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BASIC MICRO- AND MACROECONOMIC MODELS

The textbook

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The textbook contains the systematized statement of the applied behavioural micro and macroeconomic models which studying allows to understand the main regularities and optimum parameters of functioning of economic subjects and the commodity markets, and also to comprehend interrelations between micro and macroeconomics, to receive idea of their system.

Addressed to students of economic specialties, masters and teachers, and also it can be useful for all to those who is interested in behavioural aspects of the micro and macroeconomic theory.

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Introduction

The modern Kazakhstan economy, undergoing essential transformations, is built in system of the world economy that inevitably actualizes need for studying and practical use of models and instruments of market agent optimum behavior both at micro and at macrolevels. The role of the micro and macroeconomic theories increases in this context, having studying the mechanism of functioning the modern economy and models of market agent rational behavior as the dominant purpose.

At the same time, the revolution which has occurred in the last decades in the theoretical macroeconomic, considerably caused by "Lukas's criticism" has led to the fact that "the modern macroeconomic theories rely not on the prior dependences between macro variables, but on behavioral models of agents and the theory of general equilibrium"[1]. As a result, after many years of almost partite existence of micro and macroeconomics, synthetic theories are intensively developed now, in particular, behavioral economy.

This work book is devoted to profound consideration of the applied behavioral micro and macroeconomic models which studying allows understanding the basic laws and optimal operation parameters of economic agents, commodity markets and the economy as a whole.

The subject area where this work book positions (applied behavioral models of micro and macroeconomics) does necessary establishment of close connections between the micro and macroeconomic theory that is methodologically realized through a microeconomic justification of macroeconomic models. Similar approach allows to comprehend better the interrelation between micro and macroeconomic, to receive idea of their system.

The workbook includes two sections such as "Microeconomics: applied models of a consumer and producer behavior "and "Macroe-

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[1] Polterovich V.M. The crisis of economic theory/ Report presented at a scientific seminar of the Economics Department and CEMI of the Russian Academy of Sciences "Unknown economy". - http://vif2ne.ru.

conomic: applied models of macrosubject behavior in the commodity market"

In the first section in particular logical sequence, such aspects of the applied behavioral microeconomic theory, as specifics and methodology of the microeconomic analysis, the demand theory and parameters of rational behavior of the consumer, the supply theory and algorithm of producer's optimum behavior, the model of market equilibrium and a problem of its stability, the concept of elasticity of demand and supply are considered. In disclosing the content of microeconomic behavioral models, the author follows the neoclassical paradigm including methodological individualism, modeling the behavior of economic agents as goal-setting and rational, and also equilibrium approach. Thus the principle of goal-setting and rational behavior of economic agents is based on the assumption that the behavior of each of market agents can be considered as a series of the interdependent rational actions with predetermined goal. This model of behavior is realized both by consumers and producers, so today most of the economic area can be characterized by a rational demand and a rational supply.

In the second section, there is developing of such aspects of the applied macroeconomic theory, as specifics and methodological tools of the modern macroanalysis, parameters of equilibrium of economic circulation model, feature of commodity market general equilibrium model, including its neoclassical and Keynesian interpretations. The special attention is paid to structuring aggregate demand, especially to a detailed analysis of macroeconomic models of a consumer demand and savings, investment demand, as well as economic activity of the state as a component of aggregate demand. It should be noted that these applied aspects of the modern macroeconomic analysis are developed through a prism of two alternate methodological approaches such as neoclassical and Keynesian.

The presented fundamental micro and macroeconomic models in work book are accompanied not only by verbal, but graphic illustrative and basic mathematical justification. It allows creating complete view of the content of the applied branches of micro-and macroeconomic theory and promotes effective learning and retention of learning material.

The work book can be used by students of all economic specialties in the study of microeconomics and macroeconomics courses, in the preparation for practical and laboratory researches, independent work of the student with the teacher, as well as in the preparation for examinations. The work book is of interest to undergraduates and teachers, as well as to all who wish to study the behavioral and applied aspects of micro-and macroeconomic theory.

I SECTION. MICROECONOMICS: APPLIED MODEL OF CONSUMERS AND PRODUCERS BEHAVIOR

THEME 1. MODERN MICROECONOMICS AND ITS METHODOLOGY

1.1 The subject of modern microeconomics and its main parameters.
1.2 The methodology of micro-economic analysis.

1.1 The subject of modern microeconomics and its main parameters.

The microeconomics is one of two constituents of the modern economic theory. Historically the roots of the microeconomics goes into the works of the Physiocrats (F. Quesnay), classical (A.Smith, D. Ricardo, J. S.Mill, J.B.Say), neoclassical (A.Marshall), marginalistic (K.Menger, F. Wieser, V. Pareto, L.Valras, etc.) schools.

As well as any other science, microeconomics has, first, its own object of study; second, the content allocated by it in this object, i.e. an object of research; third, own method of knowledge defining specifics of microeconomic approach to object and subject emphasis in it.

The microeconomic theory studies economic activity of individuals, determining its essential basic laws. All economic agents as participants of uniform reproduction process can carry out two functions: either to convert the labor objects to products, or to use the benefits for own needs. In first case, they will be producers, in the second – consumers.

