for the depositors. The advantage of time deposits for the depositors is the higher interest rate, and for the bank the opportunity to manage the invested funds for a fixed term. The disadvantage of time deposits is their low liquidity, since the funds on time deposits

The funds in the accounts cannot be used by depositors for settlements and current payments, or for receiving cash.

Demand deposits, on the other hand, are very liquid because the owners can use the money in their accounts at any time. But at the same time such accounts are interest-free or pay very little interest. For its part, the bank has to keep an increased reserve on demand accounts, having in

TYPE OF POTEHTCIdJlbH yOu WHICH M3CCOBOFO ZnK}ZyZlty.

2. Active operations are operations by means of which the bank uses the means at its disposal. The results of such operations are reflected in the assets of the bank balance sheet. Credit (loan) as well as investment and stock operations shall be distinguished in the composition of active operations.

Credit operations mean the issuance of funds to the borrower on the basis of repayment, maturity and payment. They are extremely diverse and are divided into groups according to the following criteria:

- Type of Borrower. Banks make loans to commercial and nonprofit businesses, other banks, the government, local governments, and individuals;
- The method of securing a loan. There are unsecured and secured loans. In the latter case, collateral is pledged property, guarantees and sureties, insurance. Collateral does not guarantee the repayment of the loan, but it reduces the risk of the bank;
- Loan terms. There are short-term (from 1 day to 1 year), medium-term (up to 3-5 years) and long-term (over 3-5 years) loans;
- Purpose. Loans are divided into purposeful, i.e. provided for certain needs (replenishment of working capital, purchase of equipment, construction of housing, etc.) and non-purposeful;
- Etc.

At first glance, the situation with lending by banks to the real sector (enterprises producing goods and services) and individuals

The number of loans in Russia is not bad or, at least, is improving. Thus, in 2003 the volume of loans increased more than one and a half times, reaching 2764 billion rubles. At the same time, lending to individuals grew particularly fast (more than twice). In the structure of bank assets lending to the real sector and individuals reached 50%.

Nevertheless, there is a set of interrelated problems. The first problem is related to the fact that, despite the noticeable growth, the role of bank loans in the financing of the Russian economy remains extremely insignificant. Thus, in 2003, loans barely exceeded 21% of Russia's GDP, whereas in developed countries they account for an average of 53% of GDP.

Another problem concerns the timing of lending: most of the funds provided are short-term loans. As a rule, a loan is given to support the production cycle, which does not require long-term investments. But for technical re-equipment, which most of our companies need so much, we need long-term loans. However, of the total volume of loans to legal entities, "long money" (over 3 years) accounts for less than 5%.

The third problem is related to the distribution of credit. They are mainly received by industrial giants, to a lesser extent - the construction industry and trade. At the same time, almost half of the loans are directed to the export sectors of raw materials to the detriment of the processing industries.

Banks prefer to work only with proven partners, offering loans at exorbitant rates to others. Most banks do their business on a few clients, for the most part related to their shareholders. For example, a bank belonging to the same financial and industrial group as LUKOIL or Sibneft keeps their money and largely finances their projects with it, framing this financing as a loan.

At the same time, ordinary enterprises, not so rich in petrodollars, remain on a starvation ration of credit. In the manufacturing sectors of the economy there is already a significant shortage of credit money.

According to some economists, it reaches \$5 billion. Thus, the current banking system does not facilitate the flow of capital from raw materials to manufacturing industries, which exacerbates structural imbalances in the economy and impedes economic growth.

How to reverse the situation? Obviously, there are no easy solutions. exists. The problems of the banking sector stem directly from the shortcomings of the entire Russian economy. In particular, it is difficult to hope that capital will willingly agree to flow from highly profitable industries to low-profitable ones.

In order to justify their lending policy, banks are not unreasonably referred to the high risks of lending to the majority of real sector enterprises. It is unlikely to help the cause and proposed by a number of economists massive lending to the national economy at the expense of public funds, because this money is likely to be used inefficiently and the loans "will go in the sand.

It is impossible to correct the situation only by improving banking legislation; a whole set of measures is needed. First of all, loans will not flow to manufacturing industries, as long as the economic activities of enterprises remain non-transparent. If there is clear and, most importantly, honest reporting, the bank does not need to add extra interest

"at risk" when granting credit. Transparency can be achieved by using globally accepted standards of financial reporting.

Much will also depend on the government's position on allowing foreign banks into Russia and on their willingness to work in our market. The transition to international reporting can significantly increase the interest of Western banks in Russian enterprises, making loans more accessible and cheaper.

Credit bureaus, which collect credit histories and data on "delinquent" debtors, can also be of great help in separating reliable from unreliable borrowers. On the need for

There has long been talk of such bureaus, but it is not yet clear how they should work and what kind of information they should collect.

The consolidation of banks envisaged by the reform is also very important, increasing the credit potential of banks and reducing banking risks.

Other measures are also needed: from de-monopolization of the economy, improvement of contract law, support for small and medium-sized enterprises to reform of the entire judicial system. The scenarios of further development of the financial sector and the entire economy depend on how the government copes with these tasks.

Another type of active operations are investment and stock operations of the bank. Investment operations are operations on the bank's investment of its funds in securities and units of the non-banking sector. For example, a bank may purchase shares or bonds of companies with the expectation to receive income on these securities and also to gain control over firms. Banks also invest in state and regional government bonds. Unlike lending, investment operations are carried out by banks on their own initiative and not at the request of borrowers. A kind of investment operations are stock operations, when a bank buys or sells securities listed on stock exchanges.

3. Banking services are intermediary operations performed by banks on behalf of customers for a fee (commission). They include

RELATED:

- Settlement operations - transactions for crediting and debiting funds from customers' accounts. By means of such transactions, customers' obligations to their counterparties and counterparties' obligations to customers are fulfilled;
- Collection operations - receipt of money on behalf of clients on the basis of various money documents;

- Transfer operations, through which the money deposited in the bank is transferred to the recipient located in another location;
- Trade-intermediary operations, when the bank sells or buys securities, foreign currency, precious metals, etc. on behalf of clients. Such operations also include leasing, when the bank (or a leasing company subordinated to it) buys expensive equipment and then leases it out, accepting periodic payments from the lessee;
- Trust operations, which involve the temporary management of the principal's property. As part of such operations, a bank, for example, may at its discretion invest the principal's money in various securities to maximize profits;
- Counseling services;
- And others.

Thus, banking functions are extremely varied, but among them there are three main ones that make a bank a bank:

- deposit acceptance;
- issuance of loans;
- making settlements.

By performing all three of these functions, commercial banks create money in addition to the cash money issued by the Central Bank. How this happens is explained in the next paragraph.

4. Money creation by banks

Let us consider how the activities of commercial banks increase the money supply in the economy. Let's start from the beginning. Suppose a firm sold goods abroad, raising \$100. The Central Bank bought these dollars at the current exchange rate (conventionally 1:1), and thus put 100 rubles into circulation (creating a monetary base).

Someone (maybe the same firm) has deposited these 100 rubles in his current account at commercial bank A. Initially, the bank keeps 100 rubles in its reserve. As a result, the bank's balance changes as follows:

Active	Passive
100 - Reserve	100 - Current account

This operation did not increase the money supply in the economy, but only changed its form: money was in the form of the aggregate MO (cash), and became in the form of M1 (current account).¹

A commercial bank is obliged to keep an amount equal to a portion of the accepted deposits in reserve at the Central Bank. This part is called the mandatory reserve rate. Let it conditionally equal to 20%. If the actual reserves exceed the required reserves, the difference is excess reserves, which the bank can use for its business operations, for example - for issuing loans.

Currently, the excess reserves of bank A are 80 rubles. The bank lends this amount in non-cash form by opening a current account with itself for the borrower.

After the loan is issued, the bank's balance sheet changes as follows:

Active	Passive
100 - Reserve	100 - Current account
80 - Credit	80 - Current account

As a result of the loan, the money supply in the economy in the form of current accounts (M1) increased from 100 to 180 rubles.

Conclusion: Every time a commercial bank makes a loan, it creates additional money.

The loan recipient then settles the loan with his business partner, as a result of which the money is debited from his account and transferred to the partner's current account at bank B.¹ At the same time the reserves of bank A

As for the cash 100 rubles, once in the reserve of a commercial bank, they disappeared from circulation, and therefore ceased to be considered money.

decreased by 80 rubles, because this amount had to be transferred to the reserve account of Bank B at the Central Bank.

As a consequence of this operation the balances of banks A and B will be as follows:

Актив	Array	Актив	Пассив
Резервный актив Wfedit	Текущий аккаунт	Резерв	Текущий счет

Now bank B has already formed an excess reserve of 64 rubles (80% of 80 rubles), which he lends in non-cash, after which his balance is so:

Актив	Пассив
Резервный актив W'edit	Текущий счет Текущий счет

As a result of the new loan, the money supply in the form of current accounts increased by another 64 rubles, reaching 244 rubles.

Borrower of bank B again uses the loan to pay his business partners. And everything repeats all over again with the involvement of banks C, D, E, etc.

Thus, the money supply in the form of current accounts increases in a decreasing geometric progression with a denominator of 0.8: $100+80+64+51+\dots+0=500$. In general terms, the amount of current accounts (deposits) can be calculated by the formula:

$$M = MB \frac{1}{R}$$

where M - money supply in the form of deposits in all banks; MB - monetary base (100 rubles in our example); R - mandatory reserve ratio in fractions (0.2 in our example).

' In fact, nothing would change even if the partner had an account at the same bank A. The case of different banks is used to

Accordingly, in our example: $M=100-5=500$

In this simple model, the money supply in the economy coincides with the amount of deposits in all commercial banks, because there is no cash in circulation - all 100 rubles, originally issued by the Central Bank in circulation, distributed on the reserve accounts of commercial banks ($20 + 16 + 13 + \dots + 0 = 100$).

The fraction is called the deposit multipliers (MD) It the coefficient showing by how many rubles the current accounts increase with an increase in the monetary base by 1 ruble:

$$M_D = \frac{\Delta D}{\Delta M}$$

In our example, the deposit multiplier is 5.

Since deposits are the only form of money in the simple model, the deposit multiplier here is equal to the money multiplier.

The amount of loans issued by all banks (K) is calculated according to the formula:

$$K = MB \frac{1 - R}{R}$$

Fraction — - the credit multiplier (Mk). It shows by how many rubles the credits in the economy increase as a result of increasing the monetary base by 1 ruble:

$$M_K = \frac{\Delta K}{\Delta M}$$

In our example, the credit multiplier is 4, respectively, the amount of loans issued will be 400 rubles ($80 + 64 + 51 + \dots + 0 = 400$).

It should be borne in mind that here we consider a simplified model of the formation of money supply in the economy. The simplification consists in the fact that all settlements are made non-cash through the transfer of money from one account to another. Cash, on the other hand,

originally issued by the Central Bank are out of circulation. Instead, banks have reserve accounts with the Central Bank for the same amount.

In real life, things are somewhat more complicated. First, commercial banks create, at their discretion, additional reserves in addition to the mandatory reserve. Second, some of the allocated loans do not go into current accounts, but are cashed out.

Suppose a bank is required to reserve 20% of accepted deposits. In addition, it creates an additional reserve of 10%. Consequently, having accepted 100 rubles in deposits, the bank can issue loans of not 80 rubles, as before, but only 70 rubles.

Let us also assume that the loaned 70 rubles are not fully credited to an account at another bank, but are partly converted into cash to pay salaries, etc. If, for example, 30% of the received loans are cashed out, only 49 rubles of the 70 rubles of credit money get to the current account at another bank.

Hence the implication:

1. Part of the cash issued by the Central Bank is not returned to the Central Bank in the form of bank reserves, but remains in circulation;
2. Since less money enters bank current accounts now than in the conditions of the simple model, money "multiplies" more slowly. In other words, the money multiplier using the realistic model is always smaller than the multiplier inherent in the simplified model.

In Russia, the money multiplier, measured as the ratio of the money supply by the M2 aggregate to the broad monetary base, fluctuated between 2001 and the first half of 2003 at 1.7-1.8.

SELF-STUDY ASSIGNMENTS

1. Are the statements true?
 - A. Aggregate M1 includes cash, demand deposits and time deposits;

B. The cash included in the M1 aggregate consists of coins and paper money;

У; B. The MZ aggregate exceeds M2 by the value of time deposits; D.

The M2 aggregate is more liquid than MZ;

Д. When cash is deposited in a bank, it is withdrawn from
The money supply is shrinking as a result;

E. Deposit multiplier always exceeds credit multiplier;

Ж. Increase mandatory reserve rate leads to The monetary supply in the economy grows;

3. If most of the loans issued are cashed out, the money supply in the economy will increase.

2. Rank the assets by liquidity:

- a bar of gold;
- toothbrush;
- cash;
- demand deposit in sberbank;
- Gazprom's stock;
- credit card;
- apartment in Moscow;
- English pounds;
- current bank account with a plastic card;
- house in Tver province;
- TV;
- U.S. dollars.

3. Which of the following assets would you classify as a monetary aggregate?

- A small change that got lost in the pocket of your old suit;

- a term deposit with the Bank of Moscow;
- Visa Electron card;
- action of Sberbank of Russia;
- deposit of a commercial bank with the Central Bank;
- the firm's current ruble account at a commercial bank;
- the country's gold reserve;
- state short-term bond;
- euros stored in your home;
- Your euro bank account.

4. Explain the type of banking operations listed above:

- A. Commercial bank buys shares of Gazprom;
- B. Commercial Bank advises client on about the investment project;
- C. A commercial bank sells GKOs on behalf of its client; D. A commercial bank issues its own shares;
- E. Because of increase rate mandatoryThe commercial bank is reducing its lending to businesses;
- F. A commercial bank deducts money from its customer's account to pay taxes;
- G. A commercial bank manages its client's securities portfolio;
- H. A commercial bank sells bonds of the Bank of Russia;
- I. The Bank of Russia extends credit to a commercial bank; J. A commercial bank attracts deposits from the public;
- K. A commercial bank buys and sells currency;
- L. Commercial Bank transfers money a client to his partner's account at another bank.

5. The central bank bought government bonds from commercial banks for 150 rubles. How will this operation change the amount of money in the economy, as well as the amount of credit issued, if the mandatory reserve rate is 20%? It is assumed that the banks

FULLY USE YOUR OPPORTUNITIES.

6. Deposits of the commercial bank's clients amount to 10 million rubles. The bank's reserves are equal to 1.5 million with a mandatory reserve rate of 10%. How will the money supply in the economy change if the bank decides to use all of its excess reserves to issue loans?

7. The deposits of clients of commercial banks amount to 40 billion, and bank reserves are equal to 4 billion at the mandatory reserve rate of 10%. What will happen to the money supply in the economy if the required reserve ratio is lowered to 8% and banks fully use their credit potential?

8. As of January 1, 2003, the following data were available on the Russian economy (in billions of rubles):

Cash in circulation	813,9
Correspondent accounts of commercial banks with the Central Bank	169,7
Obligatory reserves of commercial banks	201,1
Deposits of commercial banks with the Central Bank	47,4
Securities repurchase obligations	0,5
Money supply (by M2 aggregate)	2119,6

Calculate the value of the money multiplier.

9. Let the required bank reserve requirement be 0.12. The demand for cash is 0.3 of the amount of issued loans. The monetary base is 40 billion.

- 1) Define the money supply in the economy;
- 2) If the Central Bank increases the reserve rate to 0.2, how will the money supply change?

10. The initial balances of banks A and B look like this:

Bank A		Bank B	
A	Π	A	Π
Reserves: 1000	Accounts of clients: 400500	Reserves: 1050	Accounts of the clients: 6508050
Deposits: 1000	Loans: 500	Deposits: 1050	Loans: 800

Bank A's client wrote a check in the name of bank B's client for 50 rubles, and bank B's client wrote a check in the name of bank A's client for 40 rubles. How will the balances of both banks change?

11. Баланс банка выглядит так:

A	Π
Reserves: 22	Бессоумныеклады: 100
Securities: 38	
Loans: 40	

The mandatory reserve rate is 20%. Answer the questions:

- 1) What is maximum size of new loans, that can the bank provide? How will the balance change immediately after they are disbursed?
- 2) How would the supply of money in the economy change as a result of all banks? Explain.
- 3) What will the bank's balance sheet be like after the new loans are used up?

TEMA 9. MONOPOLY POWER

1. Monopoly and monopoly power
2. Monopoly equilibrium
3. The economic consequences of monopoly
4. Antitrust policy
5. Monopolism and Economic Reform in Russia

1. Monopoly and monopoly power

The previous topic dealt with a market structure called perfect competition. Now we will talk about other possible market structures. These include monopoly, oligopoly, and monopolistic competition.

A monopoly is a firm that is the only producer of a good that has no close substitutes. Compared to perfect competition, this is another extreme case: there were many sellers operating in the market, but here there is only one.

Monopolies are found at the global, national, regional and local levels. For example, De Beers controls the supply of diamonds to the world market, in the electricity sector a federal grid company will monopolize the main power lines in our country, only one local firm carries out the water supply of a city, etc.

Oligopoly is a market structure characterized by a small number of operating firms. In this case the produced product can be either standard (exactly the same in different firms) or differentiated (products of each firm differ slightly from those of their competitors). The latter is not so important because the main content of oligopoly consists precisely in a small number of producers.

A fundamental characteristic of oligopoly is that firms are aware of their interdependence: each firm is able to

identify their rivals and take into account their behavior when making their own decisions. Hence the strategic behavior of oligopolies, when decisions are made in anticipation of this or that reaction of competitors. Therefore, in each particular case the oligopoly behaves as its own capabilities and the behavior of its competitors allow. In this case one or another form of competition or collusion is chosen.

Like monopolies, oligopolies operate at different levels. For example, Aeroflot and Transaero are oligopolists on some air routes, the cell phone market in Moscow is controlled by four companies, and there are two grocery stores in a certain village.

Monopolistic competition is a market structure in which a group of goods that are close substitutes is produced by a large number of independent firms. This means that buyers are able to distinguish one product from another by quality, brand name, seller's location, etc. For example, many firms make sneakers, but customers distinguish between "Adidas" and "Reebok; there are a lot of cafes in our neighborhood, but the food is a little different, and they are on different streets. Thus, we are faced with a multitude of mini-monopolies competing with each other. This situation differs from perfect competition first of all by the fact that there all firms sell exactly the same product and all sellers are indistinguishable from each other in the eyes of buyers. Here, however, each product has some "flavor" - real or imaginary, generated, for example, by advertising.

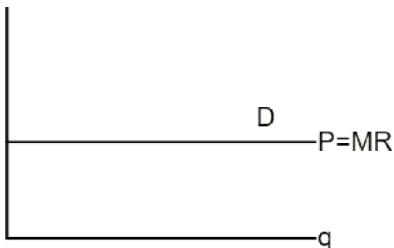
Thus, as we move from perfect competition to monopolistic competition, then to oligopoly and finally to monopoly, competition becomes weaker and monopoly becomes more and more apparent.

We should therefore distinguish between monopoly and monopoly power. Monopoly power means that a firm can influence the price by changing the output of a good. Such a firm is not necessarily a monopoly, but can also be an oligopoly or a monopoly-competitive firm.

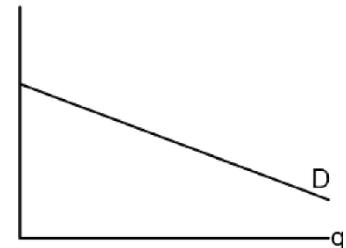
Possession of monopoly power leads to the fact that the demand curve for the firm's product ceases to be horizontal (as in a perfectly competitive firm), but has a negative slope. Recall that a perfectly competitive firm, occupying a negligibly small market volume, accepts the market price as set, is unable to change it, but can sell any quantity of its product at that price (topic 8, item 1). In contrast, a firm with monopoly power can increase (decrease) the price, but then it is likely to experience a decrease (increase) in demand for its product (Figure 9-1):

Figure 9-1. Demand curves for the product of a perfectly competitive firm and a firm with monopoly power

A. Completely competitive



B. A firm with firm monopoly power



The steeper the slope of the demand curve, the less demand falls when the firm increases the price, the higher its monopoly power.

A number of indicators are used to assess the degree of monopolization of the industry, the most well-known of which is the Herfindahl-Hirschman index (H). It is calculated by the formula:

$H = S_1^2 + S_2^2 + \dots + S_N^2$, where S_i is the share of the i -th firm in industry production (in %), and N is the number of firms.

This index responds to both the number of firms in the industry and their relative power. The maximum value of the index, corresponding to the situation of a pure monopoly, is 10000.

The Herfindahl index is not without its drawbacks. Nevertheless, it is used in the U.S. when deciding on the admissibility of mergers. Thus, if the index exceeds 1,800 points, the market is considered highly concentrated, which makes it difficult to obtain merger clearance. There is an additional condition that a merger should not allow an enlarged firm to capture more than 35% of the market. The latter value is similar to the powder rate established in Russia for including a firm in the state register of enterprises with monopoly power.

There are the following reasons for the existence of a monopoly

Vlasti:

- Exclusive rights granted by the authorities. Only one company, for example, has the right to engage in a given activity; thereby the government or regional authorities create a monopoly. If, on the other hand, the government grants exclusive rights to several firms to operate in a given field, it contributes to an oligopoly. The unofficial use of **t h e** so-called "administrative pecypca" is the most important source of monopolization of the modern Russian economy. Federal or local authorities patronize one or more related firms, while impeding the activities of others;

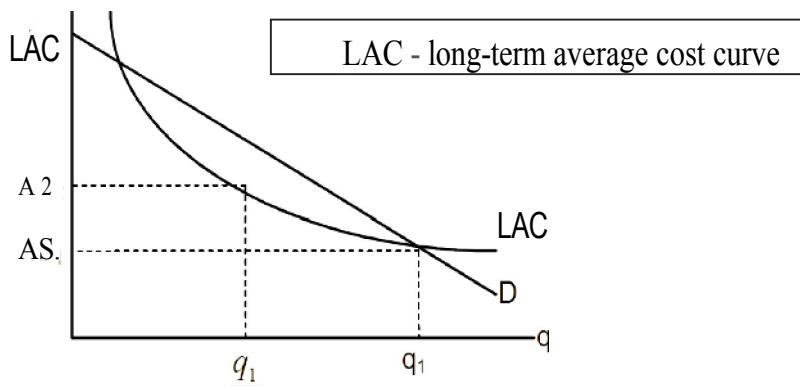
- Exclusive ownership of any productive pecypc. To produce something, you need resources - labor, capital, land. If only one firm has the rare resource necessary to produce a given product, it is a monopolist. For example, an aluminum company controls the extraction of bauxite, a movie studio has exclusive rights to a unique film, a firm has a patent on the latest technical development, a singer has

ownership of their unique voice. There are times when more than one firm has the necessary resource. In this case we have an oligopoly in this market;

- Increasing returns to scale are a case of natural monopoly. Increasing returns to scale mean, recall, that if we increase all factors of production by a factor of n , output increases by more than a factor of n .

Thus, for a natural monopoly, output grows faster than the number of resources it uses, i.e., as production grows (respectively, as the firm enlarges), the unit cost (long-term average cost) falls. Note that this is not always the case. Very often a larger firm also incurs higher costs per unit of output as compared to a relatively small enterprise. The point here is that large businesses are usually sluggish and bureaucratic. Nevertheless, a **natural monopoly** is a firm that can meet any market demand at a lower long-term average cost than it would have if it had two or more firms operating in the market instead (Figure 9-2):

Figure 9-2. Natural monopoly



Suppose a natural monopoly chose output q_1 at which its long-run average cost is AC_1 . If, instead of one monopoly, there were two firms operating in the market, each firm's share of

at this price would get about half of the market demand ().

But then the average cost of each firm would be higher than that of the monopoly - increased to AC_z .

As an example, let's take the municipal water supply system. The company that provides it is a monopolist on a city or district scale. Theoretically, it is possible to install several hot and cold water pipes belonging to different companies into the apartments. Then the consumer will be able to choose which company to use, and competition will be ensured. This, however, is not done, since the total cost of laying pipes (fixed costs) will increase exactly as many times as the number of firms taking part in the project. As a result, the cost per liter of water will also increase. Competition will, therefore, lead to higher costs, and is therefore inefficient.

It also happens that minimum costs per unit of output are achieved when there is more than one firm operating in the market. This contributes to a natural oligopoly.

At the level of the economy as a whole, natural monopolies are oil pipelines (if we lay a second pipeline next to Transneft in order to fight the monopoly, it will cost society more per ton of oil than before), power lines, railroads, etc.

Thus, the existence of a natural monopoly is based not on government privileges and other in principle avoidable factors, but on cost advantages over smaller firms. Consequently, unbundling a natural monopoly would lead to a loss of efficiency, and therefore is not economically feasible; other methods of regulation are applied to such monopolies. For example, state control of prices.

2. Monopoly equilibrium

A. The monopolist's marginal revenue

Since monopolist is the only The demand curve for the monopolist's product is at the same time the market of market demand for product. This curve has, as usually has a negative slope (Fig. 9-1B). Therefore, the monopolist can control the price of his product, but then he will have to face a change in the magnitude of demand:

The price is higher, the higher the price is, the lower demand. The monopoly is a price-seeker. Its goal is to set the price (and therefore choose the output) at its profit will be maximal. Although in the future we will use the term "monopoly," all of the following applies to any firm with monopoly power, i.e. both an oligopoly and a monopoly-competitive firm.

The general rule: Profit is maximal when marginal revenue equals marginal cost - $MR=MC$ - (topic 8, item 3) remains true for a monopoly. The only difference is that for a perfectly competitive firm the line of marginal revenue (MR) is horizontal and coincides with the line of the market price at which that firm can sell any amount of its output (Topic 8, item 2). In other words, marginal revenue equals price. In contrast, for a monopoly, the MR line is not horizontal and does not coincide with the price line (the demand curve).

To justify this, recall that marginal income is the incremental revenue when output is increased by one unit: ***

For an example of calculating marginal income, let us take the simplest demand function for the product of a monopoly: $P=10-q$. Let us make a table (Table 9- 1)d

Table 9-1. The marginal revenue of a monopolist

P	10	9	8	7	6	5	4	3	2	1	0
q	0	1	2	3	4	5	6	7	8	9	10
TR(P-q)	0	9	16	21	24	25	24	21	16	9	0
MR(ATR/Aq)		9	7	5	3	1	-1	-3	-5	-7	-9

The data in the table show that if the monopolist lowers the price from 10 to 9, the demand increases from 0 to 1. Accordingly, the revenue increases by 9. This is the marginal revenue generated by an additional unit of output. Increasing the output of one more unit leads to an increase in revenue of another 7. And so on. In the table, the values of marginal revenue are not strictly below the values of price and demand, but between them. In this case the increments of output are not infinitesimally small, and so the marginal income is obtained as if "on the transition" from one value of production to another.

At the moment when the marginal revenue reaches zero (the last unit of output does not increase the revenue at all), the monopoly's revenue reaches its maximum. A further increase in production leads to a fall in revenue, i.e. the marginal revenue becomes negative.

The data in the table allow us to conclude that the value of the marginal revenue related to each value of output (except for zero) is less than the corresponding value of the price. The point is that when an additional unit of output is produced, revenue increases by the price of that unit of output (P). At the same time, in order to sell this additional unit of output, we have to reduce the price by the value of

A/. But According to new price for sale not only the last one, but all

previous units of output (q) previously sold at a higher price. Therefore, the monopolist suffers a loss in revenue from the price decrease,

equal . Subtracting from the gain from increased output the loss from decreased of the price, we get the value of the marginal income, which is thus less than the new price:

For infinitely small changes in price and demand, the formula takes the form:

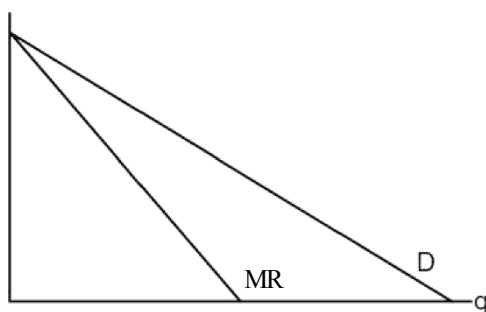
$$MR = P + \frac{dP}{dq} q,$$

where $\frac{dP}{dq}$ is the derivative of the price function on demand.

Let us return to the table. Suppose the monopolist set a price of 7 last week, selling 3 units at that price. Trying to increase his revenues, he decreases the price this week to 6, which allows him to sell 4 units of goods. So the monopolist gets 6 units of extra income from expanding output by one unit. But from the sale of the first 3 units of product he now gets only 18 units of revenue, instead of 21 units last week. The monopolist's loss from the price cut is equal, therefore, to 3. Therefore, the marginal revenue from expanding sales when the price is reduced is: $6-3=3$ (see Table 9-1).

It can be rigorously proven that with a linear demand function, the marginal income function is also linear, and its slope is twice the slope of the demand curve (Figure 9-3):

Figure 9-3. Demand curves and marginal income of a monopoly



If the demand function is given analytically: $P=P(q)$, then to determine the marginal income function it is easiest to first derive the output revenue function: $TR=P(q)q$, and then take its derivative by

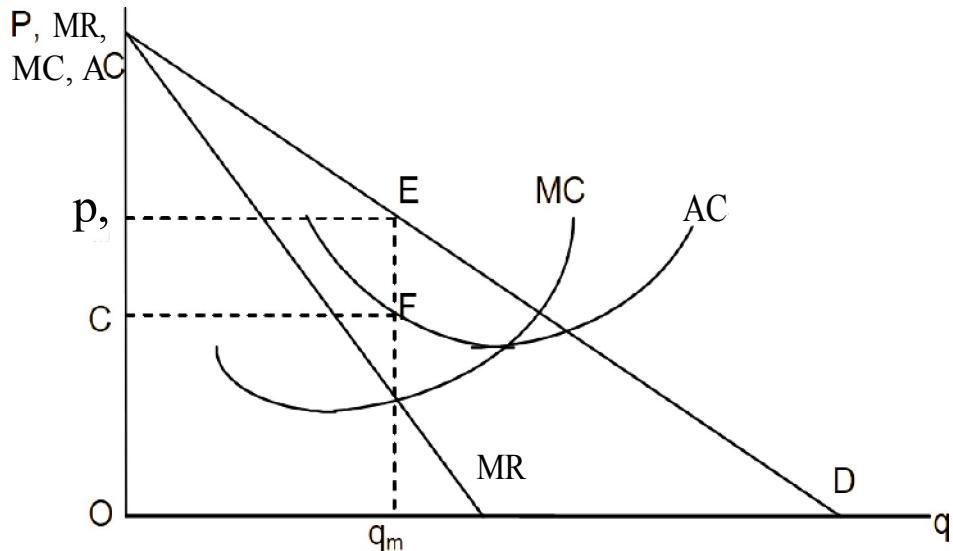
$$\text{выпуску: } MR = TR'_q = \frac{dTR}{dq}$$

B. Maximization of monopoly profits

Combine the demand, marginal revenue (MR), marginal cost (MC), and average cost (AC) curves of a monopolist into one figure (Figure 9-4):

Figure 9-4. Profit maximization of a firm with a monopoly

властью



The point of intersection of the curves MR and MC determines the output (q) at which the monopolist gets the maximum profit. The marginal income here is equal to the marginal cost. On the demand curve we find the monopoly price corresponding to this output (P). At this price (output) the monopoly is in equilibrium, because it is not profitable to raise or lower the price.

In this case, at the equilibrium point the monopolist makes an economic profit (superprofit). It is equal to the difference between its revenue and total costs:

$$P = TR - TC = P \cdot q - AC \cdot q$$

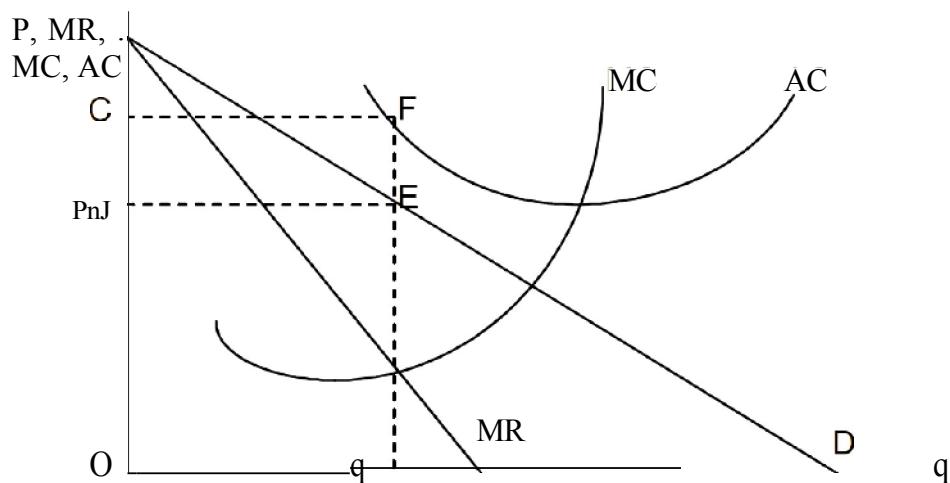
In Figure 9-4, revenue is the area of rectangle $OPEq$, total cost is the area of rectangle $OCFqq$. Therefore, profit is equal to the area of rectangle $CP EF$.

It is noteworthy that in a monopolistic equilibrium the price is higher than the marginal cost. This differs from the equilibrium of a competitive firm: such a firm chooses output at which the price is exactly equal to marginal cost. The ensuing problems will be discussed in the next question.

In "Perfect Competition," it was stated that in the long run, a competitive firm is unable to make an economic profit (Topic 8, item 4). This is not the case with monopoly. As long as a monopolist manages to protect his market from invasion by competitors, he maintains an economic profit in the long run.

At the same time, the possession of monopoly power alone does not guarantee an economic profit, even in the short term. A monopolist may suffer losses if demand for its products falls or if its costs rise, for example, because of rising resource prices or taxes (Figure 9-5):

Figure 9-5. Monopoly incurs losses



In the figure, the monopoly's average total cost curve runs above the demand curve for any output, which condemns the monopoly to losses. By choosing output at which marginal revenue equals marginal cost, the monopolist minimizes its losses in the short run. The total loss is equal to the $CFEPq$ area. In the long run, the monopolist can try to lower his costs by changing the amount of capital used. If he fails, he will have to

TO LEAVE THE STATION.

B. Price discrimination

Until now, it has been assumed that a monopoly sells all of its products at the same price. In fact, the monopolist often

sets unequal prices for different units of the same product sold to the same or different customers. The differences in prices are not due to differences in the costs of producing and selling the goods. This practice is called price discrimination.

Note in this regard that differences in prices do not always mean price discrimination. In particular, the sale of fruit in Chukotka more expensive than in Moscow is not discriminatory, because in this case the high price is explained by higher transportation costs.

Successful price discrimination is based on the following prerequisites:

- It is necessary that the elasticity of demand for the product at its price is different for different buyers;
- A monopoly must be able to clearly identify different buyers in terms of differences in their demand;
- Buyers should not be able to resell purchased goods.

There are three degrees of price discrimination. First-degree discrimination occurs when each unit of a commodity is sold at its own demand price. As a result, not only do different buyers pay different prices for a product, but each buyer pays a different price for a particular item. This is why such discrimination is called perfect discrimination.

In practice, perfect discrimination is difficult to implement, because the monopolist must have complete information about the demand curves of all consumers. Some approximation to it is possible in the provision of legal, real estate, etc. services, when the firm charges a certain percentage of the transaction. Accordingly, the firm's remuneration is strictly tied to the amount of the transaction, while its costs of securing the contract may be the same in all cases.

Second-degree price discrimination occurs when different units of a product are sold at different prices, but all customers who buy the same amount of product pay the same price. Such discrimination takes the form of various kinds of discounts (for example, for the volume of purchases).

Third-degree price discrimination means that goods are sold at different prices to different categories of buyers, but for representatives of each category the price does not depend on the value of the purchase. Examples include discounts on public transportation for students, different tuition fees for Russians and foreigners, the sale of goods at different prices in "rich" and "poor" regions, etc.

Suppose a monopolist can divide his customers into N groups, which he treats as N isolated markets. Each market has its own demand function on the price. Accordingly, the monopolist's marginal revenue functions from the sale of goods to different groups of consumers differ. At the same time the monopolist's marginal costs do not depend on to whom he sells his products - they are the same when selling goods in all markets. To gain maximum profit under conditions of price discrimination a monopolist sells each category of consumers such quantity of product (and at such price), in which his marginal revenue from the sale of goods on each market is equal and equal to the marginal cost. The equality is observed:

$$MR_y = MR_z \dots = MR_u = MC,$$

where MR_i is the marginal revenue from the sale of goods on the i-th market.

As long as this equality is not fulfilled, the monopolist can increase his profits by moving some goods from the market where the marginal income is lower to the market where it is relatively high. Such moves will eventually lead to an equalization of marginal income in all markets.

Г. Mathematical application

The definition of the monopoly price can also be shown analytically. The monopolist wants to maximize his profit, which is the difference between his revenue and his total costs. Both the monopoly's revenue and costs are functions of its output: $TR=TR(q)=P(q) \cdot q$ and $TC=TC(q)$. Therefore, the profit function can be written as follows:

$$P=TR-TC=P(q)-q \cdot TC(q) \rightarrow \max.$$

We need to determine the output at which profit is maximal. To do this, we take the derivative of the profit function over the output and equate the result to zero:

$$\Pi' = \frac{d\Pi}{dq} = \frac{dP}{dq} \cdot q + P - \frac{dTC}{dq} \cdot q = 0 \rightarrow \frac{dP}{dq} \cdot q + P = \frac{dTC}{dq} \cdot q$$

The left-hand side of the last equation represents the monopoly's marginal income (see Section 2A of this topic), and the right-hand side represents its marginal costs. Thus it is rigorously proved that the profit-maximizing output corresponds to the point where $MR=MC$. Let us continue the transformation:

$$\frac{dP}{dq} \cdot q + P = \frac{dTC}{dq} \rightarrow P(1 + \frac{dP}{dq} \cdot \frac{q}{P}) = MC$$

Recall the formula for price elasticity of demand: $\frac{dq}{dP} \cdot \frac{P}{q}$ Hence:

$\frac{dP}{dq} \cdot \frac{q}{P} = \frac{1}{E_d^p}$ Consequently: $-!^I,)$. Hence:

$$E_d^p$$

Conclusions: a) since the price elasticity of demand is negative, the monopoly price exceeds the marginal cost (which was shown graphically); b) the more price elastic demand is, the smaller the difference between the price and marginal cost.

The latter can be justified logically. The high price elasticity of demand suggests that the commodity in question is fairly easy to replace. Therefore, the monopoly is able to increase the price only slightly in

compared to the marginal cost: when the price rises, customers switch en masse to substitute products.

Let's continue the transformation:

$$\frac{P - MC}{P} = \frac{1}{1 + \frac{1}{E}}$$

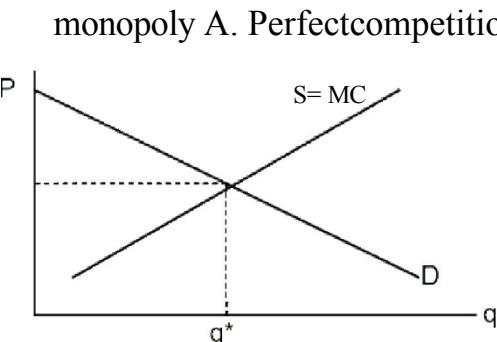
The expression $\frac{P - MC}{P}$ is the Lerner coefficient, showing

the relative excess of the price over the marginal cost and thus characterizing the monopoly power. As can be seen from the last formula, the Lerner coefficient is the lower the more price elastic the demand is. At infinitely elastic demand (the demand curve is horizontal) it is zero, i.e. the price coincides with the marginal cost, which is a sign of perfect competition.

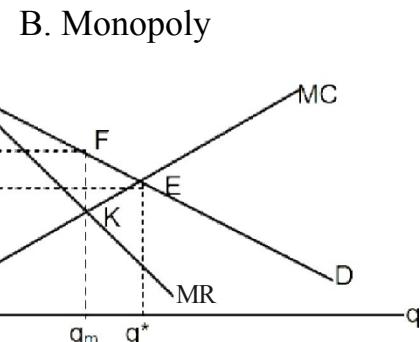
3. The economic consequences of monopoly

Under perfect competition, output and price are determined by the point of intersection of market demand and supply curves (Figure 9-6A):

Figure 9-6. Price and output under conditions of perfect competition and monopoly A. Perfect competition



P'' - price under perfect competition
 q^* - output under perfect competition (socially efficient output)



P^* - price at perfect competition
 q^* - output at perfect competition
 R_u - price at monopoly
 $C_{m\text{-EXP/SK}} P | EI MONOPOLI And$

In this case, the market supply curve is the public marginal cost (MC) curve. The point here is that producers agree to offer the market each successive unit of production only if

if its price at least covers the cost of its production marginal costs.
 Thus Thus, at perfect competition
 the market price b exactly coincides c marginal costs
 for the production of *the last* unit produced:

$$P=MC$$

The price that consumers are willing to pay for a given unit of product (demand price) is a measure of the social value of that unit of product to buyers. All demand prices determine the demand curve. On the other hand, the marginal cost of producers is the social value of the resources expended in the production of each additional unit of goods. Thus, as long as the price exceeds the marginal cost, society gains more than it loses by producing an additional unit of product. Society's net gain from producing an additional unit of product is equal to the difference between its price and marginal cost. Accordingly, society's welfare from the production of all units of goods becomes maximal at the moment when the price equals the marginal cost. Therefore the output corresponding to this equality (q') is called **socially efficient output**. The condition for achieving such output is perfect competition.

Now suppose that the previously competitive industry is monopolized by a single firm (Fig. 9-b). The social demand curve for the product of the industry does not change from this fact. Similarly, the marginal cost of the monopolist is the same as that of the previously independent firms in the competitive industry. Therefore, the supply curve (aka the marginal cost curve) of the competitive industry becomes the marginal cost curve of the monopolist.

At the same time the monopolist's output is determined by the intersection of the marginal income and marginal cost curves ($MR=MC$). But the monopoly price, as shown above, exceeds the monopolist's marginal income. Therefore, the monopoly price is higher than

marginal costs. The condition of socially efficient output is thus not met.

Conclusion: the profit-maximizing monopolist chooses the output less than the socially efficient one, while the price he sets is higher than the one that would be formed under competition. The loss of public welfare or the loss of deadweight from monopoly power in this case is equal to the area of the triangle EFK. This means that with increasing output from qq to q^* , the additional gain of the society would be equal to the sum of excesses prices, which consumers are willing to pay for subsequent units of output, over marginal costs.

There are other losses due to monopoly. The weakening of the competitive pressure on the firm leads to the fact that the latter no longer faces the choice: to reduce costs as much as possible or to perish. At the expense of market power, monopoly can compensate for inefficient production structure, outdated technology, bloated bureaucracy, etc. Overcharging under the guise of monopoly power is one of the manifestations of the so-called "**X inefficiency**". This notion was introduced into scientific circulation by the American economist H. Leibenstein.²

One can also find arguments in favor of monopoly. We have just talked about the overestimation of costs arising from the presence of monopoly. However, the opposite is also possible: it is monopoly power that stimulates technical, organizational, and marketing improvements, because it guarantees that the results obtained will not be immediately

If you have forgotten what dead weight loss means, go back to topic 3, item 5.

X inefficiency means overestimation of marginal costs beyond the minimum possible level. Causes of X inefficiency, in addition to monopoly power, can be negative qualities of personnel (laziness, slackness, etc.), their weak motivation, government interference in the functioning of the market, etc.

The monopoly's research is also designed to protect the markets it controls from potential intrusion by its competitors. Monopolies also conduct research to protect the markets they control from potential intrusion by competitors, providing a cost advantage. Importantly, monopolies have greater opportunities for research than competitive firms at the expense of their economic profits.

On the other hand, the very desire for monopoly (or rather, for economic profit from monopoly power) stimulates technical progress. Obviously,

that monopoly is less evil than technical stagnation. So, people would prefer to fly planes produced by a monopoly rather than ride in stagecoaches produced by perfect competition. This is why most governments grant temporary monopoly rights to inventors, and protect inventions with patents for a statutory period of time.

Thus, the possession or pursuit of a monopoly often leads to fundamentally new products, lower marginal and average total costs compared with the competitive situation, which contributes to the growth of social welfare.

4. Antitrust policy

The previous question stated that monopolies tend to underestimate their production compared to the socially efficient output achieved under perfect competition. Therefore, the state uses various methods to limit monopoly

THE POLITICAL REGIME IS A REGIME OF MONOPOLY.

A. Promoting competition

The most important tool of antitrust policy in all countries is the promotion of competition. Antitrust authorities discourage mergers of firms if the resulting consolidated company will have excessive market power. On the other hand,

Antitrust laws prevent incumbent firms from using their market power to reduce production, raise prices, impose their products on consumers, prevent new producers from entering the market, or engage in other anti-competitive practices. The laws provide for a variety of sanctions for restricting competition, up to and including forced unbundling of the offending firm.

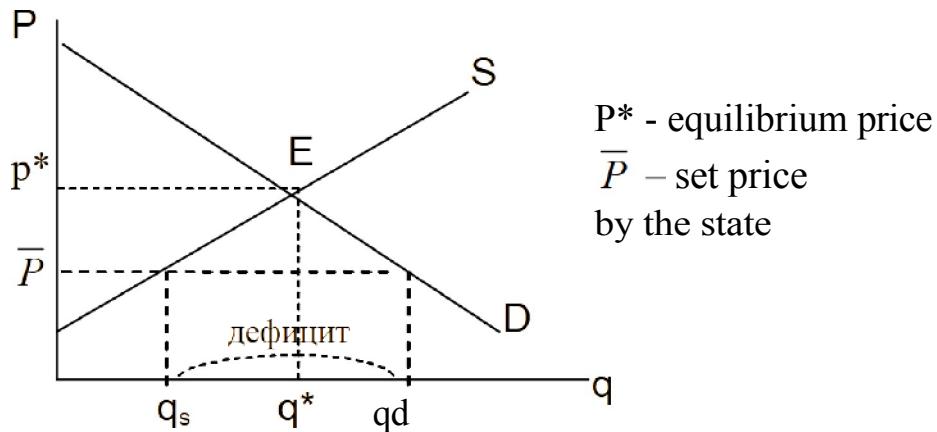
B. Setting the maximum price

In practice, it is not always possible to ensure competition by splitting the monopoly or by the entry of new producers into the industry. In the case of a natural monopoly, its fragmentation and the establishment of competition in general lead to a loss of efficiency, and therefore are not justified (this topic, point 1).

In this regard, the most important tool of anti-monopoly policy is price control - the establishment of a maximum price above which the state prohibits the monopoly to sell its products.

Recall that in perfect competition, the government's setting of a maximum price leads to a reduction in output and a shortage (topic 3, item 5). This is shown in Figure 9-7:

Figure 9-7. Consequences of the State setting the maximum price under conditions of perfect competition

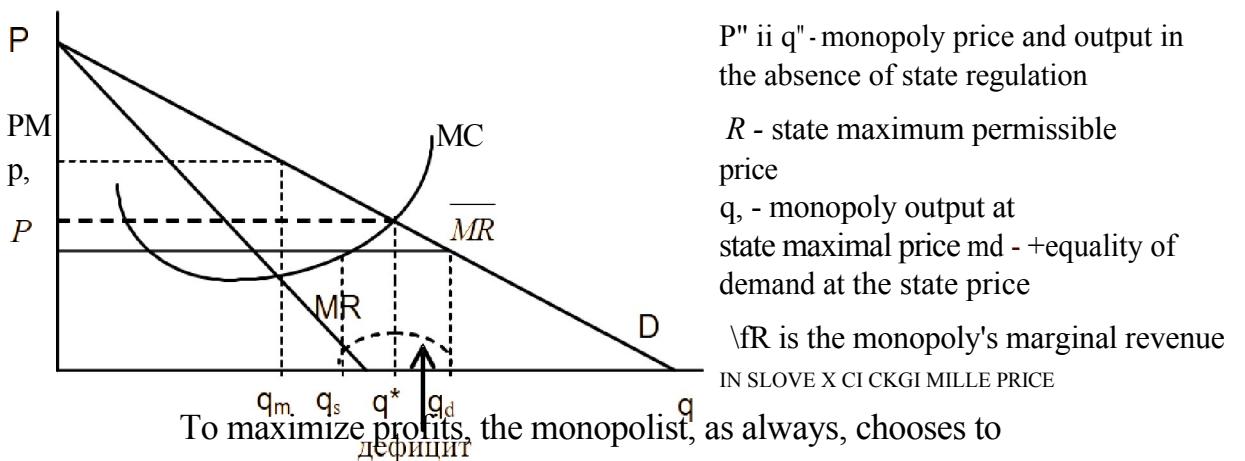


This is different in a monopoly. An unregulated monopoly chooses output (q), corresponding to point intersection lines

marginal revenue (MR) and marginal cost - MC (Fig. 9-8). The monopolist sets the price P_p . However, the state considers the free monopoly price too high, and therefore forces the monopolist to sell all his products at no more than the state price

γ . Usually such a price is fixed, i.e., it does not change with the growth of sales. But if the price is constant, then the monopolist's marginal income also becomes constant and equal to the price of goods. In other words, the monopolist finds himself in the situation of a perfectly competitive firm (topic 8, point 2). As a result, the monopoly's marginal income curve (i/l) becomes horizontal at the state price level up to its intersection with the demand curve:

Figure 9-8. Consequences of maximum price setting by the state under monopoly conditions



The best result for the state would be to establish price at the intersection of the demand and marginal cost curves (P^*).

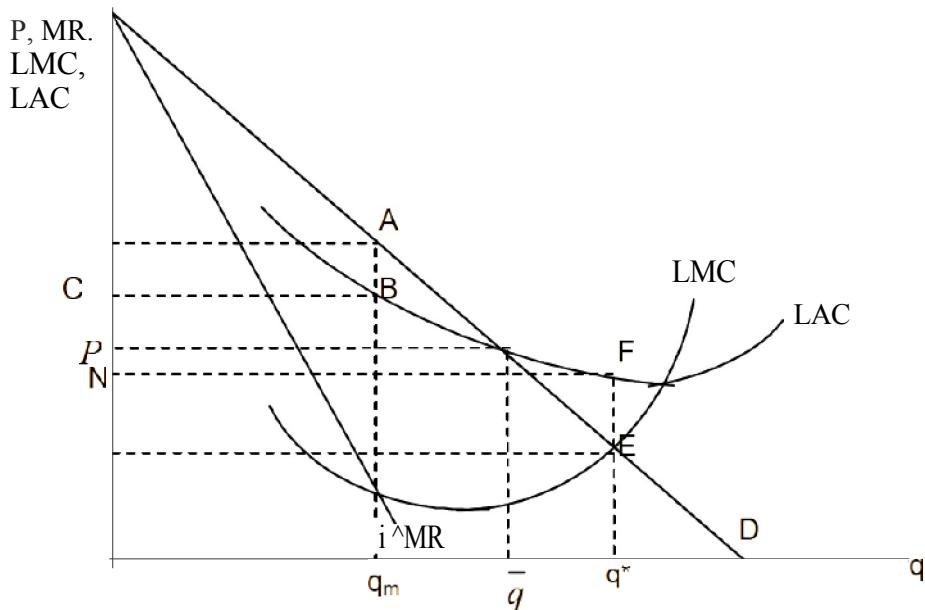
In this case, the monopolist's output will be maximal and equal to the socially efficient (q^*), and the deficit will disappear.

Thus, in contrast to perfect competition, price regulation of monopoly is quite justified, because it contributes to the growth of production and its approach to the socially efficient level.