Any economic activity of individuals is the concrete economic behavior carried out in definite forms and depending on various factors (economic, social, psychological, etc.). All these factors, as well as various interrelations and human relations form conditions of economic behavior. The last, being the repeating, steady and standard norms and rules of economic behavior are fixed in the relevant formal and informal institutes.

Object of microeconomics is the economic activity of individuals and economic problems arising in its course - what, how, for whom to make? - resolved in accordance with existing type of economic system (traditional, command, market). Investigating this object, the microeconomics allocates the special content in it, making a studying subject. It includes economic agents, economic benefits and economic actions.

The economic agents are individual, independently operating economic units in the economy (certain individuals, their groups, communities). However not any community of individuals can be considered as the economic agent. For this purpose, this group has to have the uniform purposes and work together for their achievement.

The main market agents whose behavior is studied in microeconomics include: households, firms and the state. The specifics of these main economic agents are presented in Table 1.1.

Table 1.1

Characteristics of the main subjects of microeconomics

Economic agent	Definition	The dominant behavioral function considered in microanalysis	Target function
1	2	3	4
Household	Individuals or groups of individuals who receive the incomes and spend them for goods consumption.	Consumer function (consumption of goods and services)	Individual utility maximization, i.e., satisfaction from the consumption of a particular good.
Firm	Independently operating economic organization using resources for production of goods or services	The productive function (production of goods and services)	Maximization of profit from the goods or services sale in the market

Table 1.1 continuation

1	2	3	4
State	The system of public institutions with the right and the duty to establish and protect the conditions for the functioning of economic agents and redistribute results of their performance	Redistributive function (redistribution of market income)	Maximizing public welfare, i.e. social utility

The objects of any economic activity are the benefits.

The benefits are tools (the material and non-material subjects) that meet the needs. All benefits are divided into two main groups: not economic benefits (that are in almost unlimited quantity, for example, air) and the economic benefits (that are in limited quantity). The economic benefits in turn are divided into lower-order benefits (these are consumer goods and services intended for final consumption) and the higher order benefits (Called also capital benefits, investment goods or the means of production and intended for the production of other benefits).

Besides, among the economic benefits, there are interchangeable (substitutes) and complementary.

For production of the consumer benefits, the indirect economic benefits (resources) also are used.

The economic resources are a set of natural, social and spiritual powers and substances which can be used for creation of goods and services. The main economic resources include: natural, capital, labor resources, enterprise abilities, information. Resources are a potential productive power of society. However in practice, the process of production involves only part of the available resources. Therefore the resources used directly in the production process are called production factors. It includes the work, the earth, the capital, the business, the information, the technology. It should be noted that basic classification of production factors includes the first three factors (work, earth, capital) as this triad was emphasized for the first time

by the representative of classical political economy J.B.Say in the theory of three production factors.

All economic agents (households, firms, state and society as a whole) face the problem of limited resources. The multiplicity of economic goals in limited resources poses a problem of an economic choice in front of economic agents, i.e. a choice of optimum option of available alternatives of resources use where the maximal obtaining of benefits is reached at these costs. There are problems for each economic agent: what, how and for whom to produce, i.e. to define conditions and directions of limited resources use. The microeconomic theory does not only try to fix something that is there, but also develops the best solution options of problems. In the latter case there is a problem of rational housekeeping. In the microeconomic theory, it is supposed that each managing agent seeks for maximizing the benefits. So, the household maximizes degree of satisfaction of their needs (individual utility from goods and services consumption), a firm maximizes profit, the state – level of public welfare (general social utility).

Economic activities of the economic agent can be described as taking certain decisions by them and their subsequent implementation. The modern microeconomic theory is concentrated on the study of decision-making processes.

Thus, **the object of study** of microeconomics is the behavior of individual economic agents such as households (consumers) and firms (producers), making economic decisions concerning the economic benefits, as well as a mechanism to harmonize their economic goals and decisions.

2. The methodology of micro-economic analysis.

Depending on approach to an explanation of individual economic agents' behavior in the microeconomic theory, two versions of the analysis are used: positive and normative. Concepts of the positive analysis and the normative analysis were first introduced into science by A. Smith.[2]

[2] Smith A. Inquiry Into the Nature and Causes of the Wealth of Nations/Smith. A. Collected works. – M., 1991. – V.1.

The positive microeconomics studies the facts and the relationship between these factors and the answers to the question: what is or might be? The normative microeconomics supplys "recipes" of actions (i.e. has recommendation nature), defines what conditions of economy are desirable or undesirable, and answers a question: what and how should it be?[3]

The microeconomic studies are based on a number of fundamental premises (mainly of neo-classical nature) that determine the specificity of the method of micro-economic analysis. These methodological features of micro-analysis include:

1. Economic atomism. The microeconomics concentrates the attention on individual acts of behavior of the most prime, initial, indivisible economic units in the actions making independent decisions and carrying out them in own economic activity.