B. Regulation of natural monopoly

Price control of natural monopolies is especially important. Recall that a natural monopoly is a firm whose monopoly position is based on unit cost advantages over smaller firms. A natural monopolist's long-run average cost (LAC) decreases as output increases (Figure 9-9):

Figure 9-9: Natural Monopoly



In the absence of state price control, a natural monopolist, like any other, chooses an output q_m , at which marginal revenue equals marginal cost, and sets a monopoly high price, P . Since the price exceeds the long-term average cost of the given output (equal to the segment OS), the monopolist makes an economic profit (superprofit), which is equal to the area of rectangle CP AB. As a result, society suffers from the actions of the monopolist, because the price is overpriced and the output is less than the socially efficient (q^*).

In response, the state can set a price (d) for the monopolist that corresponds to the intersection point of the demand curve and long-term average cost, i.e., the break-even level. Since the price becomes equal to the cost per unit of output, the monopolist's super-profit disappears, which is already nice. In this case, the state allows the monopolist to conduct break-even production, content with a normal accounting profit covering implicit costs (topic 7, item 1). On the other hand, at this price the monopolist increases output to the level of , approaching the socially efficient output.

To induce the monopolist to ensure socially efficient output (q^*), the government should lower the price even more - to a level corresponding to the intersection point of the demand curve and marginal cost (P^*). The price is equal to the marginal cost, which is actually a condition for efficient output.

The specifics of natural monopoly, however, is that with socially efficient output, the long-term average cost is higher than the price, i.e. each unit of the product brings the monopolist a loss equal to this difference (segment NP^* in Fig. 9-9). Accordingly, the amount of the loss from the total output is obtained by multiplying the loss from one unit of output by the volume of production (q^*) and is equal to the area of the rectangle P^*NFE . To prevent the monopoly from leaving the industry, it must be subsidized by compensating the loss at the expense of society.

Around the world, the activities of natural monopolies are regulated by government commissions by setting maximum prices and product quality standards. In Russia, talk about the need for such regulation has been going on for quite some time, but so far it has been limited to convulsive and ill-advised price restraint.

The problem at is b lack of effective
 control over the cost structure of monopolies (both
 natural and other), without

which it is impossible to check the validity of monopoly pricing. Monitoring of prices and costs should become permanent and all-encompassing, elimination of monopolistic abuses should be based on the independent judicial system. So far in Russia there are only isolated cases of prosecution of firms abusing their monopoly power.

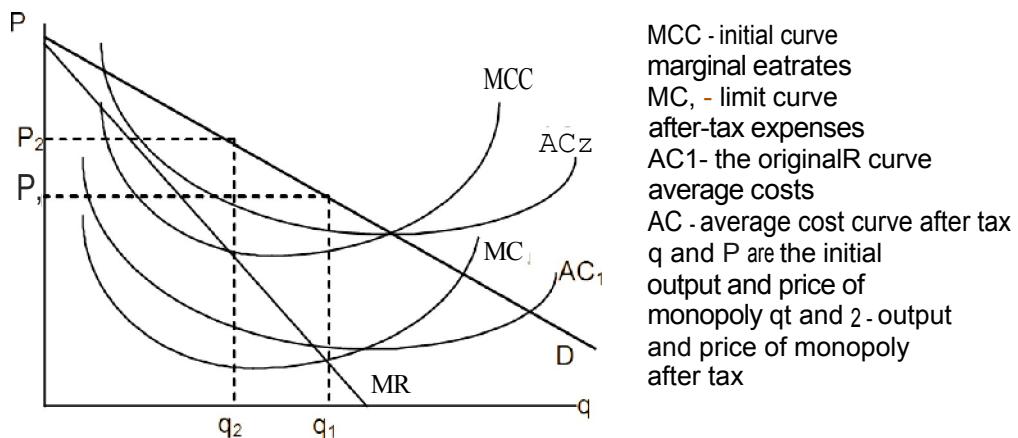
Г. Taxation

Taxation reduces the economic profits of the monopolist, thereby reducing the benefits of the monopoly position. The impact of the tax on the monopolist's behavior depends on the type of tax.

Let us consider two types of tax: commodity tax, which is set per unit of production (VAT, excise duties, customs duties, mineral extraction tax, etc.), and lump-sum tax, which is charged regardless of the volume of output (various kinds of license fees).

A commodity tax increases the monopoly's variable, respectively marginal costs, which shifts the MC curve upward, so that the price generally rises and output falls. The AC curve also shifts upward (the average total cost increases), and hence the economic profit of the monopolist decreases (Fig. 9-10):

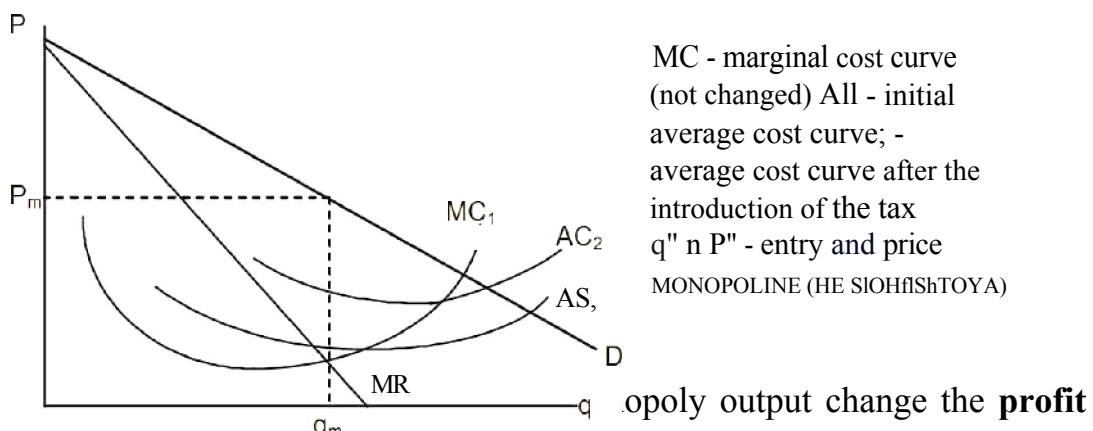
Figure 9-10. Consequences of the commodity tax



The lump-sum tax affects only fixed costs, but does not affect variable costs, and therefore only the average curve shifts upward

of total costs (AC), and the marginal cost curve (MC) remains in the same place. As a result, the monopoly's profits decrease, while price and output remain the same (Figs. 9-11):

Figure 9-11. Consequences of the lump sum tax



tax levied as a percentage of profit. Here, however, the marginal and average cost curves remain in the same places. As a result, if the firm tries to compensate for the increase in the profit tax by raising the price, it will only result in less profit before the tax. Accordingly, after-tax profits will also decrease.

5. Monopolism and Economic Reform in Russia

A. General Problems of Antimonopoly Policy in Russia

The need for antimonopoly regulation is recognized in Russia. In our country it is especially relevant, since we have inherited from the centrally controlled system an extremely high degree of monopolization of the economy. According to World Bank calculations, by the summer of 2003 the 23 largest business groups accounted for more than a third of all industrial production and a sixth of all employed in our country. The most highly concentrated were the non-ferrous and ferrous metallurgy, gas extraction, the automotive industry and the oil industry.

The government also recognizes the harm of high monopolization of the economy. The government recognizes the harm caused by the high monopolization of the economy. "We have very large vertically integrated companies, which, using their administrative and financial capabilities, are slowly but surely absorbing any efficient business," writes Minister of Economic Development and Trade F. Gref. Gref, "and the antimonopoly legislation is not working as it should be. It turns out that only one particular supplier works with a given region when procuring any important products, for example. Oligopolistic collusion and merger with the authorities become the main forms of business organization. It is much easier for large companies to build a collective monopoly or to buy a local administration than to engage in a competitive struggle.

In the medium term, the Russian government sees its tasks as creating equal economic conditions, simplifying administrative procedures for entering the market, and encouraging small business development and lending. In particular, in the autumn of 2002 it was decided to grant defense companies and enterprises the right to export their products abroad independently. This undermined the monopoly of Rosoboronexport, which previously had the exclusive right to export many types of arms.

In 1991, the Law "On Competition and Restrictions on Monopolistic Activities in Commodity Markets", the first antimonopoly law of Russia, was adopted.¹ In 2006, it is scheduled to be replaced by the new law 'On Protection of Competition'.

Under Russian law, the Federal Antimonopoly Service (FAS) maintains a register of business entities that have a market share of more than 35% in a particular product. This registry is compiled in order to have an information base on the largest market entities and

¹ By comparison, in the United States the first Sherman Antitrust Act has been in effect since 1890

check their compliance with the antimonopoly legislation. In particular, under the new law FAS will control mergers and acquisitions of firms, if at least one of them is included in the monopoly register, or if the amount of the merged assets or the total revenue of firms over the last year exceeds 3 billion rubles.

Antitrust law uses the concept of market dominance. Dominant is the position of one or more companies in the market of a commodity that has no substitutes and enables them to exert a decisive influence on the general conditions of commodity circulation in the corresponding commodity market, or to eliminate other economic entities from the market, or to impede access to the market for other economic entities. Importantly, the new law specifically stipulates cases of collective dominance based on agreements between firms on market sharing and price coordination. At the same time, the formal sign of dominance is a situation when an enterprise's share in the market of a certain commodity exceeds 50%.

At the same time, market share, no matter how high it may be, does not in itself automatically mean that a firm will be sanctioned under antitrust law. For this purpose, it must be proved that the firm is actually abusing its dominant market position. Actions that lead to the elimination of competition by:

- the establishment of monopolistically high or monopolistically low prices;
- The removal of goods from circulation, the result of which was an increase in prices;
- imposing on the counterparty the terms of the contract, disadvantageous for him or not related to the subject matter of the contract (unreasonable requirements to transfer financial resources, agreement to conclude a contract only on condition of entering into it provisions relating to goods in which the counterparty is not interested, and other requirements);

- unreasonable reduction or cessation of production of goods for which there is demand when there is a break-even ability to produce them;
- unreasonable refusal to conclude a contract with individual buyers (customers) in the presence of the possibility of production of the relevant goods;
- unreasonable setting of different prices for persons purchasing the same goods;
- creation of obstacles for access to the market or exit from the market by other business entities;
- agreements or concerted actions of business entities;
- distribution of false, inaccurate or distorted information capable of causing losses to another business entity or damaging its business reputation.

Etc.

At the same time, up to the present time the penalties applied to violators of the antimonopoly legislation are very low. In the West, they are many times higher. As a result, Russian firms today find it easier to pay fines than to comply with the law. Therefore, the Federal Antimonopoly Service has prepared amendments to the Administrative Offenses Code, under which antimonopoly fines will be between 0.5 and 4% of firms' revenues.

The funds thus seized can turn out to be quite significant. However, before they can fine someone, the antimonopoly service has to prove a violation of the law in court. So far, the FAS has not had much success in this field. In 2004, only 20 cases were instituted on the grounds of violation of the antimonopoly legislation and only ten of them resulted in fines.

The FAS lawsuit against OAO Eurocement Group, which controls 46% of all cement production capacities in the country, including 81% in the Central District, is well known. Since spring 2005, taking advantage of its monopoly power, the company raised prices by 60-70%. In October 2005, the antimonopoly service ordered

"Eurocement Group reduced the selling price of cement to the level of the "fair competitive price" calculated by the FAS, and also obliged it to pay to the federal budget the income obtained from the violation of the antimonopoly legislation. Having lost the case in the Moscow Arbitration Court in January 2006, the company, nevertheless, is not yet going to comply with the FAS orders, hoping for the appeal instances.

However, in any case, the markedly increased activity of the antitrust service should probably be commended.

B. Reform of natural monopolies

The issue of reforming the natural monopolies: PAO UES of Russia,

Gazprom The issue of reforming the natural monopolies: PAO EES of Russia, Gazprom and MPS. Their restructuring was declared one of the key objectives of the Kasianov government in the summer of 2000. At

that time, . At that time, the so-called "Gref's" strategy was approved. At that time, the so-called "Gref Strategy" (based on the long-term strategy) was approved. (designed to last until until 2010) program socio-economic reforms. program

were based on from The program was based on the key tenets of economic liberalism: the state should limit as much as possible its presence

in the productive sphere as much as possible, because it was losing the competitive competition private companies. K

besides excessive state ownership, as a rule , leads to an increase in government spending, which slows down economic growth. It is also important that in their current form natural monopolies have become the pillars of the old state-owned economy, feeding with their resources the inefficient non-market sector of the national economy. This role harms the natural monopolies themselves, as they are crumbling under the burden of the obligations imposed on them.

Restructuring of natural monopolies means transferring their activity to the market rails. This implies privatization of most of the assets, as well as the separation from these companies of independent firms that compete with each other. Along with this, state regulation should be strengthened in those sectors, primarily in the sphere of transport networks, which cannot be regulated solely by the market in the near future.

In the electric power industry, a fundamental solution has been found. In 2003, a package of laws on the reform of the industry was passed. The natural monopoly parts of the business (power transmission networks and dispatch service) are to be separated from the competitive part (generating plants and sales companies). As a result of the reform, PAO UES is to be liquidated. The federal grid company and the system operator (dispatch management) are separated from its composition. They will remain state-owned, which is necessary to ensure equal access to transmission lines for all electricity producers. Transmission tariffs will be strictly controlled by the government.

On the other hand, large generation and sales companies are being spun off from the holding company and then privatized, which will compete with each other. This should ensure complete liberalization of power generation. If today generation tariffs are approved by the Federal Energy Commission and Regional Commissions, in 2006, as it is planned, they will be set in the free market through voluntary agreements between sellers and buyers. This restructuring of the energy complex owes its radical character primarily to the reformatory potential of PAO UES President A. Chubais.

At the same time, the government is inclined to carry out the reform very cautiously, so that it will always be possible to take a step back if necessary. During the transition period there will be the institution of the so called "thermostat".

"guaranteeing suppliers" obligated to sell electricity

to the population at regulated prices. At the same time, all reform acts should be carried out under the strict control of the government. Only the government intends to determine the time of establishment and privatization of independent energy companies, the stages of transition from regulated tariffs to free electricity prices, etc.

In terms of its significance for our economy, the reform of the MPS is no less important than the reform of the UES PAO. Over the past decade, the MPS has not functioned exactly as an ordinary ministry. On the one hand, it carried out administration within the limits of its authority, which is natural for any state institution, and on the other hand, it was essentially a commercial organization, making profit from its economic activity.

Today Government is trying to gradually Today, the government is gradually trying to reform the railway industry. At the first stage of the reform, in September 2003, Russian Railways was established, and all the property of the MPS was transferred to its balance sheet. The Ministry of Railways is in charge only of the general management of the industry. of the industry и supervision of of the industry. state interests. At the same time, 100% of OAO Russian Railways shares are owned by the state.

The following stages reforms involve phased и "Soft" denationalization. It provides for the separation of the so-called monopoly sector. It is already known that the entire railroad infrastructure will remain under full control of the state. These are the tracks themselves, semaphores, dispatching service, etc. That is what ensures the movement of cargo and passengers. All other property of Russian Railways (cars, construction and repair units, etc.) will be gradually privatized. In the long run, this could help create a competitive market environment on the railroads.

Thus, one should not expect quick and cardinal transformations in the railway complex. In his views, the president of Russian Railways, G. Fadeev, is far from A. Chubais. Rather, he is,

A "strong economist," more inclined to improve what has been created than to create something fundamentally new.

So, the government takes a cautious approach to reforming the natural monopolies, believing that drastic changes in the ownership structure can lead to a drop in the efficiency of these companies, extremely sensitive to the entire economy. This is also evident in the example of

"Gazprom. Today it produces, transports and markets gas. At the same time, only the gas transmission networks (gas pipelines) are a natural monopoly. Therefore, the problem of equal access to the gas transmission network for producers independent of Gazprom has become urgent, which should contribute to the establishment of a competitive gas market. The best way to ensure this would be to separate the main gas pipelines from Gazprom, which Gazprom itself categorically opposes. As for the production and marketing sectors, it is theoretically possible for Gazprom to be split up into a multitude of independent companies.

But no radical reform is expected. President Vladimir Putin definitely spoke in favor of preserving Gazprom as a single company. Perhaps this was done because he was afraid that the emergence of many firms in place of the former Gazprom would not lead to competition and increased capital investment, but would only reduce state budget revenues from the gas industry and complicate the problem of repayment of loans taken by Gazprom. By avoiding drastic steps, the government seeks, above all, to improve the company's manageability. In this connection, it is planned that enterprises extracting, transporting and selling gas will have to keep separate accounting of their products and their production costs. The latter is to ensure state control over all links of the gas supply chain. It is planned on this basis to regulate gas transmission tariffs which should be unified for all suppliers, including those independent of Gazprom. In the gas production and marketing sectors, which are not classified as natural

monopolies, cautiously assumes the creation of favorable conditions

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The actual refusal to reform Gazprom is likely to harm it as well as the economy as a whole. Today, Gazprom is essentially

- A state-owned company whose activities are determined not so much by the market as by political decisions. Its task is to fill the state budget and subsidize consumers with low prices. It is hard to expect efficient production and long-term development from such a company.

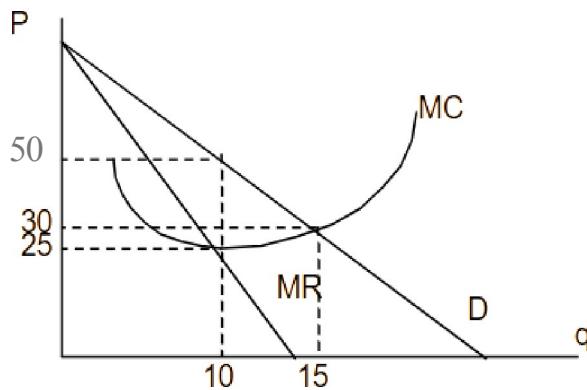
It is also bad enough that the situation at Gazprom can undermine the reform of UES, because there cannot be a full-fledged electricity market as long as gas - the main raw material for its production - remains in the hands of the state monopoly. The peculiarity of Russian reforms is that they should be implemented as a package, since each of them is directly linked to the other.

SELF-STUDY ASSIGNMENTS

1. Usually PAO "UES of Russia", "Gazprom" and OAO Russian Railways are referred to natural monopolies. Do you agree? Explain your position.

2. Prove that the profit-maximizing monopolist will not set the price on the inelastic part of the demand curve.

3. The figure below shows the demand curve for a monopolist's product, as well as his marginal income and marginal cost curves:



Explain what the monopolist's output and price would be if he wanted to maximize his profits.

4. Data are known about the demand for monopoly products at different prices:

P	20	18	16	14	12	10
q	0	1	2	3	4	5

Complete the table with the data on the change in marginal income

monopoly. To maximize his profits, the monopolist chooses an output at which his marginal cost is 8 rubles. What price will he set in this case?

5. Data are known about the demand for the monopoly's products depending on the price it sets:

P	10	9	8	7	6	5	4	3	2	1
q	0	1	2	3	4	5	6	7	8	9

The fixed costs of the monopoly are 8 rubles. The variable cost function: $VC=3q$. What price will the monopoly set to maximize its profits? What will be the output and profit of the monopoly?

Illustrate the solution graphically.

6. The demand for monopoly products at different prices is known, and also its total costs at different output volumes:

P	1000	900	800	700	600	500	400
q	0	10	20	30	40	50	60
TC	5000	6000	9000	14000	20000	28000	37000

Calculate the monopoly price, output, and profit.

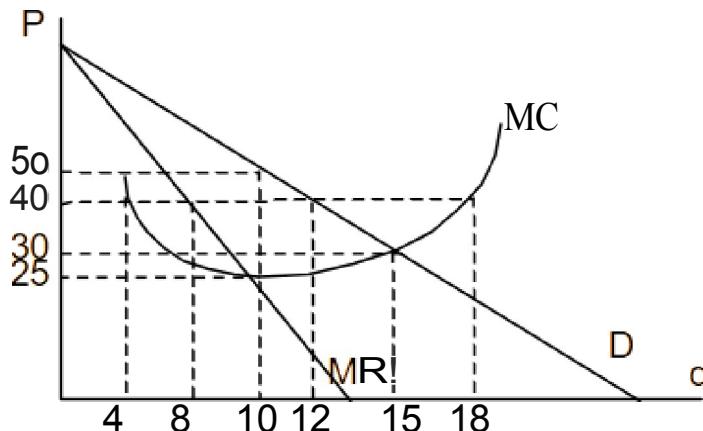
7. The market demand function for the monopoly's products: $-J = 10 - pg$ function of its total costs: $TC=4 q$. Calculate the monopoly price, output, and profit.
8. The monopoly's average income function is $P = 1 b - ,$ and its average cost function: $*'' - + .$ What is the monopoly's profit?
9. The monopoly's fixed costs are 72 CU, and its variable cost function is: $1't = "$ At the equilibrium point, the monopoly's average total cost equals its marginal cost, and the price elasticity of demand equals -4. What is the profit of the monopoly?
10. The publisher enters into a contract with the author of the book. The demand for the book is $P=10-q$. The publisher's marginal cost is equal to the average and is 2 denominations. At what price will the publisher make the maximum profit? What is the maximum fee the author can demand?
11. Sometimes repairers demand a fee for their work equal to the cost of materials purchased by the owner for repairs. How can you explain this behavior?

12. The monopoly serves two categories of consumers. The demand function of the first category: $q_1=1000-P$, and the second: $q_2=1200-5P$. The monopoly's total cost function is $TC=100q$.

How much product and at what price would the monopoly sell in the absence of price discrimination? What prices would it set for each category of consumers by discriminating? How many products would it sell to each category in this case?

13. The demand for the product of a perfectly competitive industry was given by the function: $q=6000-50P$. The supply function of the industry was: $q=100P$. Today the industry is monopolized. The demand and marginal costs have not changed. How will the price and volume of output change? What is society's loss from monopoly?

14. The figure below shows the price, marginal revenue, and marginal cost of a monopoly at different output volumes:



What price will the monopoly set in the absence of government regulation?

Let the state set the maximum price for the product of the monopoly at 40 rubles. What will be the output of the monopolist? Will a deficit arise at such a state price? What should the state price be to achieve socially efficient output?

15. Someone owns a monopoly on organizing walks on a picturesque lake. His business used to thrive. Unfortunately for the entrepreneur, the authorities imposed a lump sum tax equal to 90% of his economic profits. How will this affect the monopolist's price and output?

16. The price elasticity of demand for the monopoly's products is constant at -1.5. The state has imposed a commodity tax of 5 cents per unit of output. How much will the price of the product increase?

ANALYSIS OF THE PRACTICAL SITUATION - 1

For the residents of a small village in an arid region, water is brought in from a neighboring town. One of the residents has an abandoned well on his property. He is going to restore it and sell water to his neighbors.

The cost of restoring the well will be \$300 per month.

Water intake by customers will be fully automated. In this case, the cost of electricity for each tank will be \$3. Other costs the owner of the well is not planned.

Data are known about the monthly revenue from the sale of water depending on its price per unit capacity:

P	TR
8	0
7	700
6	1200
5	1500
4	1600
3	1500
2	1200
i	700
0	0

Make a table of the demand for water depending on its price. If the well owner's goal is to make maximum profit, what price will he set for each container of water and how much water will he sell? What kind of profit will he get?

ANALYSIS OF THE PRACTICAL SITUATION - 2

At the auction for the sale of works of art was exhibited rare thing. Its initial price was 1 million rubles. Potential buyers were 10 antique dealers, each of whom agreed to offer for this thing the highest price, the other antique dealers is unknown. In particular, the first antique dealer was ready to buy the item for 10 million rubles, the second - for 9 million rubles, the third - for 8 million rubles, etc. Thus, the tenth antiquary was ready to pay for the goods maximum of 1 million rubles.

To avoid fair competition at the auction, the antique dealers colluded, and one of them bought the thing for 1 million rubles. Then a private auction was arranged, where the antique dealers raffled off the goods among themselves.

What price was the item sold for at the private auction? Was it higher or lower than the price that would have been set in a public auction with fair competition among antique dealers? Who won and who lost from collusion? Do collusion and the private auction violate the rule of public efficient release?

How, in your opinion, did the antique dealers settle with each other at the end of the private auction?

ANALYSIS OF THE PRACTICAL SITUATION - 3

Buket specializes in the production of face creams. The manufacturing plant has back-up production facilities, allowing it to increase production as demand increases without increasing fixed costs.

In the past year, the firm has produced five basic varieties of cream. Sales and pricing information can be found below:

"Rose."	100,000 cans at a price of 28 rubles.
"Carnation."	100,000 cans at a price of 52 rubles.
"Tulip."	60,000 cans at a price of 35 rubles.
"Lily."	60,000 cans at a price of 17 rubles.
"Narcissus."	120,000 cans at a price of 60 rubles.

Managers of the firm reviewed the report on the results of economic activity for the past year (thousands of rubles.)

Revenue from sales	18320
Costs	17400
- Basic raw materials and supplies	5880
- Wages of workers	3480
- General plant expenses	1360
- Administrative expenses	3010
- Depreciation	820
- Interest on the loan	740
- Advertising costs	860
- Selling and transportation costs	1250
Profit	920

Having analyzed the cost structure, the managers found that the cost of basic raw materials and materials, as well as workers' wages are variable costs, 50% of general plant costs and 80% of marketing and transportation costs should also be attributed to the category of variable costs. The average variable costs for the production of different varieties of cream are known, which allowed to partially fill in the table:

Average cost and profit per unit (rubles)

	Rose	Carnation	Tulip	Lily	Narcissus
Costs:					
Raw materials and supplies	10	20	4	8	18
Salary	8	4	8	6	12
Other variables costs	2	4	2	4	6
Average fixed costs (AFC)					
Average total costs (AC)					
Price (P)	28	52	35	17	60
Profit per unit					

Administrative costs, depreciation, interest on loans, advertising costs, 50% of general plant costs and 20% of sales and transportation costs are fixed costs.

Assignment 1: Determine the firm's fixed and variable costs.

Allocate the fixed costs to the various products in proportion to the variable costs. On this basis, calculate the average fixed cost, average total cost, and profit per unit for each product.

Determine whether creams should be removed from production if their price is lower than the average total cost.

Assignment 2. Managers have noticed that the sales of two varieties are "Carnation" and "Tulip" can be increased by reducing their prices. Marketers have compiled demand tables for these creams:

"F Carnation."

Sales volume	Price
100000	52
120000	50
150000	46
180000	42
200000	38

"Tulip."

Sales volume	Price
60000	35
80000	31
100000	26

Should we expand output? How will the firm's costs and profits change?

Task 3. The firm has received an additional large order: a wholesale buyer is ready to buy 50,000 jars of "Carnations" at 32 rubles apiece. The plant can increase its output without increasing its fixed costs.

Should I accept or reject this offer?

Assignment 4. Consideration is given to expanding the assortment by producing two new varieties of cream at the former production facilities

POWER.

Marketers believe it is possible to sell 750,000 jars of cream "Astra" at a price of 40 rubles per jar. Approximate cost calculations are shown in the table:

Costs, price and profit per jar of Astra cream

Raw materials and supplies	16
Salary	6
Other variable costs	4
Average fixed costs	
Average total costs	
Price	40
Profit per unit	

Fill in all the cells, given that the market entry of Astra will affect the demand for Narcissus, which will fall by 40,000.

Another option to expand the range is the production of cream "Violet" in the amount of 20000 cans. The possible price is 62 rubles. Approximate cost calculations are given in the table:

Costs, price and profit per jar of Violet cream

Raw materials and supplies	15
Salary	10
Other variable costs	2
Average fixed costs	
Average total costs	
Price	62
Profit per unit	

Fill in all the boxes, given that the market entry of Violet will also affect the demand for Narcissus, which will fall by 30,000.

Is it worth expanding the range? If so, what kind of cream should be produced? How much will the profits increase?

Task 5. Managers have noticed that the prices of raw materials necessary for the production of "Carnation" are very high. A new supplier is found, offering a price 25% lower than the existing one. There is, however, a concern that the lower price corresponds to lower quality, which could lead to a 25% reduction in sales.

Is it worth it to change suppliers?

**COMPUTER CLASS SESSION: FOCUDAPCTBEHHOE
REFULTION OF NATURAL MONOPOLY**

Background Information:

The transportation company's average variable cost is constant at \$100 per t-km. The fixed costs are \$1,200,000 per day. Daily transportation demand function: $P=1000-q/10$, where q is demand and P is the tariff.

Assignment:

1. Fill in column q in the range from 0 to 10000 in steps of 500.
2. Fill in columns P , TR, MR, FC, VC, TC, AFC, AVC, AC, MC, P.
3. Plot the curves $P(q)$, MR, AC, AVC, MC on the same figure.
4. Answer the questions:
 - What price would the firm charge in the absence of government regulation? What would the output have been? Profit?
 - What price should the government set based on the break-even point of the firm? What will be the volume of transportation?
 - What should be the socially optimal output? What should the price be? What will happen to the firm in this case?

TEMA 10. MONETARY MARKET AND MONETARY POLICY

1. Demand for money
2. Money supply and equilibrium on the money market
3. The central bank and its functions
4. Objectives and instruments of monetary policy
5. The Transmission Mechanism and the Effectiveness of Monetary Policy

1. Demand for money

The demand for money should not be confused with the desire to live better. To live well, one must have all sorts of assets: real estate, securities, bank accounts, etc. Money is only one of the assets that has the advantage of liquidity.

The demand for money is the desire to keep some assets in a liquid form. By the way, rich people have relatively little demand for money, because their wealth is mainly represented by securities - stocks and bonds. This is because the desire to hold assets in the form of, for example, the monetary aggregate M1 deprives the individual of the income he could obtain by turning M1, say, into securities or other income-generating assets. Possession of money, therefore, entails a cost (lost interest income).

Keynesian theory of the demand for money argues that people agree to bear these costs for three motives:

1. **Transactional** motive: money is needed for current transactions. The demand for money according to this motive depends primarily on nominal GDP (nominal national income): the larger it is, the higher is the demand for money. Recall that nominal GDP is equal to the product of real GDP (Y) by the price level (P). Indeed, the higher the prices or the volume of national production, the more money is needed for transactions, and consequently the more money people and firms wish to have in their hands and current accounts.

Thus, the demand for money for transactions is a function of real GDP (real national income) and the price level.

2. The precautionary motive: Money is needed for unexpected expenditures. The demand for money under this motive also depends positively on real GDP and the price level.

3. The speculative motive is related to the task of preserving value. Let people have the alternative of having assets either in cash (M_1) or in the form of government bonds. If people expect bonds to fall in price soon, they start selling them, thereby increasing their demand for money. Conversely, if people expect the price of bonds to rise, they buy them up - replacing money with bonds, i.e. the demand for money declines.

The owner of a bond receives interest income on it. The higher the nominal interest rate, the greater the desire to turn money into bonds, i.e. the lower the demand for money. Thus, speculative demand for money depends negatively on the nominal interest rate.

A distinction must be made between nominal and real money. Nominal money (nominal money balances) is simply a certain amount in the hands and bank accounts. **Real money** (real money stock) is the purchasing power of nominal money. Consequently, the real money supply is obtained by dividing the nominal money supply (M) by the price level (P): M/P . Thus, when prices rise and the nominal money supply remains unchanged, people can buy fewer goods with the same amount of money, i.e. real money in the economy becomes less.

The demand for real money for all three of these motives depends positively on real GDP (real national income) and negatively on the nominal interest rate: $(M/P)d'f(Y,i)$.

The nominal interest rate is the rate at which money is borrowed in financial markets. In contrast, the **real interest rate** is the change in purchasing power

interest income. The relationship between the nominal and real rates is described by Fisher's equation:

$i = d + n'$, where i is the nominal interest rate, d is the real interest rate, and n is the inflation rate.

It follows from this equation that the nominal interest rate can change under the influence of two factors: the real rate, which suits both savers and investors, and the inflation rate. Since at the time of the conclusion of the loan agreement the parties do not yet know exactly what inflation will be during the period of the agreement, they are guided by their inflation expectations when determining the nominal rate (p_e). Accordingly, the Fisher equation takes the form:

$$+ e$$

Consequently, the demand for real money becomes a function of real GDP, the real interest rate, and expected inflation:

$$(M/P)_d = f(Y, r, e)$$

Since prices are assumed constant in the short run, the demand for money depends on the real interest rate: $(M/P)_d = f(Y, r)$. Assuming this function to be linear, we can write:

$$\left(\frac{M}{P}\right)_d = kY - hr^2$$

where k and h are coefficients reflecting the sensitivity of money demand to income and to the interest rate, respectively.

This function reflects the fact that the demand for money increases when real GDP increases and is removed when real GDP increases

' This formula is an approximation that gives satisfactory results only at low rates of inflation. The exact formula for to determine the real interest rate:

$$\frac{i - \pi}{1 + \pi}$$

Function demand for of money example:

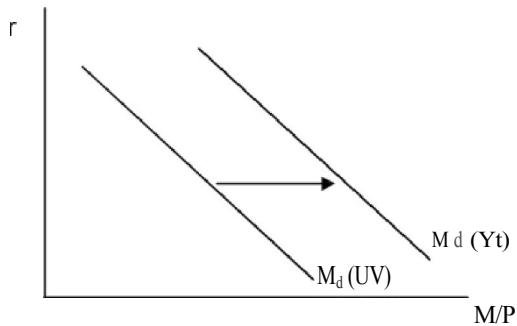
can be и

non-linear, for

$$\left(\frac{M}{P}\right)_d = kY - \frac{n}{r}$$

interest rate. On a graph, the real money demand function (M_d) on the interest rate can be shown as follows (Fig. 9-1):

Figure 9-1. Demand for money depending on the interest rate



When GDP grows from Y_t to Y_o , the demand for real money increases at the same interest rate. Thus, the money demand curve shifts to the right.

Classical theory derives the money demand function from the quantitative money theory equation:

$$MV=PY,$$

where M is the money supply in the economy, V is the number of turns of each unit of money during a given time (velocity of money circulation), P is the price level in the economy, U is real GDP (real national income).

From this we can see that people's need for money is greater the greater the real GDP and price level and the less often each ruble changes hands. Rewriting this equation, we obtain a real money demand function:

$$\left(\frac{M}{P}\right)_d = \frac{Y}{V}$$

Classical economists believed the speed of money circulation a constant value, determined by conditions such as the frequency of wage payments. Therefore, the most important factor in their demand for money was the change in real GDP. This is the difference between the classical and Keynesian approaches, because for Keynesians the leading factor is the change in the interest rate.

At the same time, the interest rate is also implicitly present in the equation of quantitative money demand theory, because it determines the velocity of money. The higher the interest rate, the greater the losses from holding assets in monetary form. Therefore, when people receive money, they try to convert it into other assets as quickly as possible. Since everyone does so, the velocity of money increases, and the demand for money is reduced accordingly.

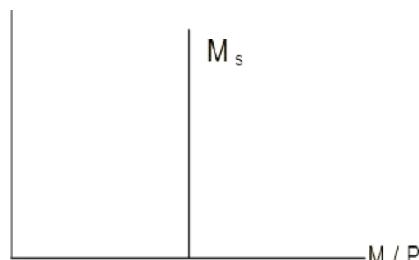
2. Money supply and equilibrium in the money market

Let us recall the most simplified formula defining the money supply in the economy in the form of deposits - current accounts (topic "Money and Banks," paragraph 4):

$$M = MB \frac{1}{R}$$

It follows that the money supply, i.e. the supply of money, depends on the monetary base (MB) and the required reserve rate (R).¹ Both the monetary base and the required reserve rate are determined by the central bank and do not depend on the real interest rate. Therefore, the real money supply function (M_e) of the interest rate is vertical (Figure 9-2):

Figure 9-2. The money supply function

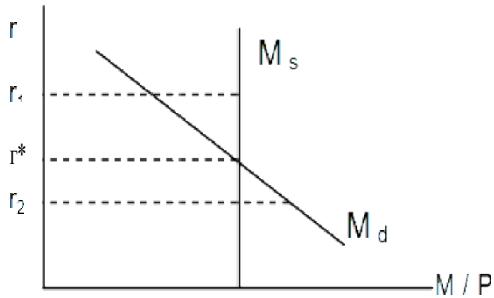


An increase in the nominal quantity of money (M) shifts the money supply line to the right. On the contrary, an increase in prices means a reduction in the real money supply, which leads to a shift of the money supply line to the left. And vice versa.

There should be no confusion between mandatory reserve (R) with the real interest rate (d).

Connect the supply and demand lines of money in one figure (fig. 9-3):

Figure 9-3. Equilibrium on the money market



The intersection point of these functions determines the equilibrium interest rate in the economy (r^*). How does the economy arrive at this equilibrium? Let the interest rate happen to be at the level of r_1 . At this rate, people want to have less money in their hands and current accounts than exists in the economy ($M_d < M$) As a result, they start buying securities and opening term savings accounts. Both lead to a decrease in the interest rate to r^* .

If the interest rate is at the r_2 level, the opposite happens. At this rate, the demand for money is greater than its supply ($M_d > M$) Wanting more assets in monetary form, people sell their bonds and close their savings accounts. As a consequence, the interest rate goes up. Thus, there is a single equilibrium interest rate (r^*) that equalizes supply and demand in the money market.

3. The central bank and its functions

Monetary (monetary) policy is a policy to change the money supply in the economy. The money supply changes as a result of operations of the Central Bank, commercial banks and decisions of the non-banking (real) sector. In this case, the most important role in the implementation of monetary policy is played by the Central Bank as the main link in the banking system of the country.

Traditionally, the Central Bank has five main tasks, according to

G KOTO|SOMEONE YaBJIeTCe:

1. The issuing center of the country. The Central Bank monopolistically issues national banknotes - paper money;
2. Bank of banks. The Central Bank holds the reserves of commercial banks, extends loans to them (it is the lender of last resort), and supervises their activities;
3. Banker of the government. It places government securities, extends credit, conducts settlement transactions for the government, maintains treasury accounts, and holds official gold and foreign currency reserves;
4. The main settlement center of the country. The Central Bank acts as an intermediary between banks for non-cash settlements;
5. The authority to regulate the economy through monetary policy.

In solving these tasks, the Central Bank performs three main functions: regulating, controlling and informational-researching.

In Russia, the law "On the Central Bank" (2002) states that the objectives of the Bank of Russia are: protecting and ensuring the stability of the ruble; developing and strengthening the banking system of the Russian Federation and ensuring the effective and uninterrupted functioning of the payment system. At the same time, the Bank of Russia performs the following specific functions:

- in cooperation with the government, develops and implements a unified monetary policy;
- monopolizes the issue of cash and organizes its circulation;
- is the lender of last resort for commercial banks, organizes the system of their refinancing;
- establishes the rules for settlements in the Russian Federation;

- establishes the rules for banking operations;
- Serves the budget accounts of all levels of the budget system of the Russian Federation by carrying out settlements;
 - Manages its gold and foreign exchange reserves effectively;
 - conducts state registration of credit organizations, issues and revokes banking licenses;
 - supervises the activities of credit institutions;
 - registers the issue of securities by credit institutions;
 - performs all types of banking operations necessary to solve its main tasks;
 - organizes and performs currency regulation and currency control;
 - determines the procedure for settlements with international organizations, foreign states, as well as legal entities and individuals;
 - establishes the rules of accounting and reporting for the banking system of the Russian Federation;
 - establishes and publishes the official exchange rates of foreign currencies against the ruble;
 - organizes the compilation of the balance of payments of the Russian Federation;
 - regulates the activities of currency exchanges;
 - analyzes and forecasts the state of the Russian economy;
 - performs other functions in accordance with federal laws.

The most important function of the Central Bank in conducting monetary policy is the management of cash and non-cash issue of money. Emission is the issue of money into circulation, leading to an overall increase in the money supply. The primary issue is non-cash money: before cash appears in circulation, it is reflected in the form of entries in the accounts of commercial banks.

For example, the Central Bank buys currency or government securities from a commercial bank or extends a loan to it. In both cases, the amount in question is credited first to that commercial bank's account at the Central Bank. However, commercial bank accounts at the Central Bank cannot be used as means of payment and therefore are not money. They constitute the reserve of the monetary system, an element of the monetary base.

The commercial bank then issues loans to businesses against the funds received, thus creating non-cash money. The recipients of the credit, in turn, pay with this money to their business partners, resulting in the transfer of money to partners' accounts in other banks. At the same time the account of the commercial bank receiving the credit (the seller of the currency) in the Central Bank decreases, and the corresponding accounts of the banks, to which the money is transferred, increase. These banks now have excess reserves, at the expense of which new credits are issued. And so on. (in "Money and banks", paragraph 4). In this way the multiplicative mechanism of expanding the non-cash money supply works.

Thus, non-cash money is created by the system of commercial banks. The central bank, for its part, regulates this process by controlling the size of the monetary base, as well as the value of the deposit multiplier.

Funds in the accounts of commercial banks at the Central Bank can be cashed out in accordance with the needs of banks' clients for cash. In this way, the Central Bank issues cash.

This is done in the following way. The Central Bank opens cash settlement centers (CCC) in the regions of Russia to service commercial banks located there. For the issue of cash in RCCs, reserve funds and cash in circulation are opened. The reserve funds hold a stock of banknotes to be put into circulation in case of necessity. While in the reserve funds these banknotes are not money, because they have not yet entered into circulation.

The revolving cash desk of the RCC constantly receives cash from banks and from it also constantly gives cash to banks. Thus, the funds currently in the circulating cash desk are considered to be cash in circulation. Cash limits for each RCC are established for the circulating cash desk. If they are exceeded, the money is deposited into reserve funds and thus withdrawn from circulation. On the contrary, RCCs are obliged to issue cash to banks at their request within the limits of the banks' available reserves on their account with the Central Bank. When funds are transferred from reserve funds to circulating cash, cash is issued.

The money issued by the RCC goes to the operational cash desks of commercial banks, and from there to the cash desks of enterprises or directly to the population. Thus, cash originates from non-cash money in the accounts of enterprises and households in commercial banks and created by the whole system of bank lending

ECONOMICS.

Another important task of the Central Bank is to control the activities of commercial banks. Today, the functioning of the banking system in our country gives rise to justified complaints. Among its significant shortcomings are insufficient capitalization of banks, lack of transparency in banking reporting, weak lending to the real sector, which does not meet the needs of economic growth.

In the previous topic, it was mentioned that the Bank of Russia plans to raise the minimum equity capital for newly established banks to 5 million euros (in ruble equivalent) by 2007. At the same time, many Russian banks today use schemes that allow them to artificially increase the amount of equity capital. As a result, the capital is high on paper, but it is an illusory welfare.

The Bank of Russia sees its task as forming a stable, developed and transparent banking system. To this end, it envisages a number of measures. First, banks should switch to international standards

financial statements. In this case, their financial indicators will better reflect the real situation. Secondly, banks should join the deposit guarantee system. This will attract people's money to them, which will increase lending to the economy. Thirdly, the Central Bank will strengthen supervision of commercial banks, which, on the one hand will lead to disappearance of non-viable banks, and on the other - will discipline the normally operating ones. At the same time, the Bank of Russia intends to shift the main emphasis in its actions from the use of sanctions against troubled banks to building a system of strict monitoring, allowing to identify banking problems at an early stage and prevent the emergence of

CJONSIDERABLE SITUATIONS.

An indispensable condition for the successful functioning of a central bank is a high degree of its independence from the executive or legislative bodies of state power. Otherwise there is a threat of unjustified monetary emission at the command of the president, the government or the parliament based on conjunctural political considerations. This is fraught with inflation and instability of the ruble exchange rate.

The status, purposes of activity, functions and powers of the Central Bank of the Russian Federation are determined by the Constitution of the Russian Federation, the law "On the Central Bank of the Russian Federation (Bank of Russia)" and other federal laws. They define the Bank of Russia as a state authority with a special status, which exercises its functions and powers independently from other state authorities.

The Bank of Russia is a legal entity. Its authorized capital and other property are federal property, but the Bank of Russia independently uses and disposes of this property, including gold and foreign currency reserves. The financial independence of the Bank of Russia is expressed in the fact that it makes its expenses from its own income. Thus, the Bank of Russia is endowed with property and financial independence.

The state is not liable for the obligations of the Bank of Russia, just as the Bank of Russia is not liable for the obligations of the state, unless they have assumed such obligations or unless otherwise stipulated by federal laws. Similarly, the Bank of Russia is not liable for the obligations of commercial banks, and banks are not liable for its obligations.

The Bank of Russia is accountable to the State Duma, which appoints and dismisses the Chairman of the Bank of Russia (as advised by the Russian President) and the members of the Board of Directors of the Bank of Russia (as advised by the Chairman of the Bank of Russia, agreed with the Russian President). In addition, the Duma considers the main directions of the unified state monetary policy and the annual report of the Bank of Russia, and takes decisions on them.

The independence of the Central Bank was severely tested in 2001-02, when the Duma decided that the Bank of Russia was actually deprived of supervision and could do whatever it wanted. Members of the Duma were overcome with suspicion that the Central Bank, which approves its own expenditure estimates (a normal world practice), was withholding its profits from the government. They were especially irritated by the high salaries of Bank of Russia employees, comparable with those of commercial banks.

Proponents of restricting the independence of the Bank of Russia began to demand the right to approve the annual directions of monetary policy and estimates of the Central Bank by laws. Ideas arose about control over the formation and distribution of profits, over all the economic and operational activities of the Central Bank. And the crowning achievement was the proposal to transform the Bank of Russia into an ordinary state institution, effectively subordinate to the government. The latter, among other things, was also dangerous in that any Western lender who issued a loan against the guarantees of the Russian government, in case of what happened, was able to seize foreign gold and foreign currency assets of the Bank of Russia.

The proposal to approve monetary policy guidelines by law was rejected at the very beginning of the discussion that arose. Its

adoption would have made it impossible for the Bank of Russia to make the necessary economic decisions promptly and, consequently, threatened the stability of the ruble.

Then it was decided that it would be unfair to expand only the Duma powers to control the Central Bank. As a result, the idea was born to transform the National Banking Council (NBC), which had previously met sporadically and had no serious powers, into a full-fledged body of control and management of the Bank of Russia.

To this end, the structure of the NBS has been changed. The NBS now consists of 12 people, with only the Chairman of the Bank of Russia being a member of the Central Bank's Board of Directors. Of the remaining members, two are nominated by the Federation Council, three by the State Duma, three by the Russian President and three by the Government.

There was a serious struggle around the functions and powers of the NBS. According to the initial plan, the NBS was to take over all the key functions of the Central Bank's Board of Directors - approval of monetary policy, the Bank of Russia's expenditure estimates, accounting rules, etc.

Such a situation would have led to dual power in the Bank of Russia. Therefore, in the end, when amendments were made to the law "On the Central Bank," its Board of Directors was returned the authority to approve both the monetary policy and the estimate of expenditures. The NBS, for its part, was only given the right to review them. Besides, the NBS was given the right to approve spending on salaries, pension insurance, capital investments, and the Central Bank's administrative and economic activities. The NBS was also given the right to appoint the Central Bank's chief auditor, approve accounting and reporting rules, the procedure for profit distribution and the formation of the Bank of Russia's internal reserves.

Thus, despite the expansion of the powers of the NBS, it did not become the same management body of the Central Bank as the Board of Directors. The latter managed to retain its key powers, therefore, the principle of independence of the Bank of Russia as a whole was preserved.

2. Objectives and instruments of monetary policy

The objectives and instruments of monetary policy can be grouped as follows: Strategic objectives:

- economic growth;
- EMPLOYMENT;
- price stability;
- stable balance of payments.

Tactical objectives:

- money supply in the economy;
- interest rate;
- To JAC NZtionlJyuta.

For To achieve these goals Bank of Russia can use the following basic tools:

1. Purchase and sale of government securities;
2. Purchase and sale of foreign currency;
3. Change in the mandatory reserve rate;
4. Change in the interest rate on deposits of commercial banks in color;
5. Change in the refinancing rate;
6. Direct and reverse repo transactions and the like;
7. Placement of CB bonds among commercial banks;
8. Regulation of funds in the accounts of the Ministry of Finance at the Central Bank. Let us consider the mechanisms of influence of these instruments on the change of

of the money supply in the economy:

1. Suppose the Central Bank buys government securities from commercial banks. By paying for them, it increases the funds in the commercial banks' accounts at the Central Bank. This means an increase in the monetary base, hence an increase in the money supply in the economy. When the Central Bank sells securities, the opposite happens. Operations to buy and sell securities are called open market operations of the Central Bank.

2. Same mechanism. By buying currency, the Central Bank pays with rubles. As a result, the monetary base in the economy grows, leading to an increase in the money supply. The opposite is true when selling currency.

3. Commercial banks are required to keep some of their borrowed funds in a special reserve account at the Central Bank. By increasing this mandatory reserve ratio, the Central Bank reduces the free reserves of commercial banks, i.e. reduces their ability to lend. It thus reduces credit and deposit multipliers and, consequently, the money supply. Since April 2004, the reserve requirement ratio in Russia has been 7-9%, depending on the type of funds raised. Prior to that, this norm was changed in 2000. In other words, the Bank of Russia extremely rarely uses this instrument. Western Central Banks also use it quite seldom.

4. No interest is accrued on funds in the reserve accounts of commercial banks with the Central Bank. At the same time, today the Bank of Russia offers commercial banks to open special deposit accounts, on which it pays interest. The increase of this interest rate allows the Central Bank to attract deposits from commercial banks, thereby reducing their excess (free) reserves, and hence the money supply in the economy. Accordingly, the reduction of interest on deposits gives the opposite result.

5. As the lender of last resort, the Central Bank lends to commercial banks. In developed market economies, the interest rate at which the Central Bank lends to banks is called **the discount rate**. At this rate, the Central Bank records the bills of exchange of banks, i.e. gives them credit on the security of bills of exchange. By increasing the discount rate, the Central Bank reduces the amount of credit that commercial banks can take from it. As a result, bank lending to the economy is also reduced. Consequently, the monetary base decreases and so does the money supply. Accordingly, when the discount rate decreases, the monetary base and the money supply, on the contrary, increase.

In Western countries, the discount rate is the most important macroeconomic indicator, because it determines the interest rate in financial markets. By obtaining cheaper (expensive) credit from the Central Bank, commercial banks reduce (increase) interest rates on their loans. And interest rates determine a lot of things in today's economy. In particular, as we have already said ("Aggregate demand and aggregate supply", paragraph 1), households' consumer spending and firms' investment spending, i.e. aggregate demand, depend on interest rates. This also affects the market value of securities and, correspondingly, the situation on stock markets. In addition, an increase (decrease) in the interest rate in a given country leads to an inflow (outflow) of currency from abroad, i.e. affects the exchange rate of the national currency. For all these reasons, a change in the discount rate (or even a rumor about it) always attracts increased attention from specialists.

For example, in 2002 and early 2003, the U.S. and European economies were in recession. Therefore, the central banks of these countries periodically lowered interest rates in order to stimulate aggregate demand and, consequently, production. In the spring of 2003, the discount rate in the United States fell to 1.25% per annum.

In Russia, things are somewhat different. Our Central Bank sets the refinancing rate. In January 2004, it was reduced to 14% per annum. Formally, its purpose is the same as the discount rate in the West. In fact, however, the refinancing rate is not very important in our country yet. Today both the interest rate on the money market and the market value of securities and other macroeconomic indicators weakly depend on it.

However, it should be noted that the change in the refinancing rate still followed the dynamics of the yield of government debt and loan rates, rather than being determinative of the NIH.

It so happens that in Russia the refinancing rate affects the market only through other rates of the Central Bank (deposit, credit or repo

see below), as well as all sorts of penalties and regulations. At the same time, the system of lending to commercial banks by the Bank of Russia has not yet been perfected. The Bank of Russia provides loans only occasionally, and at a lower rate than the refinancing rate. The main method of lending in the second half of 2002 - early 2003 are "currency swap" transactions, which actually represent the issuance of overnight loans secured by foreign currency.

On the other hand, rates on loans issued by banks to enterprises and organizations amounted to a little more than 14% per annum in early 2003. Thus, the refinancing rate does not so much determine the market interest rate, as follows the market, and at a considerable distance. Its change only reflects the state of affairs after the fact, but does not have any noticeable impact on the market. At best, the refinancing rate sets today the upper limit of the cost of borrowing on the money market. Nevertheless, its further reduction may in the future lead to a reduction in the cost of credit for enterprises.

6. **Direct REPO** operations mean the temporary sale by commercial banks of government securities to the Bank of Russia with the obligation to repurchase them after a certain period of time. In this case, banks temporarily increase funds in accounts with the Central Bank (because they have sold securities), i.e., the monetary base increases. This leads to an increase in the money supply in the economy, as commercial banks can issue more loans to the real sector.

In **reverse REPO** operations, the opposite happens: the Bank of Russia temporarily sells government securities to commercial banks, repurchasing them after a specified period of time. Carrying out such operations reduces banks' funds in accounts with the Central Bank (because they buy securities), which means a reduction of the monetary base and, consequently, of the money supply in the economy. Analogous to reverse repo are the operations **of stock exchange modified repo**, which the Bank of Russia

most often used today to temporarily withdraw available funds from the banking system.

7. The Bank of Russia has the ability to influence the money supply in the economy by issuing BOBRs (BOBRs - the Bank of Russia's zero-coupon bond). By placing its bonds among commercial banks, i.e. by selling bonds to them, the Central Bank reduces banks' funds in accounts with the Bank of Russia. This means a reduction of the monetary base, respectively, and the reduction of excess (free) reserves of commercial banks. As a result, banks can give fewer loans to businesses, which leads to a reduction in the money supply in the economy. When the time comes for the Central Bank to redeem its bonds, the opposite happens: the free reserves of banks, the size of loans issued by them, and hence, the money supply grows.

A pilot project to issue BOBRs was implemented by the Bank of Russia in the fall of 2001. It was not very successful (banks were only willing to buy a small part of the proposed bonds on the terms of the Central Bank), and since then (summer 2003) nothing has been heard about BOBRs.

8. The government keeps its free funds in accounts with the Bank of Russia. These funds are not included in any monetary aggregate, so they are not considered money. But, in carrying out its functions, the Ministry of Finance transfers funds to the accounts of budget recipients. As a result, they end up in the accounts of enterprises and organizations, as well as turning into cash in the hands of the population. We should not forget that cash plus funds in the current accounts of enterprises, organizations, and local authorities constitute the money supply in aggregate M1 (theme 18, point 1). Thus, an increase in government spending leads to an increase in the money supply in the economy. On the contrary, an increase in tax collections along with a decrease in government spending leads to the accumulation of funds in the government's accounts at the Bank of Russia, due to which money is withdrawn from the economy. Thus,

the accumulation of funds in government accounts with the Bank of Russia reduces the money supply, while their reduction increases it.

Obviously, this instrument of monetary regulation cannot be used by the Central Bank on its own, but requires a solidarity policy of the Bank of Russia and the government.

The objectives and instruments of the monetary policy of the Bank of Russia can be summarized in the table (Table 19-1):

Table 19-1. Monetary policy of the Bank of Russia

	The "cheap money" policy	The "expensive money" policy
Goals	Increase in the money supply to stimulate economic growth and falling unemployment	Decrease in the money supply to combat inflation
Tools	Buying foreign currencies; <ul style="list-style-type: none"> - Purchase of government securities; - Reducing the mandatory reserve rate; - Reducing the interest rate on commercial banks' deposits with the Central Bank; Reducing the refinancing rate; - Direct repo transactions; - The Central Bank's repurchase of its bonds from commercial banks; - Decrease in balances on 	Sale foreign currencies; <ul style="list-style-type: none"> - Sale government securities; - Increase mandatory reserve rate; Increase in the interest rate on commercial banks' deposits with the Central Bank; Increase in the refinancing rate; - Reverse repo and exchange-modified repo transactions; The Central Bank selling its bonds to commercial banks; - Increase in balances at

	Government accounts with the Central Bank	Government accounts with the Central Bank
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In Western countries, the main instruments of monetary policy of central banks are open market operations on the purchase and sale of government securities and changes in the discount rate. In Russia in recent years, mainly three instruments are used: the Central Bank intervention in the foreign exchange market, i.e. the purchase and sale of foreign currency, changes in the balances of government accounts with the Central Bank and regulation of commercial banks' deposits with the CB through repo operations.

The Main Directions of Monetary Policy for 2003, adopted by the Bank of Russia and the Government of the Russian Federation, name reduction of inflation as the main objective of monetary authorities. At the same time, an active balance of payments (the inflow of currency into the country mainly due to high world oil prices significantly exceeds its outflow) creates a number of problems in conducting anti-inflationary policy. By buying up the incoming currency, the Bank of Russia imitates the ruble. The positive result of this situation is the growth of foreign exchange reserves of the Central Bank, which allows, in combination with a surplus of the state budget, to pay foreign debts without new borrowings.

On the other hand, ruble emission means the growth of the monetary base, which increased by 32.7% in 2002. This entails an increase in the money supply, which increased (according to the M2 aggregate) by 32.3% over the same period. The growth of cash in circulation was 30.8%.

An increase in the amount of money in the economy noticeably outpaces the growth of production, and therefore is fraught with inflation. To combat it, the Bank of Russia sterilizes excess liquidity, i.e. withdraws "excess" money from the economy. For this purpose, two main instruments are used: the operations of stock exchange modified repo and the accumulation of funds in the accounts of the government at the Central Bank. The latter becomes possible thanks to the state budget surplus due to economic growth and high world oil prices. Recall that a budget surplus means an excess of government revenues over expenditures due to

The government's free funds in the accounts of the Bank of Russia increase, i.e. money is withdrawn from the economy.

However, a radical solution to the problem lies in the growth of bank lending to businesses, which will effectively use the current "excessive" money supply. To this end, the government should contribute to the restructuring and bailout of the real sector so that insolvent enterprises cease to exist. Under these conditions, banks will begin to lend more actively to the economy and work with the debt obligations of reliable issuers. In other words, it is necessary to implement structural reforms.

3. Transmission mechanism и efficiency monetary политики

Monetary policy is not important in and of itself, but as a means of influencing the economy, i.e. economic growth, inflation, the balance of payments, etc. The transmission mechanism through which changes in the money supply affect macroeconomic indicators is called the monetary transmission mechanism.

The following links can be distinguished in this mechanism:

- changes in the monetary base and money supply as a result of the actions of the Central Bank;
- the change in the real interest rate;
- changes in aggregate demand (primarily investment) in response to changes in the interest rate;
- the change in GDP in response to changes in aggregate demand.

Suppose the Central Bank is going to conduct a stimulative monetary policy (a "cheap money" policy), for which it increases the monetary base. As a result, banks increase their excess reserves and are able to lend more money. However, the "cheap money" policy cannot guarantee that banks will actually give additional loans and the money supply will increase. With a similar problem.

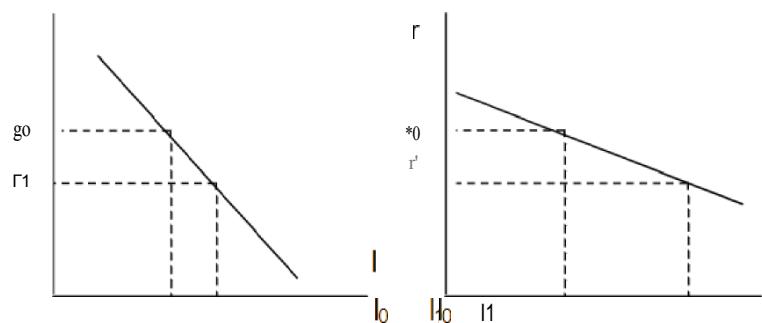
Russia is facing today, where banks are afraid to lend to the real sector.

Now suppose that the money supply does increase. This should lead to a decrease in the real interest rate. Recall that the interest rate is the price of borrowed money in the financial market (theme 11, item 1). The more money in the economy, the more money banks offer to lend, the lower the price of borrowed money - the interest rate.

But this raises an important question: how strong is the relationship between an increase in the money supply and a decrease in the interest rate. This dependence can be significant, i.e. with a certain increase of money in the economy, the interest rate decreases markedly. But it may also be different: with the same increase in the money supply, the interest rate decreases insignificantly. In the latter case, stimulative monetary policy is likely to have a weak effect. It should not be forgotten that it is the reduction of the interest rate that is the tactical goal of a stimulative monetary policy.

But why do we need to lower the interest rate? To stimulate an increase in aggregate demand, above all investment. It has been said before (theme 13, point 1) that investment is higher the lower the interest rate. But it is a question of how much investment will grow as a result of the lower interest rate. There are two possibilities (Fig. 19-1):

Figure 19-1. Interest rate changes and investment demand A B

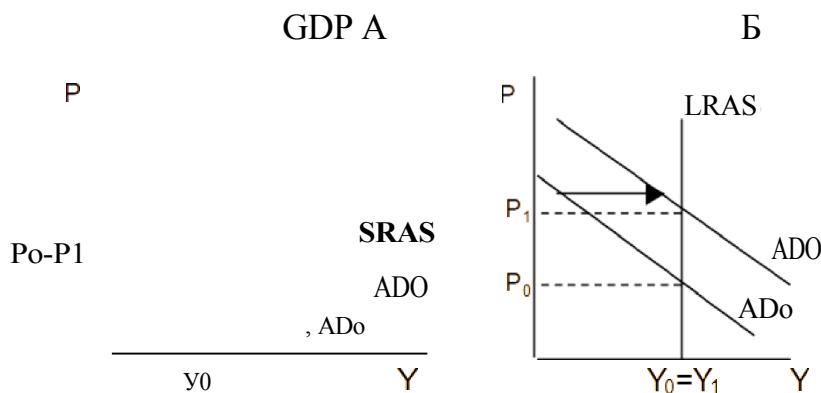


Both graphs reflect the relationship of investment to the interest rate. But in Fig. 19-1A the investment demand curve is steep. This means that for a given decrease in the interest rate (from g_u to r_u) investment increase slightly (from I_o to I_i). In other words in other words, investment is weakly sensitive to the interest rate, depending mainly on other factors. In such a situation, monetary policy is likely to be ineffective.

On the contrary, Fig. 19-1B says o high sensitivity of investment to the interest rate. This means that the same decrease in interest rates leads to a much larger increase in investment: a stimulative monetary policy in this case is effective.

Increased investment increases aggregate demand. But whether production increases as a result is a big question. It depends on the nature of the aggregate supply curve (Figure 19-2):

Figure 19-2. Growth in aggregate demand and change in



In both figures, the aggregate demand curve shifts to the right by the same amount. In Figure 19-2A, however, the economy operates on the short run of the aggregate supply curve. Here resources are not fully utilized, and the aggregate supply line (SRAS) is horizontal. As a result, GDP increases by the same amount as aggregate demand (from Y_i) at the same price level ($P = P_i$).

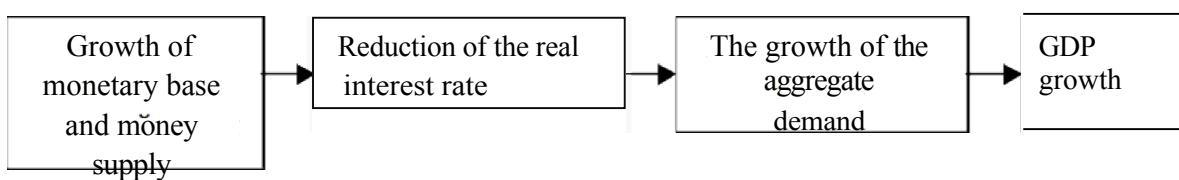
The exact opposite can be seen in Figure 19-2B. It reflects a situation where the economy is functioning under conditions of full utilization of available resources. This means that actual GDP is equal to potential GDP, and the long-term aggregate supply curve

(LSAS) is vertical. Therefore, an increase in aggregate demand leads only to an increase in prices (from P_t to P_i) while GDP remains unchanged ($Y = Y_i$).

Summarizing To summarize, Let's depict the mechanism monetary transmission B

conditions of the stimulative monetary policy schematically (Scheme 19-1):

Figure 19-1. Monetary transmission under stimulative monetary policy



If, however, the central bank chooses a constraining monetary policy (the "expensive money" policy) to fight inflation, the opposite is true. A reduction in the monetary base reduces the money supply; this leads to an increase in the interest rate, which leads to a reduction in aggregate demand; a reduction in aggregate demand leads to slower inflation.

A distinctive feature of monetary policy is the insignificant internal lag. Recall that the internal lag is the time lag between a change in the economy and the adoption of responsive economic policy measures. The Central Bank can take measures to regulate the money supply on its own. It does not require a lengthy procedure of approval by the State Duma, as in the case of fiscal policy.

At the same time, monetary policy is characterized by a relatively long external lag. The external lag is the time lag between economic decisions and the time when they begin to produce results. A change in the monetary base by the central bank does not affect the economy immediately, but only after a certain amount of time has passed. This is due to the complex transmission mechanism of monetary

policy. The duration of the external lag makes monetary policy difficult.

The comparative effectiveness of fiscal and monetary policy is the subject of heated debate among representatives of different schools of economics. For example, Keynesians favor fiscal policy because monetary policy has a complex transmission mechanism with many weak links in the chain of cause-effect relationships. For their part, neoclassics deny the effectiveness of fiscal policy because of the crowding-out effect: an increase in government spending leads to an increase in the interest rate, respectively, a decrease in private investment. Consequently, the final result of the impact of fiscal policy on aggregate demand is unpredictable or, at best, insignificant.

The neoclassical direction includes a number of schools. They are united by the belief in a free market capable of ensuring stable economic development. As for the state, its intervention in the economy, contrary to good intentions, only undermines the market's ability to self-regulate and intensifies cyclical fluctuations in the economy.

Representatives **of the monetarist school** are convinced that monetary policy affects the economy to a much greater extent than Keynesians believe. Monetarists see the size of the money supply as the most important determinant of production, employment, and prices.

The basic equation of monetarism:

$$MV=PY$$

If you have forgotten this equation, go back to topics 13, item 1 and 15, item 2. It follows from the equation that if the velocity of money (V) remains unchanged, an increase in the money supply (M) will lead to exactly the same increase in nominal GDP ($P \cdot U$). In this case, monetarists believe that the change in the amount of money affects not only the investment demand of firms through changes in the interest rate, but also on the demand of the population for all goods and services. The transmission mechanism of monetary policy, therefore,

is simplified. As for investment demand itself, it is, according to monetarists, very sensitive to the interest rate (Keynesians believe the opposite), and therefore also highly dependent on the money supply.

The leader of monetarism M. Friedman showed a close connection between the dynamics of money supply in the economy and nominal GDP on a large factual material. Thus, when the amount of money increases with some time lag, the growth of nominal GDP begins. At the same time, at first, real output grows at relatively stable prices. Gradually the growth of production slows down, and the increase in nominal GDP is achieved by increasing prices. On the contrary, a reduction in the amount of money first leads to a reduction in real GDP, and then - with some delay - affects the rate of inflation.

The main question posed by monetarists is what monetary policy should be to ensure sustainable GDP growth without inflation. Monetarists oppose **discretionary monetary policy** in which the central bank changes the money supply arbitrarily under the influence of immediate goals. From their point of view, it is arbitrary monetary regulation, not the internal instability of the economy (as Keynesians believe), that generates economic instability. Therefore monetarists advocate the establishment of a firm rule according to which the money supply should increase annually at the same rate as the growth of potential GDP (by 3-5%). In this case, aggregate demand would automatically coincide with aggregate supply under full employment, production growth would be ensured, prices would remain stable, and any deviations of the economy from the equilibrium state would become short-lived.

SELF-STUDY ASSIGNMENTS

Explain how the above transactions can affect the money supply in the economy as well as production, employment, and price levels:

- A. The Bank of Russia is buying up foreign currency;
- B. The Bank of Russia sells government bonds to commercial banks;
- C. Bank Russia reduces mandatory reserve rate of commercial banks;
- D. The Ministry of Finance increases balances in its accounts with the Bank of Russia;
- E. The Bank of Russia conducts reverse repo or exchange-modified repo transactions;
- F. The Bank of Russia conducts direct repo operations;
- G. Bank . is buying up foreign currency,
At the same time, it increases interest rates on commercial banks' deposits with itself;
- H. The Pension Fund of the Russian Federation invests its funds to purchase government bonds from the Bank of Russia.

2. The Bank of Russia bought U.S. dollars from commercial banks to the amount of 150 billion rubles. How will this operation change the amount of money in the economy, as well as the amount of issued loans, if the mandatory reserve rate is 10%? It is assumed that banks make full use of their lending capacity.

3. The velocity of money is determined from the equation: $MV=PY$. When conducting monetary policy, the Central Bank assumes the constancy of U . Then it estimates the possible rate of inflation in a given year. Finally, the Central Bank aims to ensure a certain rate of growth of real GDP, for which it changes the money supply in the economy.

In this regard, suppose inflation is 5 percent, and the goal of the Central Bank is to increase real GDP by 2 percent. By how much should the money supply change?

4. The aggregate demand function: $- \frac{1}{10}P + 1000$. At the same time, the money supply is 1,000 and the velocity of money is 10. The price level in the economy is 1 and the potential GDP is 10500.

Calculate the equilibrium price and GDP levels in the short run.

Central bank policy has led to an increase in the money supply to 1100. How will the price level and real GDP change in the short and long run?

Illustrate the solution with a graph.

5. The central bank has increased the money supply in the economy by 40 denominations. How will this affect the value of real GDP if:

- (a) Each increase in the money supply by 20 denominations removes the interest rate by 1 percentage point;
- 6) each 1 percent point decrease interest The interest rate reduction stimulates new investment expenditures in the amount of 30 cents;
- c) the multiplier of autonomous expenditures is 2.5;
- d) the level of unemployment is so high that an increase in aggregate demand does not lead to a marked increase in prices.

Illustrate the solution with a graph.

TEMA 10. THE MARKET FOR RESOURCES IN A PERFECT CONCURRENCE

1. Peculiarities of perfect competition in the resource market
2. Demand for pecypc
3. Offer pecypca
4. Equilibrium in the resource market

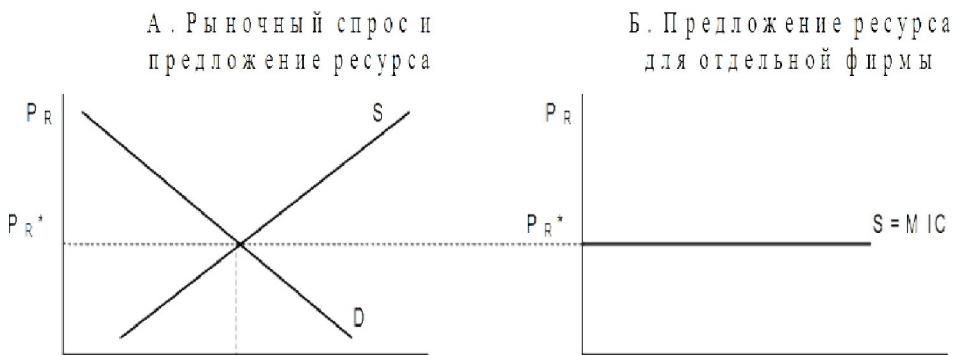
1. Features of perfect competition in the resource market Resources (factors of production) are economic goods, used to produce other economic goods.

There are four main factors of production: labor, capital, land, entrepreneurial activity.

Resource markets differ from one another in the extent to which individual buyers or sellers have the ability to influence the price of a pecypca by changing the demand for it or its supply.

In a perfectly competitive market, there are so many sellers and buyers of pescypca that none of them individually is able to influence the market price of pescypca. The latter is determined by the interaction of total supply and demand on the resource market (graph 1- 1A). An individual firm - a buyer of pescypca - accepts this price as given. It can buy any quantity of pescypca at this price. The pescypca supply curve for a competitive firm is, therefore, horizontal (graph 1-LB).

Figure 1-1. Situation on the competitive pescypca market



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jIIpIIoif

The pescypca supply curve for a competitive firm coincides with its marginal cost per pescypca (MIC). The firm's marginal cost of pescypca is the increment of its total cost (ATC) when the number of pescypca (AR) is increased by 1 unit: $MIC = ATC/AR$. Since the firm buys each subsequent unit of pescypca at the same market price, its marginal cost of pescypca is constant and equal to the price of pescypca:

$$MIC = P_R$$

2. Demand for pescypc

Pescypc is purchased for production. To maximize its profits, the firm compares the marginal gain from using an additional unit of pescypca with the marginal cost of it.

The marginal gain is measured by the marginal revenue from **the marginal product pecypca** (MRP). It is the additional income (ATR) that comes from using an additional unit of pecypca (AR): $MRP = ATR/AR$.

Let the firm use another unit of pecypca, for example, to hire an additional worker. This worker will bring the firm some additional product - the marginal product (MR).¹ Each unit of this additional product will be sold and generate some additional income - marginal income (MR).² Consequently, the additional income the firm receives from the additional worker is calculated by multiplying his marginal product by his marginal income: $MRP = MP * MR = ATR/AR$.

If a firm is perfectly competitive not only in the market for a given pecypca (as a buyer), but also in the market for finished goods (as a seller), then it sells each of its additional units at the same market price. In other words, the marginal revenue of such a firm is equal to the price of the goods (see "Perfect Competition"). In this case, therefore: $MRP = MP * P$.

Let us consider a conditional example. A firm is perfectly competitive both on the labor market and on the product market. The firm's output (q) depends on the amount of labor it uses (L). We also know the price of the firm's finished product (P) and the unit price of labor, the wage ($L=MIC$). Through calculations we obtain the marginal (MC) and total (TC) costs of the firm for different volumes of output, as well as its revenue (TR) and profit (Π). To simplify the calculations, we assume the absence of fixed costs:

$$\begin{array}{ccccccccc} L & Q & M & P=MR & MRP & MIC & & 'L & TC & MC & TR & \Pi \\ \hline \end{array}$$

Recall that the marginal product of pecypca is the increment of output (Aq) when pecypca (AR) is increased by one unit: $MP=Aq/AR$.

² The marginal revenue is the incremental revenue (ATR) with an increase in output (Aq) by one unit: $MR=ATR/Aq$.

0	0	10	20	0	0
1	4	4	10	40	20
2	7	3	10	30	20
3	9	2	10	20	20
4	10	1	10	10	20

The table shows that as long as the next worker brings more additional income than it costs the firm itself ($MRP > MIC$), the firm hires that worker, thus increasing its profits. Accordingly, the maximum profit is reached at the point when **MRP=MIC**, and this condition is similar to the previously used: $MR=MC$ (see "Perfect Competition"). At this point the firm hires three workers. It is not profitable to use the fourth, because he will bring the firm only 10 rubles of additional income, requiring 20 rubles of additional wage costs. It should be emphasized: the point is not that the fourth worker is bad, but that the law of decreasing productivity operates, i.e. the marginal product of labor is falling while all other factors are constant (see "Theory of Production").

The equation $MRP=MIC$ as a condition for maximizing the profit of the firm is easy to prove. Since profit is the difference between revenue and total costs, and revenue and costs are functions of the amount of pеcypca used then:

$$P = TR(R) - TC(R) \rightarrow \max.$$

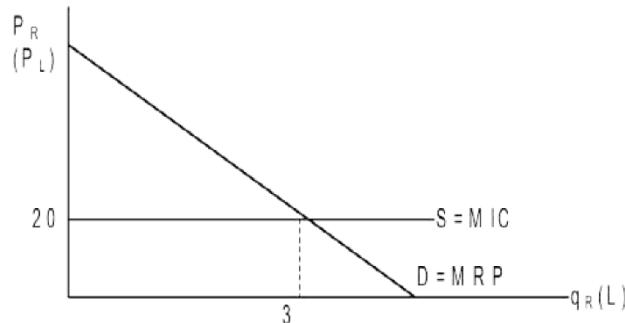
Differentiating the profit by the number of pеcypca and equating the result to zero, we get:

$$\frac{dI}{dR} = \frac{dTR}{dR} - \frac{dTС}{dR} = 0 \rightarrow \frac{dTR}{dR} = \frac{dTС}{dR} \rightarrow MRP = MIC$$

Thus, **the firm's demand curve for pеcypca from its price is nothing less than the MRP curve.** In our example, with a wage of 20 rubles, the firm hires three workers precisely because the MRP of the third

is equal to 20 rubles (see graph 2-1). The point of intersection of the MRP and MIC curves on the graph will give us the optimal amount of pcvpc - labor used:

Graph 2-1. Firm demand for pcvpc



If the price of labor on the market rose to 30 rubles, the number of hired workers would fall to two, because the MRP of the second worker is 30 rubles. And so on.

A firm's pcvpc demand curve may shift as a result of the following factors:

- Changes in demand for the finished product - the higher it is, the higher the demand for pcvpc;
- Changes in technology that affect the value of the marginal product pcvpc;
- Prices of substitute resources - the higher they are, the higher the demand for the pcvpc under consideration;
- The number of complementary resources used. Thus, if the firm increases the amount of capital used, it usually attracts more workers - the labor demand curve shifts to the right.

Industry demand for pcvpc is the total demand of all firms operating in an industry. The industry pcvpc demand curve is obtained by horizontally summing up the demand curves of individual firms.

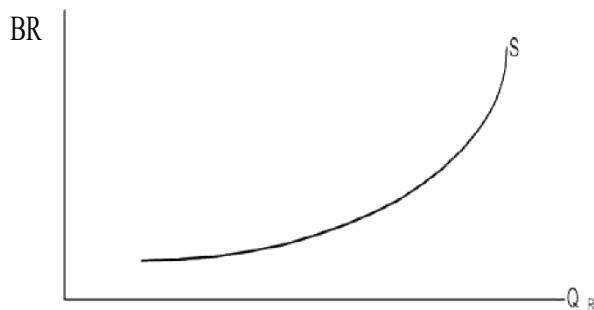
Accordingly, the market demand for pcvpc is the total demand from all industries using this pcvpc.

3. Offer pecypca

As noted in the first question, the supply of pecypca for an individual competitive firm is a horizontal line, i.e., the firm can purchase any amount of pecypca at the prevailing market price.

The pecypca market supply line usually has an upward slope: if all firms and industries want to buy more pecypca, they can only do so at a higher price (graph 3-1):

Graph 3-1. Market supply of pecypca



With respect to material resources (machines, raw materials, semi-finished products, etc.) this is due to the growth of the marginal cost of their production in connection with the law of decreasing productivity (see the topic "Cost Analysis").

Labor supply has a certain specificity.

Consider first the labor supply of the individual worker. When he decides how many hours he should work, he weighs the marginal income from the sale of labor—the price of labor (the hourly wage rate) against the opportunity cost of an hour of labor. The latter is the value of free time lost as a result of work.

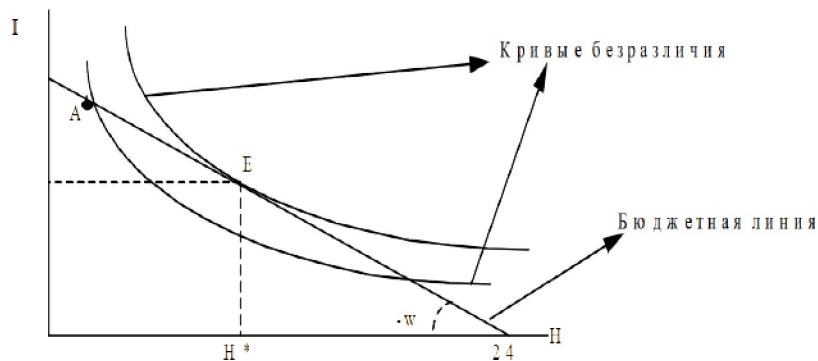
The apparatus of indifference curves can be used to determine the amount of labor a worker offers for sale at a given wage rate. The indifference curve in this case shows different combinations of income (I) and free time (H), at which the welfare of the worker remains the same. The marginal rate of income replacement by leisure time (MRSni) shows from which income the worker

can refuse when his free time is increased by 1 unit so that his welfare remains the same.

Let us construct a budget line in the same "leisure-income" space. Its equation is $I=w(24-H)$, where w is the hourly wage rate. It follows that if a person does not work at all, he will have 24 hours of free time and zero income. In the opposite case, working around the clock - rest will be 0 hours, and the income will be: $I=24w$. Of course, all intermediate variants are also possible. From the equation of the budget line we see that its slope is $-w$. Consequently, if the wage rate increases, the slope of the budget line increases. The slope of the budget line increases.

Connect curves and the budget line at in one graph (graph 3-2):

Schedule 3-2. Employee's choice



In t. A, the worker will not be in equilibrium because he can move to a higher indifference curve by increasing his leisure time and reducing his income. As a result, the worker's welfare will increase.

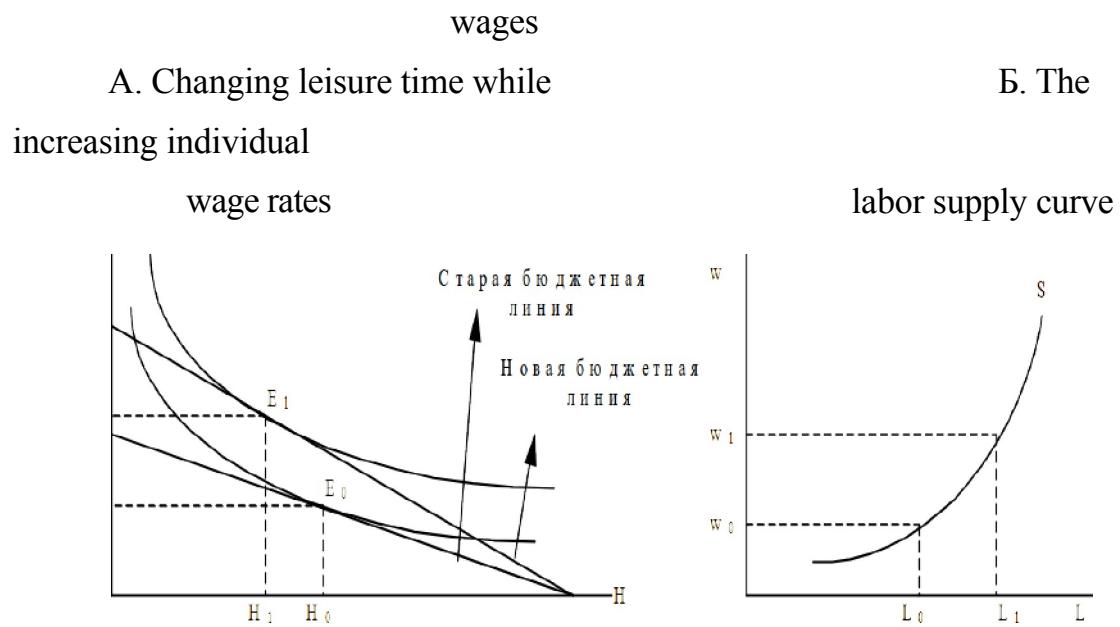
Accordingly, the maximum welfare of the worker will reach at the touch point of the indifference curve of the budget line, in which his marginal rate of income replacement by leisure will be equal to the hourly wage rate ($MRS_{NI}=w$). In this case he would prefer to rest H^* hours, earning income I^* .

It is possible to analytically calculate the employee's equilibrium point by solving a problem on conditional extremum. The target function is a function of employee's welfare depending on his income and leisure time: $TU=f(I,H)-\max$. The limiting function is the employee's budget constraint: $I=w(24-H)$, where w is a given wage rate.

We are interested, however, in the labor supply curve of the individual worker, i.e., how he will change the duration of his work in response to a change in the price of labor - the hourly wage rate.

Suppose the price of labor increased (from w_0 to w_1). In Graph 3-A, the slope of the budget line has increased, and as a result, the new equilibrium point (E_1) is on the higher indifference curve:

Graph 3-3. Possible employee reactions to rate increases



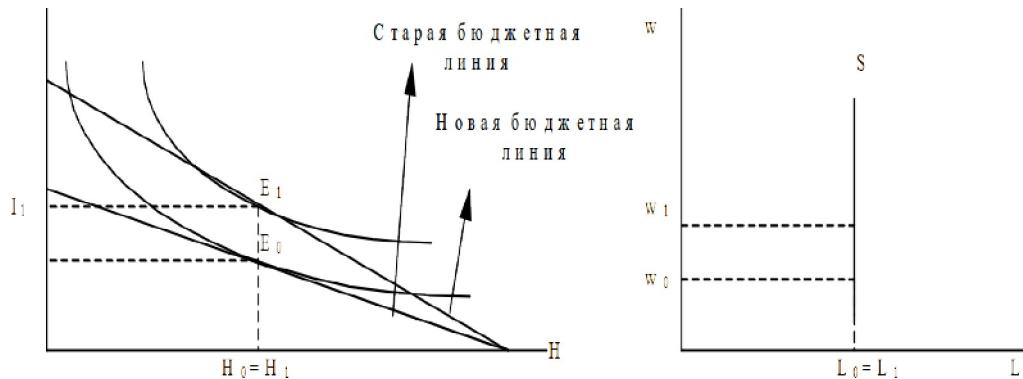
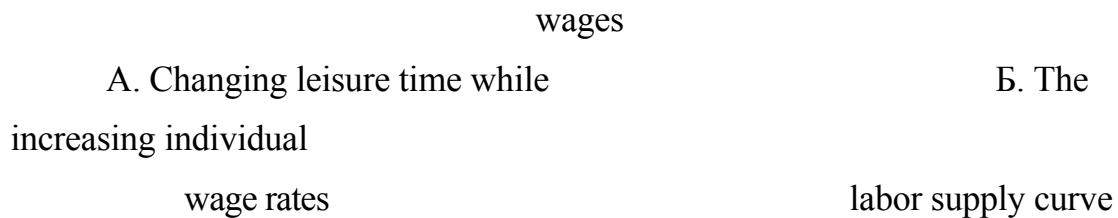
It is important that E_1 turns out to be to the right of the initial equilibrium point E_0 , i.e. the worker chose to reduce his leisure time (from H_0 to H_1) in response to an increase in the price of an hour of labor. But a reduction in leisure means an increase in the individual labor supply (L). This is reflected in Graph 3-ZB, where we see an increase in labor hours (from L_0 to L_1) as the price of labor rises (from w_0 to w_1).

In this case, the individual labor supply curve (S) has a positive slope - as the price of labor increases, so does its supply. But this is not necessarily the case, as Graphs 3-4 and 3-5 show.

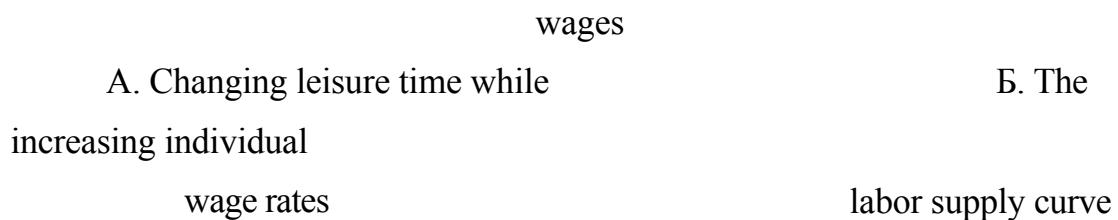
Graph 3-4A shows that when the hourly price of labor increased, the worker chose to keep his leisure time the same ($H_1=H_0$), i.e. his labor supply did not change. Therefore, in graph 3-4B the labor supply curve is a vertical line ($L_1=L_0$ when the price of labor increases from w_0 to w_1).

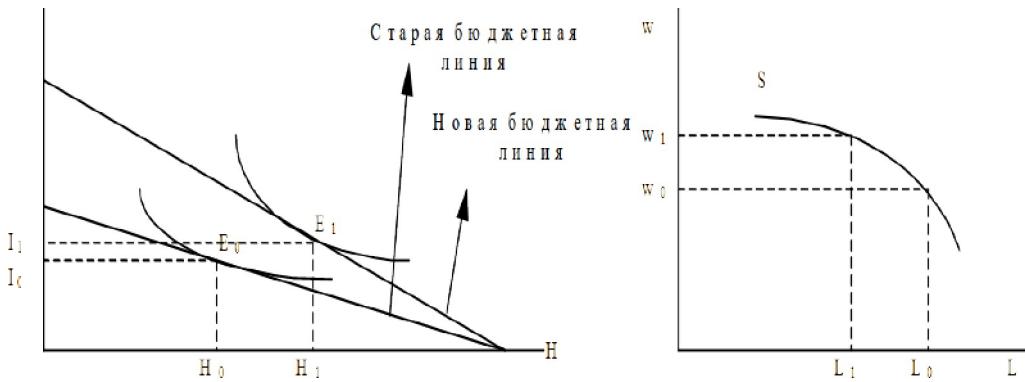
Graph 3-5A shows that, in response to an increase in the price of labor, the worker increased his leisure time ($H_1>H_0$), taking comfort in the fact that his income increased anyway (from I_0 to I_1). His labor supply therefore decreased, as reflected in the negative slope of the corresponding curve in Graph 3-5B.

Schedule 3-4. Possible employee reactions to rate increases



Schedule 3-5. Possible employee reactions to rate increases





Which of the three versions of the labor supply curve is more likely?

When a worker decides how many hours he should work when the price of labor increases, his decision is influenced by substitution and income effects (see Consumer Demand and Consumer Welfare).

As the wage rate rises, the opportunity cost of an hour of rest increases, so the substitution effect encourages the worker to substitute leisure for work, i.e., to increase the supply of labor. (The inner voice seems to say to the person, "How can you rest at such a high wage!")

The income effect operates in the opposite direction. This effect is due to the fact that the growth of wages makes the worker richer, which means that he or she tends to increase consumption of all goods, including leisure. (The same inner voice: "You won't make all the money, you've already become richer, think about leisure!")

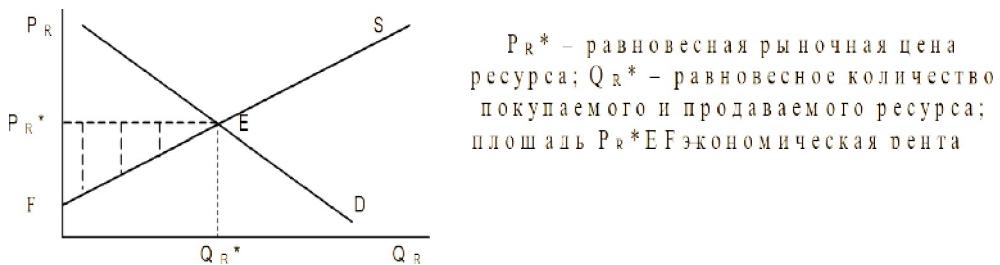
So, the two effects affect the labor supply in different directions. Which one will be stronger depends on the psychological characteristics of the individual. Usually at low wage rates, the substitution effect is stronger than the income effect; when the price of labor rises further, these effects balance each other out, and if wages rise even more, the income effect is already stronger. Thus, the individual labor supply curve first has a positive slope, then becomes vertical, and finally curves to the left.

Market The market offer is the sum of the individual offers of all workers of a given profession and qualification. It depends on the number of labor resources and people's willingness to sell their labor. The former is determined by demographic factors, and the latter by the availability of non-labor sources of income and the opportunity cost of labor.

4. Equilibrium in the resource market

In a perfectly competitive market, its price is determined by the interaction of market demand and market supply (Graph 4-1):

Figure 4-1. Resource market equilibrium and economic rents



The difference between the price of the resource and the minimum fee for which the owner of the resource would agree to sell it is called economic rent. In turn, this minimum payment is determined by the marginal cost of using the resource. For the worker, these costs are the marginal value of leisure.

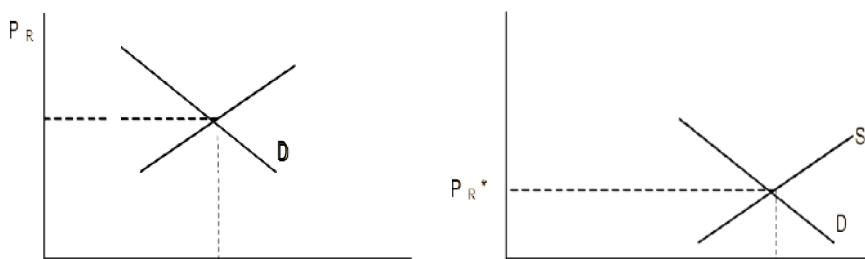
Suppose someone would be at most agree to work a certain amount of time for a wage of 10 rubles per hour, and the market price of an hour of labor is 15 rubles. Then the economic rent received by such an employee from the last hour of his labor is equal to 5 rubles. Thus, the economic rent is essentially the seller's gain when selling a given unit of resource.

Geometrically, the economic rent of all sellers in the resource market is defined exactly as the sum of producers' gains in the market of goods (see the topic "Demand and supply") and is equal to the area of the triangle PR^*EF .

The use of supply and demand curves helps explain the differences in the price of different categories of resources. For example, the demand curve for low-skilled labor runs below the demand curve for skilled workers, due to differences in their marginal products. On the other hand, the labor supply curve for low-skilled workers is also below the corresponding curve for high-skilled workers because the labor of the latter requires more training (Graphs 4-2):

Chart 4-2. Skilled and unskilled labor markets

A. Qualified B. Unqualified

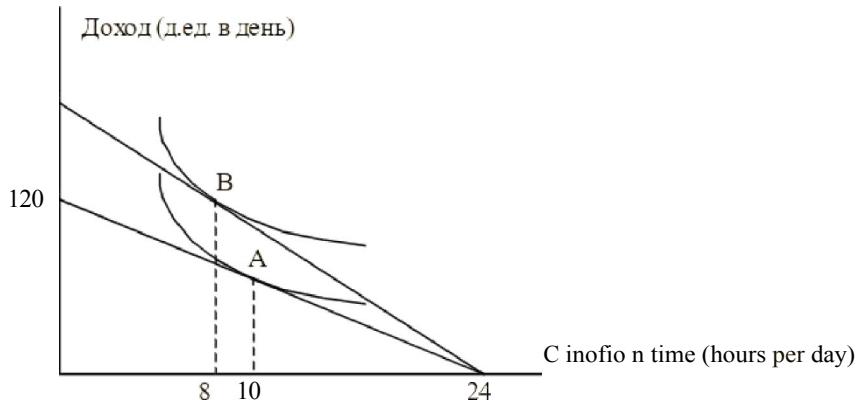


B as a result rates wages wages workers The wages of highly skilled workers are usually higher.

SELF-STUDY ASSIGNMENTS

1. The production function of a competitive firm: $Q=30L-L^2$, where L - number of employees. The firm sells products at a price of 5 d.u.
 - 1) Output the MRP function of the firm;
 - 2) If wages = 50 c.e., how many workers will the firm hire?
 - 3) If wages increase to 100 d.u.s., what will happen: a) to output; b) with the profit of the firm; c) with the number of people employed.

- 4) At what wage will the firm be forced to close?
2. All labor of a certain skill is used in a given industry. The labor supply function $L=10w$, where L is the number of workers and w - wages. There are 100 firms in the industry, each of which sells \$5 units of finished goods. The production functions of the firms are also the same and are: $q=4-(1-2)^2$, where 1 is the number of workers employed by one firm. How many workers and for what wage will each firm hire? What is the profit it will make? Illustrate the solution graphically.
3. It is often said that people will work harder and better if they get a pay raise. Explain why this may not be the case.
4. Using the apparatus of indifference curves and the budget line in the "income - free time" space (see graph), answer the questions:



- 1). What is the hourly wage in t. A?
- 2). How many hours per day will this worker work if the hourly wage is \$7?
- 3). Positive or negative slope has of the individual labor supply curve? How did you determine this?
- 4). What is the daily income of the employee in t. A, in t. B?

5. Let wages be your only source of income. Draw indifference curves between work and leisure and show your equilibrium point at a particular hourly wage. Suppose you received an inheritance that gives you some daily income without any work. Show how this would affect your choice between work and leisure. What happens to your individual labor supply curve?

6. The worker's welfare function $TU = H^2 * I$, where H is leisure time (in hours) and I is income (in dollars). How many hours per day will this person want to work, and what will his daily income be at a wage of 4 d.u.s. per hour?

7. The worker's welfare function $TU = H*I$, where H is leisure time (in hours) and I is income (in currency units). The worker can work any number of hours per day. He has a choice: to continue working without receiving a pension, or to retire, but lose the right to work. The pension is 12 d.u.s. per day. What would be the minimum hourly wage rate for a person to choose to continue working? Illustrate the solution graphically.

8. The worker's welfare function $TU = H*I$, where H is leisure time (in hours) and I is income (in currency units). The worker can work any number of hours per day. He has the choice of continuing to work without receiving a pension, or retiring but losing the right to work. The hourly wage rate is 4 c.e.f. How large would the daily pension have to be for the person to choose not to work anymore? Illustrate the solution graphically.

9. Worker's welfare function $TU = H*I$, where H is leisure time (in hours) and I is income (in currency units). An employee can work no more than 8

hours a day. He is faced with the choice of continuing to work without receiving a pension, or retiring but losing his right to work. The hourly wage rate is 4 d.u.s. How large would the daily pension have to be for the person to choose not to work anymore? Illustrate the solution graphically.

10. In this market, the labor demand function is $P=20-0.002L$ and the supply function is $P=11+0.001L$, where P is the price of labor and L is the number of workers. What is the economic rent of workers? Show it on the graph.

11. Using the conditions of the previous problem, calculate the number of unemployed in a given market if the state sets the minimum wage at 15 DUs.

TEMA 11. CAPITAL AND INTEREST

1. Capital and its formation. The equilibrium interest rate
2. Elements of Financial Mathematics
3. Market value of capital assets
4. Introduction to Investment Analysis

1. Capital and its formation. The equilibrium interest rate

Capital is a productive pecypc created by man. A distinction is made between physical and human capital. Physical capital - the means of production - belongs to firms and consists of fixed and working capital. Fixed capital is the production funds used repeatedly in the process of production: buildings and structures, machinery, equipment, vehicles, etc. Consumption of fixed capital is a decrease in its value due to physical and moral wear. Depreciation of fixed assets gradually transfers its value to finished products, which is reflected in the accounting as depreciation deductions.

Working capital is the production funds fully used during one production cycle: stocks of raw materials, semi-finished products, etc.

Human capital is useful knowledge and skills owned by people and used in production.

It is important to distinguish capital as productive pecypc (capital goods) from financial capital or money invested in business. Firms have a demand not only for capital goods, but above all for temporarily free cash that can be spent to acquire capital goods.

Financial capital arises when households do not spend all of their income on current consumption, but save some of it. These savings reach firms through financial markets and are used by them to increase capital goods, i.e., to invest.

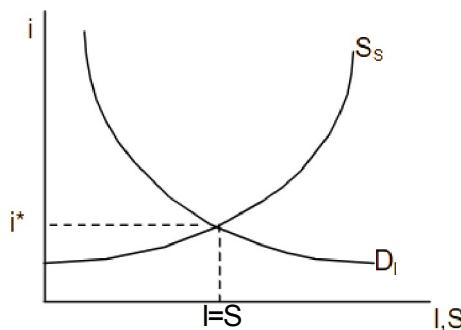
Using capital sourced from household savings, firms pay interest to savers, which is the price of capital.

Financial markets are assumed to be perfectly competitive. In other words, none of the individual savers or firms is able to influence the interest rate by changing the supply of their savings or their demand for them. The equilibrium market interest rate arises from the competition of all savers and investors.

The demand of firms for financial capital for investment depends on the interest rate: the lower the rate, the more investment. Savings behavior usually follows the opposite logic: the higher the interest rate, the greater the savings.

Let's combine in one figure (Fig. 11-1) the demand curve of firms for money for investment (D_I) and the supply curve of savings by households (S_S)

Figure 11-1. Equilibrium in the financial market



The point of intersection of these two curves gives us the equilibrium interest rate (i^*). At this rate, financial markets are in equilibrium, because investment equals savings ($i=S$).

An individual investor firm cannot influence the market interest rate, but accepts it as a given. Therefore, to determine the investments made by a given firm, substitute the market interest rate for the firm's investment demand function.

2. Elements of Financial Mathematics A.

Simple and Compound Interest

Let someone deposit 100 rubles in the bank today at 50% per annum. Obviously, after year¹ the account will be the amount of the deposit plus interest on it. The latter is calculated by multiplying the interest rate by the deposit amount ($100 \cdot 0.5$). Total we get:

$$100 + 0.5 \cdot 100 = 100(1 + 0.5) = 150$$

Let us solve the problem in general terms, denoting the initial amount of the deposit - K_0 , the interest rate - i and the amount in a year - K_i . Then we have:

$$K_i = K_0 + i K_0 = K_0(1 + i)$$

If, starting from the second year, the bank charges interest only on the amount initially invested, it is called simple interest. In this case, having invested 100 rubles at 50% per annum, in two years we get 200 rubles on the account. The calculation is as follows:

$$100 + 0.5 \cdot 100 + 0.5 \cdot 100 = 100(1 + 2 \cdot 0.5) = 200$$

Denoting the amount that will be in the account in two years, we obtain in general terms:

$K_2' K_0 + i K_0' K_0 (1 + 2i)$. Consequently, in a year we have on the account:

$$K_p' K_0 (1 + ni)$$

If, starting from the second year, the bank accrues interest on the entire amount accumulated earlier, this interest is called compound interest. Let's return to our conditional example with an investment of 100 rubles at 50% per annum. As already established, we have on the account in a year: $K_i = 100(1 + 0.5) = 150$. Next year the interest rate will be increased by 150 rubles. Hence, in two years the account will have:

$$K_2' 150(1 + 0.5) = 100(1 + 0.5)(1 + 0.5) = 100(1 + 0.5)^2 = 225$$

In general terms we get: $K_2 = K_0 (1 + i)^2$. Thus, in a year the amount in the account (K_p) will be:

¹ 'Year' here and below does not necessarily mean a calendar year, but any time period for which interest accrues.

$$K = K(1+i)^t$$

Let's complicate the model. Previously, it was assumed that the money is deposited into the account once. Now let's assume that someone deposits the same amount of money (K rubles) into the bank each year at $i\%$ per annum (compound interest is accrued).

As an example, suppose that you decide to save money for your vacation, for which on the first day of each month you deposit K rubles in the bank. The bank pays $i\%$ per month on deposits. The first deposit is made on September 1, the second

- October 1, etc., until July 1, when you don't invest anything else, but take the money out of your account and go on vacation. So let's do the math:

On the first of September K rubles were put on the account:

Date	The amount in the account
September 1	K

On October 1, this amount will become $K(1+i)$, but you add more K rubles, and the account will have $K(1+i)+K$ rubles in total:

Date	The amount in the account
September 1	K
October 1	$K(1+i)+K$

By the first of November, September money had been in the account for two months and turned into $K(1+i)^2$, October K rubles having been in the account for one month turned into $K(1+i)$, besides K rubles are deposited additionally. In total, therefore, you have on the account $K(1+i)^2 + K(1+i)+K$ oak...:

Date	The amount in the account
September 1	K
October 1	$K(1+i)+K$
November 1	$K(1+i)^2 + K(1+i)+K$

Let's skip December, January, etc. July 1 comes. By this time the September money has been in the account for 10 months and has turned into $K(1+i)^{10}$, respectively the money deposited on October 1 is $K(1+i)^9$. And so on.

The last time K rubles were invested was June 1, i.e., they turned into $K(1+i)$ rubles. So you close the account with $K(1+i)^0 + K(1+i) + \dots + K(1+i)$ rub:

Date	The amount in the account
September 1	K
October 1	$K(1+i) + K$
November 1	$K(1+i)^2 + K(1+i) + K$
July 1	$K(1+i)^0 + K(1+i) + \dots + K(1+i)$

The considered example is a special case. If a similar operation continues for years (time periods), then at the end of the term the amount in the account (K_n) will be:

$$K = K(1+i) + K(1+i)^2 + \dots + K(1+i)^n$$

This is a geometric progression, the sum of its terms (S_n) is calculated according to the formula:

$$S_n = b \frac{1 - q^n}{1 - q}$$

where b is the first term of the progression [in our example: $K(1+i)$], q is the denominator (common multiplier) of the progression (in our case: $1+i$), and n is the number of members of the progression.

Consequently, in our case:

$$S_n = K(1+i) \frac{1 - (1+i)^n}{1 - (1+i)}$$

All these calculations are called finding the future value (FV). Consequently: $K_n'FV_u$.

B. Discounting

Discounting is the calculation of the original amount of money based on its final value. Thus, discounting is the inverse of finding future value.

For example, if someone wants to have on his account 150 rubles in a year at an interest rate of 50% per annum, then today he should invest 100 rubles in the bank. The calculation is simple:

$$\frac{150}{1+i} = 100$$

In general, the question sounds like this: How much money (K) should be put into the account today so that in a year there will be K_i rubles, if the interest rate is $i\%$ per annum? Answer:

$$\frac{K}{1+i}$$

Let's put the question in the most general form: how much money should be put in the bank today, so that in n years the account will have K rubles? Now the answer will depend on what kind of interest the bank charges: simple or compound interest.

If the percentage is simple, then: $\frac{K}{I} = \frac{1}{1+i}$

If the interest is compounded, then: " $\frac{1}{(1+i)^n}$ "

By discounting, we can determine how much money today is equivalent to some amount that will be received in the future (FV). In this way we can calculate the present value of future cash receipts (PV).

The most important tenet of financial analysis is that money has different temporal value: 100 rubles today is preferable to 100 rubles, which will be received later. This is because today's money can already be used in some way by the individual, increasing his welfare. The easiest way is to put the money in the bank, and

TOGDZ IH CMMC BO3]3ZGTeT.

Let the bank pay 20% per annum on the deposit. Consequently, 100 rubles today will turn into 120 rubles a year later. If such conditions suit the individual, and he invests the money, it means that he is ready to give up

from 100 rubles today to 120 rubles a year from now. In other words, 120 rubles received a year later is at least equal to 100 rubles today. In this case the result is obtained by discounting 120 rubles by

interest rate: $\frac{*}{1+i}$

In general terms, denoting the amount received in one year - FVi, we get its present value:

$$\frac{1}{1+i}$$

Thus, when compound interest is charged, the present value of money to be received in n years (FVn) is calculated

according to the formula: $\frac{F}{(1+i)^n}$

Let's complicate the model. Suppose you decide to rent an apartment for five years. According to the contract, at the end of each year the tenant will pay you \$3,000. How much money will you get for the entire tenancy? The answer is that \$15,000 is not factually correct, because you should remember that money that is spread over time does not have the same value. In particular, \$3,000 due to you in a year is not at all equal to the same amount you receive in 5 years. Therefore, only money that came or went at roughly the same time can be simply added up or subtracted.

In your case, all future income must first be brought back to today by discounting it at the bank interest rate and then adding it up. The result is the present value of all future income:

$$Pf = \frac{3000}{1+i} + \frac{3000}{(1+i)^2} + \frac{3000}{(1+i)^3} + \frac{3000}{(1+i)^4} + \frac{3000}{(1+i)^5}$$

Thus, if someone receives some amount of money (FV) annually for n years, the present value of the entire amount of future income will be:

$$PV = \frac{FV_1}{1+i} + \frac{FV_2}{(1+i)^2} + \dots + \frac{FV_n}{(1+i)^n}$$

If income, received by each year is constant (FV), we have a geometric progression with denominator $1/(1+i)$:

$$PV = \frac{FV}{1+i} + \frac{FV}{(1+i)^2} + \dots + \frac{FV}{(1+i)^n}$$

Hence:

$$PV = \frac{1}{1 - \frac{1}{(1+i)^n}}$$

If the number of years is infinitely large ($n \rightarrow \infty$), the formula is simplified:

$$PV = \frac{FV}{i}$$

On the basis of discounting you can solve the problem of repayment of loans. Let someone take a loan at a compound annual interest rate of $i\%$. The repayment in the j -th year is FV . Discounting this repayment by the interest rate, we find its present value:

At the moment when the sum of all discounted payments becomes equal to the original debt, the latter is considered to be repaid.

As an example, suppose a loan of 100 rubles for 2 years at 100% ($i=1$) per annum. In the first year, the borrower paid the lender 100 rubles. As a result, only 50 rubles of the loan is repaid, because:

$$\frac{100}{1+1} = 50$$

In the second year another 200 rubles were paid. Discounting this amount, we find:

$$\frac{200}{1+1} = 100$$

Thus, the amount of discounted payments for two years was the value of the loan - 100 rubles ($50 + 50 = 100$). The debt is repaid.

3. Market value of capital assets

A capital asset is an income-producing asset. Capital assets include manufacturing equipment, a store, rental housing, land, securities, etc. Essentially, by buying a capital asset, people are actually buying future income. Therefore, the present value of such an asset will be equal to the present value of those revenues, determined by discounting.

Consequently, the market value of a capital asset (P) depends on OT:

- the value of future income (FV);
- of time before the receipt of income (n);
- market interest rate (i);
- risk of non-receipt of income.¹

Suppose the capital asset is a government bond.

will bring income (120 rubles) once in a year. The market interest rate is 20% per annum. What price would buyers be willing to pay for such a bond today?

For answer to this . let's consider, that
 buyers there is an alternative: to invest money in a bank at 20% per annum or in a bond. Therefore, it is not profitable for them to buy a bond for more than 100 rubles. It makes no sense, for example, to pay 105 rubles to get back 120 rubles in a year, because investing the same 105 rubles in the bank you can get 126 rubles in a year. Naturally, no buyer would refuse to buy a bond for less than 100 rubles. Buying, for example, for 90 rubles is a good deal in their eyes: we pay 90 rubles today and get 120 rubles a year later; if you put those 90 rubles in the bank, you won't get more than 108 rubles. To the purchasers' dismay, that would be unlikely to happen. Even if some of the present owners of the bonds will agree to cede them for next to nothing on a competitive market. market

¹ The risk factor is not considered here for the sake of simplification.

so many people will be willing to buy the bonds that their price will automatically increase. Eventually, the price of this bond will fluctuate around 100 rubles:

$$P = PL \cdot \frac{1 + U}{1 + i}$$

At this price buyers becomes it doesn't matter, whether to invest in a bank or in a bond.

In general, the today's market price of a capital asset that will yield a return once in one year is determined by the formula:

—

This is the amount that an investor would agree to pay today for this asset.

Accordingly, If asset will bring income (F_n) for the first and only once in n years, the price of the asset today would be:

$$\frac{FV_n}{(1+i)^n}$$

If an asset generates income every year for n years

, the formula takes the form:

$$P = \frac{FV_1}{1+i} + \frac{FV_2}{(1+i)^2} + \dots + \frac{FV_n}{(1+i)^n}$$

If income, received by each year is constant ($FVi=FV - F_n$), and the number of years is infinitely large, the formula is simplified:

4. Introduction to Investment Analysis

A firm is planning an investment project, and it needs to determine its effectiveness.

There are two basic criteria assessment the effectiveness of an investment project:

- internal rate of return;

- net present value.

These criteria usually do not contradict each other; their use leads to the same results.

A. Internal rate of return

At the beginning of this period the firm intends to invest PV rubles.

In a year you plan to get income (profit) FVi rubles. Then: $P = \frac{FVi}{r}$,

where r - internal rate of return

It shows how much interest income (in fractions) a firm earns on its initial investment. The internal rate of return should not be confused with the bank interest rate (i).

If the income will be received for the first time and for the last time only in n years (FV.), the formula is used:

If the income will be received every year for n years, the formula takes the form:

$$\frac{FV_1}{1+r} + \frac{FV_2}{(1+r)^2} + \dots + \frac{FV_n}{(1+r)^n}$$

If the income received each year is constant (FV) and the number of years is infinitely large, the formula is simplified:

Having calculated the internal rate of return using these formulas, the firm compares it to the bank interest rate (i). If $r > i$, it is more profitable to invest the money in the project than in the bank, i.e., the project is profitable. And vice versa.

B. Net present value

Some investment project is carried out over a number of years, and each year it requires some costs and brings some income. First, we calculate the profit of each year (P) by the formula:

$q' B_j C_j q' F_d e B_j$ is the income of year j, and C_j Costs of year j.

Then the profits obtained for all years are adjusted to the present time by discounting at the bank interest rate. The result is the net present value (NPV).

The net present value is the sum of the profits earned in all the years of the project and reduced to the present time. Accordingly, it is calculated according to the formula:

$$PV = \Pi_0 + \frac{\Pi_1}{1+i} + \frac{\Pi_2}{(1+i)^2} + \dots + \frac{\Pi_n}{(1+i)^n}$$

denotes the profit received in the zero period - at the very start of the project.

If profits for all but zero years are the same (P), and the number of years is infinitely large, the formula is simplified:

The problem is that in the zero (initial) period there are usually no revenues, and the costs are high; accordingly, the profit is negative and the firm makes a loss. If we are talking about a project with a long period of capital construction, negative profits will occur over a number of years. This means that the net present value of the project is not necessarily positive: the original discounted losses may be higher than the subsequent discounted profits.

If the net present value is positive ($NPV > 0$), it is more profitable to invest in the project than in the bank, i.e. the project is profitable. And vice versa.

As a rule, the use of both criteria leads to the same results: if an investment project is profitable according to the internal rate of return criterion, it will also be profitable according to the net present value criterion. The opposite is also true.

Here is the simplest example. Suppose that at the start of the project you need to invest 100 rubles. The term of the project is 1 year. Upon expiry

of the year there will be a profit of 120 rubles, and the bank pays 50% on deposits ГОДОВЫХ.

Let's calculate the internal rate of return:

$$= \frac{120}{1+r} \rightarrow r = 0,2$$

Thus, the internal rate of return was 20% per annum, i.e. it was less than 50%, which the bank pays to depositors. According to the criterion of internal rate of return the project is unprofitable.

Let's calculate the net present value:

$$NPV = -100 + \frac{120}{1+r} = -20$$

The internal rate of return was negative. So the project is not profitable according to this criterion either.

The net present value criterion is used when the market interest rate is determined, which assumes developed financial markets. If this is not the case, an internal rate of return is calculated for different projects and preference is given to the one with the higher rate of return.

SELF-STUDY ASSIGNMENTS

1. The firm's demand for investment is given by the function: $i=0.5-0.01*I$, where I is the amount of investment and i is the market interest rate (in decimals). Answer the questions: 1) At what market interest rate will the firm's demand for investment be zero? 2) What would be the value of the demand for investment at an interest rate of 10%?

2. The market demand function for investments: $i=0.5-0.0001*I$, and the supply function of borrowed funds for investments: $i=0.00015*I$, where I is the investment amount and i is the market interest rate (in decimals). What will be equal to: a) the total investment; b) the market interest rate; c) the investment of an individual firm if its investment demand function is given in the previous problem?

Illustrate the solution with graphs.

3. In his memoirs, Chaplin tells the following story (reproduced from memory). The president of the film company offered him a new contract on the following conditions: the first year - \$1,000 a week, the second year - \$2,000 a week, the third year - \$3,000 a week. "I agree," Chaplin replied, "but only if my salary is paid in a different order: first year \$3,000 a week, second year \$2,000 a week, third year \$1,000 a week. "But that's wild!" the president exclaimed. The contract was not made.

Explain the differences in the financial positions of Chaplin and the president. Why did Chaplin's demand seem excessive to the president?

4. The bank lent the firm 100 denomination units for two years at 50% per annum (compound interest). In the first year, the firm repaid 50 cents. What should be the amount paid in the last year for the debt to be repaid? Justify the answer.

5. This project has an initial investment of 1,000 cfu. The project is perpetual, and during each year it will require an additional cost of 150 cfu and generate an income of 240 cfu. Calculate the net present value of the project if the market interest rate is constant at 10% per annum. Does it make sense to invest in this project?

6. What is the internal rate of return? Determine the internal rate of return on a 20,000 cfu investment that yields 25,000 cfu in one year. What would be the internal rate of return if the investment did not yield anything in the first year, but yielded 30,000 cents after two years?

7. Suppose the interest rate is 10% per annum. What is the maximum amount you would pay for a bond that yields 100 denominations of annual income over 5 years (at the end of each year), and at the end of the fifth year is also redeemable at par, 1000 denominations? Write the formula for the calculation using specific figures. Repeat the calculation for the case where the interest rate is 20%. What does this tell you?

8. Suppose a piece of land is sold for 50,000 cen. By renting out the land, you will receive 4,000 cents a year for an unlimited period of time. Would you buy the land if the bank interest rate on deposits were 10% per annum? Justify your answer.

9. The store offers customers to buy a discount card that entitles its holder to a 2% discount on the purchase of goods. The cost of the card is 200 rubles. You need to decide whether to buy such a card based on the methods of investment analysis. What additional information do you need? Would you buy the card in the end? Justify your answer.

10. A family plans to buy 1000 rubles' worth of groceries at the store each month for a year. Using the conditions of the previous problem, explain whether this family will purchase a discount store card if they are unwilling to invest in projects with an internal rate of return of less than 10% per month.

11. The firm is about to make a purchase. Two vendors offer their services, but the first has to transfer 4,000 currency units at once, and the second asks to pay 2,000 currency units now and 2,180 currency units in a year. Which option

shopping more advantageous for firm, if bank interest is 15% per annum? Justify your answer.

12. The bank interest rate is 1.5% per month. The firm's account in a given year received amounts:

1.03	1.07	1.11
400	600	800

Calculate net present value value of the project, if 1.01 the firm has invested 1,000 CU.

13. The management of the company is offered to buy a plant with a capacity of 100 products per year. The cost of the plant is 10,000 currency units. The plant will operate for 10 years. The sale of each product will bring the firm 20 denominations of profit. Is it worth buying the plant if the bank interest rate is 20% per annum?

CLASS IN A COMPUTER CLASS FINANCIAL CALCULATIONS

Assignments:

- Let \$1,000 be deposited annually in a bank account at the interest rate of 9% per annum. C using function "BS" (FV).

Calculate how much will be in the account in 20 years. How will the accumulated amount change if the interest rate is 5%, 10%, 15%?

2. A family wants to purchase a car loan, paying \$1,000 annually for 10 years at an interest rate of 9% per annum. Use the "PV" function to calculate the present value of the car. How would that amount change if the interest rate were 5%, 10%, 15%?

3. A family wants to buy a house and borrows \$100,000 from a bank for 25 years at 12% interest. Use the "PLT" function (PMT) function, calculate the amount of the annual payments. How will that amount change if the interest rate is 5%, 10%, 15%?

4. Using the conditions of the previous problem, calculate using the "KPER" function (NPER) how many years it will take you to repay your debt if your annual payments are \$20000, \$10000, \$5000.

5. There is evidence of a World Bank irrigation project:

Years	1	2	3	4	5	6	7	8	9	10-30
Revenue						1,67	3,34	5,00	6,68	8,38
s										everyon e

Consu	1,09	4,83	5,68	4,50	1,99	0,67	0,97	1,30	1,62	1,95
mption										everyon e

Assuming that the discount rate is 10%, calculate the net present value of the project. To do this, use the NPV function. Construct a graph showing the dependence of NPV on the interest rate.

Use the IRR function to calculate the internal rate of return for this project. Construct a table of internal rate of return on its expected value (1%, 2%, ..., 30%) in order to make sure that the project has a single value of internal

standards returns. Construct a graph, depicting the relationship NPV to the interest rate.

6. There are data about the investment project:

Years	1	2	3	4	5	6	7	8	9
Investments	700							400	1200
Revenues	500	600	700	800	800	800	800	400	
Expenses	250	300	350	400	400	400	800	400	

Using the IRR function, calculate the internal rate of return for this project. Draw a table of the dependence of the internal rate of return on its expected value (1%, 2%, ..., 30%). Make conclusions. Construct a graph showing the dependence of NPV on the interest rate.

TEMA 12. EXTERNALITIES AND PUBLIC GOODS

1. The concept of external effects
2. Externalities and inefficient resource allocation
3. Internalization of external effects
4. Private and public goods
5. The supply of public goods. Public Choice

1. The concept of external effects

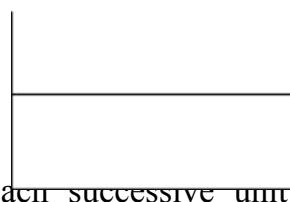
Externalities are the costs (benefits) of market transactions that are not reflected in commodity prices. Let's start with costs.

So far we have considered **private** costs (TPC or simply TC), i.e. the costs of producers of a given good. There are, however, and **external** costs (TEC) - costs third parties, caused by the production or consumption of that good. For example, if an enterprise pollutes the environment, the residents of nearby cities suffer from it. The **social cost** (TSC) is the sum of the costs of producers and third parties due to the production and consumption of the good: $TSC = TPC + TEC$. Thus, **marginal private** costs (MPC), marginal **external** costs (MEC) and **marginal social** costs (MSC) are the increase, respectively, in private, external and social costs at increase in output by one unit:

$$\Delta TPC \quad \Delta TEC \quad \Delta TSC = \dots +$$

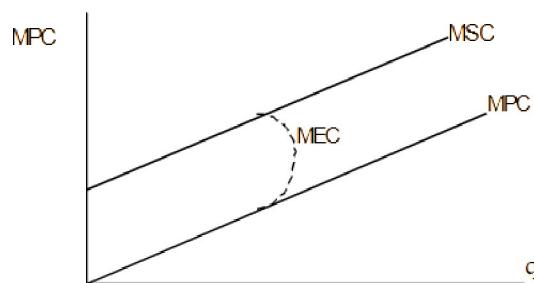
Assume that marginal external costs are constant, i.e., do not depend on output (graph 1-1):

Graph 1-1. Constancy of marginal external costs MEC



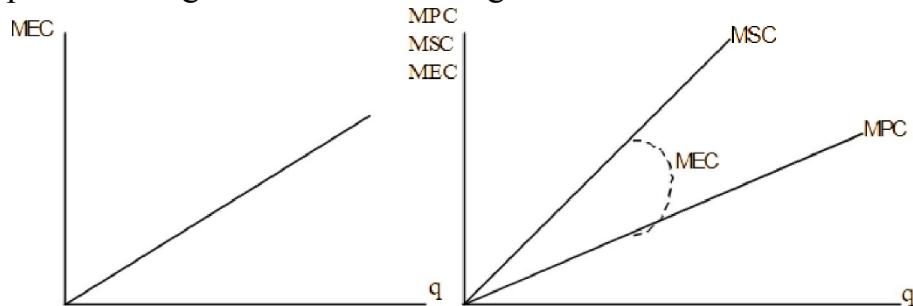
This means that each successive unit of production causes the same additional damage to third parties as the previous one. In this case, the marginal social cost curve is directed upwards (as the marginal private cost increases) parallel to the marginal private cost curve (graph 1-2):

Graph 1-2. Marginal social costs



In fact, the marginal external costs tend to increase. For example, each successive ton of toxins released into the atmosphere causes more and more additional damage. This is reflected accordingly in the dynamics of marginal social costs (graph i-Z):

Graphs 1-3. Marginal external and marginal social costs



Hereafter, however, for simplicity we will assume a constant marginal external cost.

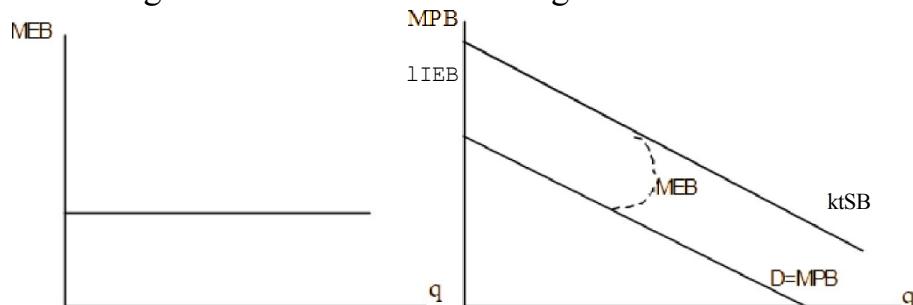
Now for the external benefits. **Private benefit** (TPB) is the utility received by the direct consumers of the good. **External benefit** (TEB) is the utility received by third parties in connection with a given market transaction. For example, if someone improves a public area at their own expense, the well-being of all residents increases. **Social benefit** (TSB) is the utility received by the buyers of the good and all third parties: $TSB = TPB + TEB$.

Thus, the **marginal private benefit** (MPB), marginal **external** benefit (MEB), and **marginal social benefit** (MSB) are, respectively, the increase in private, external, and social benefit with one unit increase in production and consumption of a good:

$$\Delta TPB = \Delta MPB - \Delta MEB = \Delta TEB = \Delta MSB = \Delta kSB$$

The marginal private benefit is reflected by the market demand curve for the good. It decreases as the consumption of the good increases. The marginal external benefit is assumed constant. In this case the marginal social benefit curve is decreasing and runs parallel to the market demand curve (graph 1-4):

Graph 1-4. Marginal external benefit and marginal social benefit

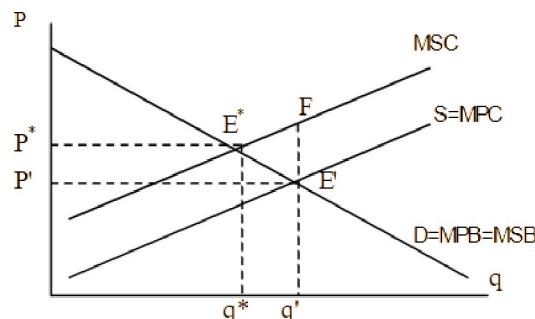


2. Externalities and inefficient resource allocation

As noted (topic "Monopoly," paragraph 3), the efficient allocation of resources is carried out when the prices of goods are equal to marginal costs ($P=MC$). However, the market does not account for marginal external costs because producers do not pay for a number of the resources they consume. For example, a chemical plant dumping waste into a lake actually uses water for free, worsening the situation of vacationers, fish-farmers, etc.

Thus, when negative externalities exist, the marginal private costs are lower than the social costs. In other words, producers make output decisions based on underestimated costs (Graph 2-1):

Frafigure 2-1. External costs and public welfare losses



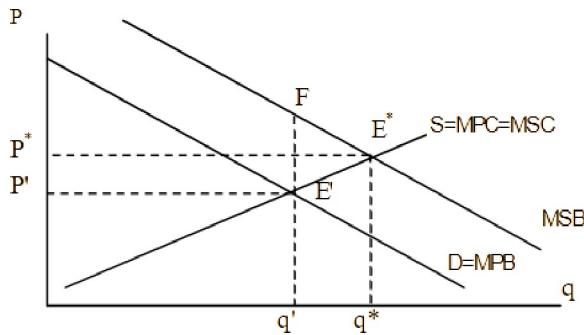
The socially efficient output (q^*) corresponds to the intersection of the marginal social benefit (MSB) and marginal social cost (MSC) curves. In this case the equilibrium price should be P^* . But since the marginal external costs are not paid and not accounted for by the market, actual production is determined by the point of intersection of the curves of marginal private benefit' (MPB) and marginal private cost (MPC). So the actual output (q') will be greater than the efficient output, and the price

- lower (P'). In other words, the industry is using too many production resources compared to their optimum. The area of triangle E^*FE' constitutes the public deadweight losses arising from non-payment of marginal external costs.

Efficient allocation of resources is not achieved with positive externalities either. In this case, the market does not account for marginal externalities. For example, if there is a field of buckwheat near an apiary, the beekeeper's profit increases, but this fact is not reflected in the income of buckwheat producers. Consequently, the marginal private benefits from the production of goods with positive externalities are lower than the social benefits (Graph 2-2):

Figure 2-2. External gains and losses of public welfare

¹ In this case, the absence of external benefits is assumed, hence the equality of marginal social and marginal private benefits, reflected



Here, as in the previous case, the socially efficient output corresponds to the intersection point of the curves $MS\ C^2$ and MSB and is q^* at price P' . The actual production (q') is lower, because it is determined by the intersection point of curves MPC and MPB . The latter means that the industry is underutilizing resources by producing too little. The area of triangle $E'FE'$ is the public deadweight loss arising from the market's failure to pay for marginal external benefits.

3. Internalization of external effects

The essence of the problem of externalities is the inefficient allocation of resources in the economy due to the divergence of private and social costs or private and social benefits. As a result, in

ONE FATHER is producing too much, and ONE FATHER is producing too much, and ONE FATHER is producing too much.

of production compared to the socially efficient output.

The solution to this problem lies in the internalization of external effects, i.e., in their transformation into internal effects. This means making producers of negative effects pay for external costs arising through their fault and thus compensating third parties for the damage they receive. It also means paying for external benefits - compensating producers of positive effects at the expense of their recipients.

How to solve the problem of externalities in practice? In some cases it can be done on the basis of purely market relations without state intervention. The following ways are known:

1. Externalities arise from the lack of ownership of the property. As a result, the use of such a property finds no relation in market transactions. It is possible, therefore, to internalize externalities by establishing private property rights over resources and allowing those rights to be freely traded. This is what Coase's famous theorem states. It says: "When property rights are clearly defined and transaction costs¹ are close to zero, private and social costs will be the same regardless of the distribution of property rights among economic agents."

² Here we assume the absence of external costs, hence the equality of marginal social and marginal private costs reflected by the commodity supply curve.

¹ Transaction costs are the costs of carrying out market transactions, including negotiations, etc. (The Theory of Production, p.1).

Suppose there is a nice pond at the junction of two suburban plots. You prefer to use it for bathing, and your neighbor prefers to raise ducks. Let the pond belong to you. You'll only let your neighbor use it if he compensates you for the damage. Ultimately, the water will be used by whoever has the most value for it: either the neighbor as a farmer or you as a recreationist. This means that the water is being used optimally. In terms of socially efficient use of the water, nothing will change if the pond originally belongs to the neighbor. Then you already have to offer him compensation for the right to bathe in clean water. If you value the water as a recreational pecypc higher than your neighbor values it as a farming pecypc, then it is yours. And vice versa.

In practice, however, this ideal is not always achievable. Very often it is impossible to establish private property rights (how to determine, for example, who owns clean air or the Volga River?). It also happens that the right of ownership is determinable, but it is difficult to use it. Suppose you - the owner of a large body of water, on the banks of which neighborhood residents like to relax, thereby receiving a positive external effect. It is likely that they would not mind paying for it, but who exactly should you negotiate with, how to provide protection from

"stowaways"? Theoretically such issues can be solved, but in practice the costs involved may exceed the benefits. It is therefore impossible to eliminate the external effect.

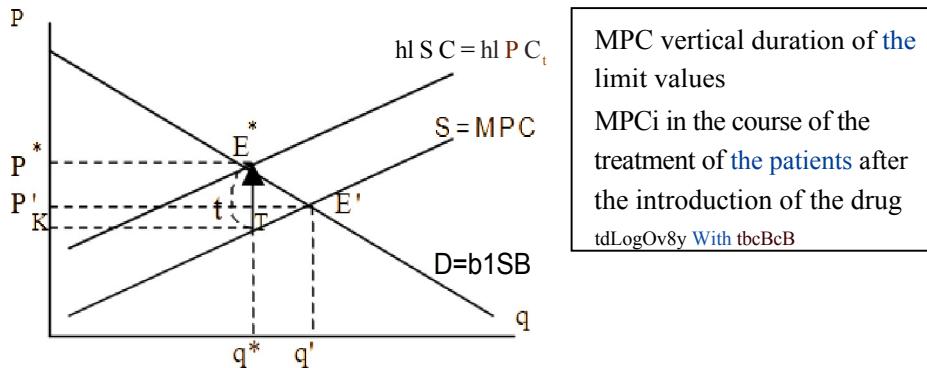
2. Another way of eliminating externalities is to combine producers and recipients of externalities into a single entity. In this case, external costs (benefits) automatically become internal. Let us imagine that the inhabitants of a coastal village themselves organize a cattle farm. They, therefore, benefit as meat sellers, but suffer losses due to the fact that the attractiveness of the reservoir for recreation is reduced. However, in this case, as stewards, the villagers will limit meat production to the level at which the positive difference between the corresponding benefits and losses will be maximum. This means a socially efficient use of resources.

3. Very often the problem of external effects is solved on the basis of social customs - moral norms, traditions, etc. A well-mannered person, for example, simply will not allow himself to walk his dog on the playground or throw cigarette butts from the balcony, etc.

When externalities exist steadily in the economy, the government must be involved in solving the problem. There are the following ways in which the government can influence externalities:

1. Introduction of corrective taxes and subsidies. **An adjustment tax** (Pigou tax) is a tax that increases marginal private costs to the level of marginal social costs (Graph 3-1).

Chart 3-1. Corrective tax and its consequences



Suppose that some production involves the emission of harmful substances into the atmosphere. In this case, each unit of output is accompanied by damage to the environment in the amount of t currency units (marginal external costs). The state levies a Pigou commodity tax on the corresponding enterprises for this amount. As a result, the private marginal cost curve (MPC) moves up by the amount of the tax and now coincides with the social marginal cost curve ($MSC=MPC_t$). External costs thus become internal to enterprises, and production falls to the socially efficient level (q^*).

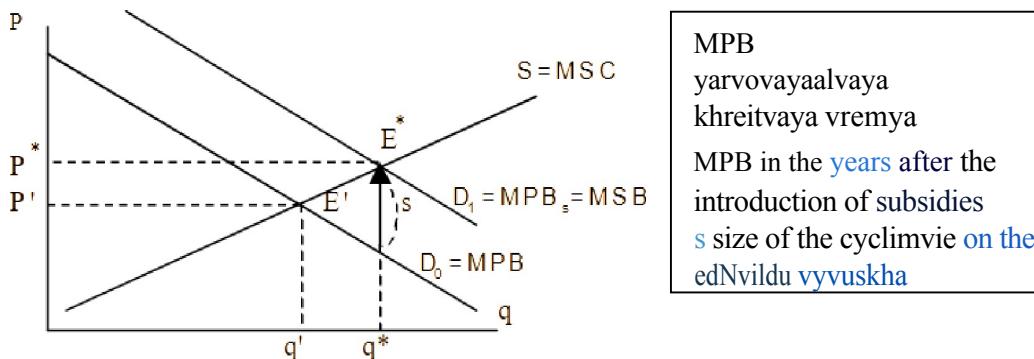
It is important to understand that the Pigou tax does not completely eliminate harmful emissions (after its introduction, the total damage from emissions equal to the amount of the tax fee is the area $P'E^*TK$), but it reduces them and makes them compensate for the damage.

The difference between a Pigou tax and a regular tax is that the latter reduces output relative to socially efficient output and leads to deadweight losses (Demand and Supply, para. 5). The Pigou tax, by contrast, eliminates these losses.

A corrective subsidy is a payment to producers or consumers of a good whose consumption creates a positive external effect.

It is recognized, for example, that students benefit not only themselves, but also those around them - creating positive externalities for them. That is why the state pays scholarships to students from public funds. As a result, the demand curve for education shifts upward by the value of the marginal external benefit (subsidies per unit of output) and coincides with the marginal social benefit curve (graph 3-2):

Chart 3-2. Corrective subsidy and its effects

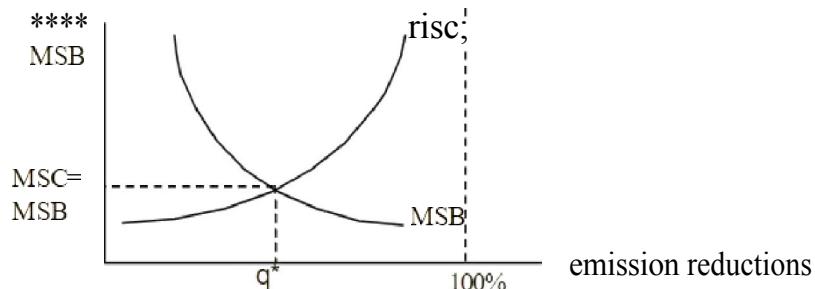


The increase in demand under the influence of the corrective subsidy leads to an increase in production to the socially efficient level (q^*). At the same time, the price of goods increases from P' to P .

Corrective taxes and subsidies are easy to introduce in theory, but extremely difficult in practice. The main problem is to estimate the real value of the external effect, especially in the long run.

2. The state corrects externalities also through administrative regulation. This is done, for example, in the establishment of maximum permissible norms of harmful emissions into the environment. Here it is important to estimate the socially effective level of emission reduction (Graph 3-3):

Figure 3-3. Socially Effective Reduction of Harmful Emissions



On the x-axis we plot the percentage of emission reductions, which can vary from zero to 100%. It is clear that cleaning up the environment, on the one hand, increases public welfare, and on the other hand

- requires a cost. Therefore, we plot the marginal social cost of cleanup (MSC) and the marginal social benefit of cleanup (msv) along the y-axis.

The MSB curve is decreasing, because for a small percentage reduction in emissions (correspondingly very high pollution), the societal benefit of a 1% reduction in emissions is high. On the contrary, if a significant emission reduction is achieved, an additional one percent reduction seems to be less important for society.

The opposite is true for the MSC curve. In the beginning, the cost for each successive percentage reduction is very small: it is enough to install the most primitive treatment facilities. However, the more emissions are reduced, the more it costs for each additional percentage reduction. That is why the MSC curve is directed from the bottom to the top.

The point of intersection of the MSB and MSC curves gives us the socially effective percentage of emission reduction (q^*). Further reductions are not justified, because each additional percentage will cost society more than the benefits it receives.

Suppose that the authorities have set a limit on emissions, beyond which it is forbidden to exceed under threat of severe sanctions. The problem, however, is that until this critical level is reached, firms can pollute the environment for free. Another

The problem is that the standard norms do not take into account the objective differences in cleaning costs between firms.

In this regard, the control of pollution by means of uniform norms can lead to the loss of public efficiency. It is more justified to establish flexible norms, taking into account the peculiarities of different enterprises, but such norms are difficult to calculate. Sometimes the authorities prohibit harmful emissions altogether (e.g. smoking in public places), being unable to assess their long-term consequences with any certainty.

3. Another means of state regulation of externalities used in Western countries is the creation of markets for pollution rights. The optimal level of emission reductions is calculated and an appropriate number of pollution licenses are issued. These licenses are then auctioned off. Firms for which the price of the licenses proves too high, put in treatment plants or reduce production. "Greens" can also participate in auctions, buying back the licenses and destroying them.

This method of regulation is considered to be the most effective. But again everything rests on the problem of determining the socially optimal level of environmental pollution.

4. Private and public goods

All goods are divided into private and public goods, depending on the specifics of their consumption. The consumption of a private good by one person makes it impossible for others who have not paid for it to consume it. This property of a private good is called high excludability from consumption.

On the contrary, the pure public good has two properties:

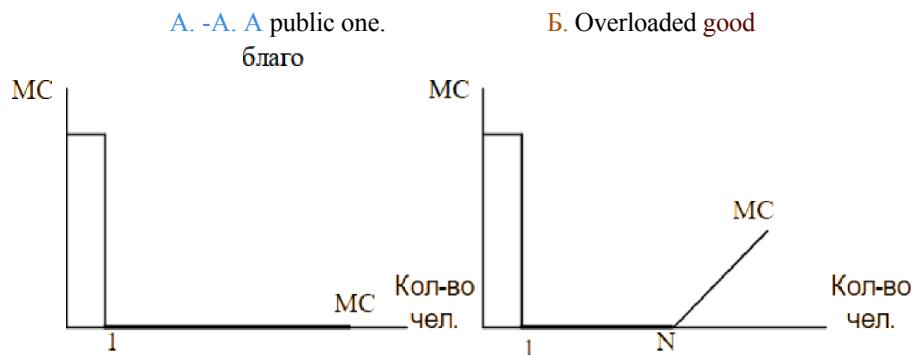
- The consumption of such a good by one person does not reduce its usefulness for another person (the property of nonselectivity in consumption). This means that the marginal cost of obtaining this good by one more person is zero. For example, if one more inhabitant comes to a city protected by an air defense system, the cost of defense does not change;

- It is impossible to prevent the consumption of a good by a person who has not paid for it (the property of non-excludability from consumption). For example, the same EIA system cannot protect a bona fide taxpayer without protecting a homeless person who never paid any taxes in his life.

In fact, not every public good has all the characteristics of a pure public good. One example is cable television. It is characterized by a high degree of indiscriminability in consumption, because adding another viewer does not diminish the usefulness of the program for everyone else. But it is inherently exempt from consumption: one cannot watch programs without paying for them.

An overloaded public good is a good whose marginal cost of providing it to one more consumer, starting from some number of consumers, is not equal to zero (Graph 4-1):

Chart 4-1. Net public good and overloaded good



Take educational services as an example. If at least one person listens to the lectures, we have to bear the cost of paying for teachers, renting space, etc. However, the appearance in the audience of the second, third, etc. listener does not increase these costs, i.e. the marginal cost of education of additional listeners is zero. This will continue until the auditorium is full. After that, the arrival of the Nth student will require expanding the classroom, paying for new teachers, etc. Consequently, the marginal cost of educating this additional person is no longer zero. Thus, education is an overloaded public good.

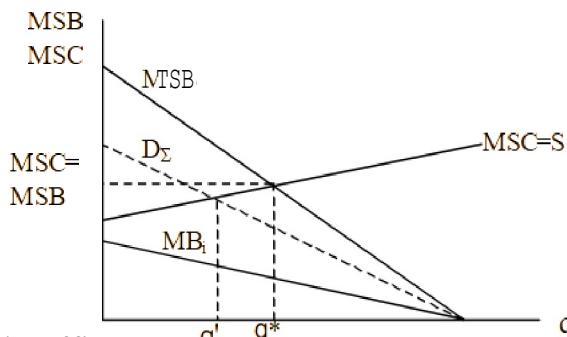
The production of a pure public good generates a positive external effect. If someone pays for such a good, not only he benefits, but everyone else benefits as well. Hence the **freerider** (hare) problem. The freerider tries to underestimate the usefulness of public good for himself, accordingly he tries to pay for it less. He expects others to pay, and to use the public good equally with everybody else. As a result, the level of production of public goods in the absence of state intervention is usually less than effective.

Let us show this. The distinguishing characteristic of a public good is that the individual consumer cannot arbitrarily change its quantity, but is forced to consume it in its entirety with everyone else. Thus, all residents of a city have the same number of garbage trucks. Therefore the marginal social benefit of using a given amount of a public good is determined by adding up the marginal private benefits of all consumers: $MSB = MB_1 + MB_2 + \dots + MB_n$.

In the graph, the marginal social benefit (MSB) curve is obtained by vertical summing the marginal private benefit curves' (MB_i) (Graph 4-2):

' This is not the case for the private good. The market demand curve for it is obtained by summing not vertically, but horizontally

Graph 4-2. Total demand for the public good and its effective output



The socially efficient output of a good (q^*) is always determined by the intersection of the curves of marginal social benefit and marginal social cost.

Suppose that the acquisition of a public good is financed by voluntary contributions. Freeriders, as noted, try to contribute smaller amounts compared to their private benefit of owning the public good. As a result, the public demand curve for the good (D_Σ) will pass below the MSB curve, and hence the actual output of the good (q') will be less than the effective one.

In this regard, the function of customer and distributor of many public goods on behalf of society as a whole is assumed by the state. Without the state, we would have no tanks, no airplanes, no missiles. Instead, everyone would be defending his own apartment with a submachine gun (a private good)! This does not mean, however, that the state performs its functions perfectly in all cases.

5. The supply of public goods. Public Choice

The supply of public goods is carried out through political institutions. In a democratic system, voters decide by majority vote how many units of a particular public good to have.

Suppose the question of the number of city police is being decided. It is known that the marginal cost per policeman is constant at 500 denominations. Five voters vote. The police are financed by taxes. To do this, each voter will have to collect 100 cents of tax (t) for each policeman. There is data on the marginal benefit of the policemen for each voter:

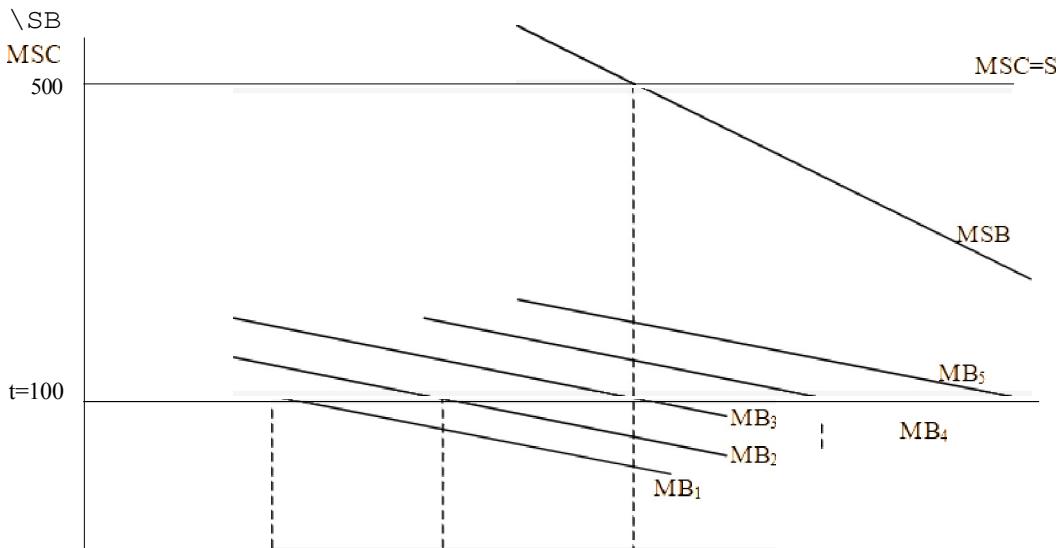
	Number of police officers (q)	1	2	3	4	5
Sidor	MB_1	100	80	60	40	20
Triphon	MB_2	120	100	80	60	40
Kuzma	MB_3	140	120	100	80	60
Fedot	MB_4	160	140	120	100	80

individual demand curves (topic "Consumer demand", paragraph 2).

Thekla	MB5	180	160	140	120	100
	MSB (ZMB,)	700	600	500	400	300

Let's transfer the data to Graph 5-1:

Chart 5-1. Determining the amount of public goods by voting



Everyone will vote in favor of having one policeman. Even Sidor will agree with this, for whom the benefit of the first policeman (100 denominations) is equal to the amount of the tax for his maintenance. However, Sidor will be against inviting the second policeman, because his marginal benefit from it (80 currency units) will be less than the tax (100 currency units). Nevertheless, the other four voters will vote in favor, and the proposal will pass. This is disadvantageous for Sidor, because he will have to obey the majority and pay for the second policeman, although he does not want to. By reasoning in a similar manner, we conclude that three voters will vote for the third policeman, and two voters (Sidor and Trifon) will be against it. The proposal passes under majority rule. However, society will refuse the services of the fourth or even more so the fifth policeman, because the majority of voters will vote against it.

So, voting by the majority rule provides an effective amount of public good, because with three policemen the equality of the marginal social benefit to the marginal social cost ($MSB=MSC$) is observed. But only Kuzma got exactly the number of policemen he wanted ($MB=t$). On the contrary, Sidor and Trifon would have preferred to have fewer, and Fedot and Thekla would have preferred to have more policemen compared to what they received by majority vote. The vote reflects, therefore, the position of the average voter, discarding the extremes.

When a decision is made by a majority vote, it is possible that society will not be able to determine its preferences. This happens if the preferences of individuals are transitive (topic "Consumer choice," paragraph 1), and society as a whole is not. Then the "**voting paradox**" occurs.

For example, the preferences of voters with respect to three objects are known (see table):

Public goods	Voter preferences		
	Andrew	Boris	Victor
School	1	3	2
Park	2	1	3
Cafe	3	2	1

Andrei puts the school first, the park second, and the cafe third. Boris and Victor have their own preferences, and we have to choose one thing.

First the school, for example, is put to a vote. "For" will be only Andrew, and the proposal will not pass. A similar fate awaits the vote on the park and cafe.

Let's try organize voting in a different way.

Choose between the school and the park. The school gets two votes (Andrei and Victor), the park one. The school was better than the park. We choose between the school and the cafe. The cafe gets the votes of Boris and Victor, and the school gets only Andrei's vote. The cafe is better than the school. We choose between the park and the cafe and see that the park is better than the cafe. The circle is closed, and the final decision cannot be made.

If a number of actors' interests coincide, they may join together to form a group. Activities aimed at ensuring that public decisions are made in the interests of the group are called **lobbyism**. The military-industrial, raw materials, agrarian and other lobbies operate in the Russian parliament.

A group of lobbyists, acting in unison, can achieve profitable for a minority of decisions if its opponents are divided and the benefits to each of them are less than the costs necessary to defend their positions.

The likelihood of minority decisions is increased when different special-interest groups come together based on mutual support or **logrolling**: one group votes for a decision that benefits another group, which in turn supports another decision that benefits the first group.

To summarize, it should be emphasized that the very fact of state intervention in the economy does not guarantee overcoming the shortcomings of market activity and efficient allocation of resources. The role of the state has to be accepted in cases where the market definitely fails to cope with certain economic functions. However, state activity can also be a source of economic inefficiency. Therefore, when deciding whether to engage in economic activity with private or state institutions, the advantages and disadvantages of market and state mechanisms should be compared.

SELF-STUDY ASSIGNMENTS

1. The functions of supply and demand of a good are given: $P=40-2q$ and $P=28+q$. Each unit of output of this good generates an external cost of \$3. Calculate the total external loss, and the social deadweight loss in the absence of internalization of external costs.

2. The use of 1 liter of gasoline leads to a pollution damage of 4 rubles. The functions of supply and demand for gasoline are $q=19,000,000-100,000OOP$ and $q=100,000P-1,000,000$. How can internalize this effect and how will it affect the amount of pollution damage as well as gasoline consumption?

3. Experts have calculated that every liter of gasoline consumed in the city leads to the emission of 60 rp of pollutants. At the same time, each ton of toxins increases health care costs by \$1,000. What "Pigou tax" should have been imposed? What will the price of gasoline become after the tax is imposed if it used to be 50 cents and the private marginal cost to gasoline sellers is constant? How would the "Pigou tax" change the welfare of city residents? How is it different from a regular commodity tax?

4. Suppose that the marginal benefit of reducing pollution falls and the marginal cost of abatement increases. Suppose that with an 80% reduction in pollution, the marginal cost is 20 billion dollars, and the marginal benefit is 15 billion dollars. Would this reduction in pollution be socially efficient? Would a 100 percent reduction be effective? How would reducing the marginal cost of pollution affect the socially efficient level of pollution?

5. Explain in terms of the theory of public goods such phenomena as dirt in the entrances, the eternal problems of collecting money to pay for the concierge, etc.

6. The individual demand functions of three consumers for a given product are known:

Price	10	9	8	7	6	5	4	3
Demand A	0	0	0	1	2	3	4	5
Demand In	1	2	3	4	5	6	7	8
Demand C	0	0	1	2	3	4	5	6

1. Determine volumes market if it is a private good; demand for product,
2. Determine volumes market if it is a pure public good. demand for product,

Let the supply function of the good be given:

	Price	24	22	20	18	16	14	12	10
Offerings e	8	7	6	5	4	3	2	1	

1. Find the optimal amount of such a good if it is a pure public good;
2. Find the optimal amount of such a good if it is a private good.

7. There are 99 families living in a small town. For the first 50 of them, the individual street cleaning demand function (each family's demand) is: $P=1-0.1q$, where q is the number of janitors in the town. The individual demand function of each of the remaining 49 families is: $P=2-0.2q$. The marginal cost of paying each janitor is constant at 74 denominations. What is the socially optimal number of janitors?

8. Explain the voting paradox using the table below.

Public goods	Voter preferences		
	A	B	C
X	2	1	4
Y	4	3	2
Z	1	5	3

9. In the situation described in the previous problem, after the meetings of the deputies with the voters, the quantitative values of the voters' utility with respect to three goods became known:

Public goods	Voter preferences		
	A	B	C
X	-60	200	-250
Y	-80	-90	150
Z	400	-200	-150

What solutions will made B as a result of votes?

How will they be affected by vote-buying and peer-support opportunities?

ACADEMY OF NATIONAL ECONOMY
under the government of the Russian Federation

UKTB

S.G. SERYAKOV.

MICROECONOMICS
Kypc lectures

Moscow
-2005-

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INTRODUCTION

The proposed textbook is the first part of an integrated course "Economic Theory," which includes micro- and macroeconomics. This course serves as a fundamental theoretical basis for the subsequent assimilation of other theoretical and specific economic disciplines, such as "Econometrics", "Transition Economy", "Management", "Marketing," "World Economy," etc.

The textbook contains a basic course of microeconomics, read, with some variations, all over the world. When working on it the author aimed to acquaint students with the most important categories and laws of microeconomics, to help them understand the principles of behavior of economic agents and their interaction in market conditions, to master the basic tools of economic analysis.

As a theoretical discipline, microeconomics has direct implications for business practice. This should not be taken literally: microeconomics is not a science of doing business, it does not teach how to make specific business decisions about management, marketing, accounting, entrepreneurial strategy, etc. Nevertheless, it enhances the validity of such decisions by drawing managers' attention to aspects that they might otherwise,

PJZOSTO PJZOIGNOJZIJZUzt.

The study of microeconomics is important not only for entrepreneurs, but to no lesser extent for employees of public administration, as well as for any citizen who wants to have an informed opinion about the likely consequences of certain economic transformations.

In an effort to simplify the presentation as much as possible, the author makes almost no use of higher mathematics. But this does not mean that you can do without mathematics at all when studying economics. In particular, if just looking at a two-dimensional graph gives you a headache, it is better to study a little beforehand.

At the end of each topic there are self-study assignments for the seminars. It is very important, however, not just to make a calculation or draw a graph, but to be able to explain the course of reasoning in solving this or that problem, i.e. to show knowledge of the theory. A special role in the creative mastering of the course is played by the analysis of practical situations, which the student should conduct independently on the results of studying a number of topics.

To consolidate the knowledge gained, periodic testing on specific thematic blocks is recommended. Such tests, like examinations, should not be feared. They have no purpose other than to arouse students' interest in studying economics.

Ultimately, a student who has successfully mastered the study material must have competent economic thinking, allowing him to:

- to continue a more in-depth study of the problems raised, to conduct independent theoretical research;
- Analyze various aspects of government economic policy and assess their consequences from the perspective of microeconomics;
- apply microeconomic laws to business decisions at the individual firm level.

The author hopes that the textbook will be useful to you not only for the purely utilitarian task of passing the exam, but also serve as a stimulus for further creative work.

I wish you success!

S.G. SERIAEOV.

MACROECONOMICS
Kypc lectures

ALL-RUSSIAN ACADEMY OF FOREIGN TRADE

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PREDICTION

This textbook is the second part of the general course "Economic Theory," which includes micro- and macroeconomics.

The textbook outlines the main provisions, categories and laws of macroeconomics in the most concise form. It should be borne in mind that macroeconomics is a rapidly developing science. This implies an analysis of the positions of various economic schools. Many topics and questions are set out in close connection with the problems of modern Russian

ECONOMICS AND ECONOMIC POLICY.

At the end of each topic there are self-study assignments for the seminars. The main thing is not just to make a calculation or draw a graph, but to understand the real economic processes behind this or that model.

The author hopes that the textbook will serve students not only to solve a purely utilitarian problem - preparation for the exam, but will also contribute to the formation of competent economic thinking, awaken interest in a more in-depth study of contemporary economic problems.

A student who has successfully mastered the study material must:

- Understand the Basic Principles and Laws of MZK-ECONOMICS IN THEIR RELATIONSHIPS close connection with microeconomics;
- Have an idea of the positions of the leading modern schools and trends of economic thought on key macroeconomic issues;
- in general understand the key aspects of the state's economic policy, and assess their consequences;
- Understand the significance of macroeconomic changes for individual businesses and each member of society;
- be prepared to master the following economic disciplines. I wish you success!