2. Assumption of action rationality of economic agents. The concept of economic rationalism comes from the fact that any economic agent on the basis of the precise accounting of all available array of information makes the optimum decisions maximizing its own benefits and respectively minimizing its costs, necessary for achievements of these benefits. Thus benefits are understood as the benefits received by agents, and costs – as the benefits which the subject loses at these actions. Thus the rational economic agent seeks to maximize benefits at these costs of used resources or to minimize the costs necessary to obtain these benefits.

3. The limit (marginal) analysis. Its essence lies in the consideration of economic phenomena, not only in the finished, but in the ever-changing form, and in the corresponding investigation not only of the general or average economic value, but also their changes (increases). In this case it is compared not only common level of benefit and costs from economic operation, but also additional (limit) benefits and additional (limit) costs. Rationally operating agent will seek for achievement of the limiting benefits and the limiting costs equality; in this case the total value of winnings will be maximized.

4. The functional analysis during which defined, characteristic feature interesting for a researcher is marked out in studied object

[3] Vechkanov G.S., Vechkanova G.R. Microeconomics. Short course. – Saint Petersburg: Publisher "Piter", 2007.

and then searching of factors influencing it begins. Once these factors are established, the way of their interrelation with earlier allocated characteristic – i.e. function is defined.

5. The equilibrium approach to research of dynamic economic phenomena and processes. Considering the volatile economic reality, microeconomics seeks to identify and examine these states in it and in its parts, which are characterized by certain stability. Cases of a stable equilibrium are of special interest for a microanalysis.

6. The economic modeling. The economic model is understood as the simplified representation of the economic reality that reflects the main properties and relationships in the phenomenon under investigation. Models can be verbal, graphic and analytical. The economic models use two types of variables: exogenous and endogenous. Values of exogenous variables are set prior to model work. It is the initial information entered from the outside. From the analysis of model, particular conclusions are drawn, i.e. values of the endogenous variables which are forming in model as result of modeling.

In microeconomics, two types of models such as optimizing and equilibrium are used.[4]

Optimizing models are applied at research of certain economic agents' behavior. Therefore the main working concepts here have the limiting character (for example, the limiting utility, the limiting profit, the limiting expenses, etc.).

Equilibrium models (also called models of market equilibrium) are used at research of relationship between economic agents (for example, model of supply and demand equilibrium).

As any model reflects an economic reality only in a particular condition, and at check of its compliance to reality it is necessary that the characteristics of an economic reality did not change which are not in model, otherwise results can be far from the conclusions made by means of model.

Questions for discussion:

1. Why is microeconomics called "price theory"?
2. Reveal the specific nature of the main economic subjects.

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[4] Ivashkovskiy S.N. Microeconomics: Textbook. – M.: "Delo", 2002.

3. Name the specific features of marginal, functional, equilibrium, positive and normative analyses in microeconomics.

4. How is the use of an assumption "all other conditions being equal" in the forecast assessment of economic processes justified?

5. Give examples of economic variables that the model tends to explain and predict

6. What are the main methodological principles of microeconomic analysis?

THEME 2. THEORY OF DEMAND AND MODEL OF RATIONAL CONSUMER BEHAVIOR

2.1 The model of demand in a market economy.

2.2 The theory of consumer behavior: the basic methodological approaches.

2.3 Indifference curves and their features.

2.4 Budget Line and its analysis

2.5 Model of consumer equilibrium.

2.6 Consumer reaction to changes in income and prices

2.1 The model of demand in a market economy.

The demand is an amount of goods which consumers are ready and able to get at each possible level of the price for a particular period of time. In other words, demand is a solvent need of market agents.

The market (volume) size is the maximum amount of the product that the consumer is willing and able to buy at a given price per unit of time (day, month, and year) under certain conditions

The dependence of the volume of demand from its determinants is a **function of demand**.

The volume of demand for the product is determined primarily by its price. **The demand price** is the maximum price at which the consumer is willing to buy the product.

The law of demand states that, in all other things being equal, the market size for the product is in inverse relationship to its price: with product appreciation, the volume of demand for it falls and vice versa.

If other factors affecting the volume of demand are taken the same, then the law of demand takes the form of the demand function:

$$Q_D = f\left(\frac{1}{P_X}\right), \qquad (2.1)$$

where Q_D is market size; P_X is product price X.

The demand function of the price can be set by 3 ways:

1 way is analytical, i.e. by means of linear function of demand:

$$Q_D = a\text{-}bP_X, \qquad (2.2)$$

where a is maximum possible market demand for the product X, *b* is dependence of the change in demand from changes in prices (at the same time reflects slope angle of the demand curve), P_X is the X product price. “Minus” sign indicates that the demand function has a negative slope.

2 way is tabular (Table 2.1).

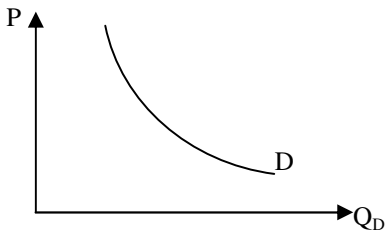
Table 2.1

The volume of demand for the product X at any given price level

P (price in KZT)	Q (the volume of demand for the product X, in pieces.)
1	160
2	110
3	60
4	80
5	50

3 Way is graphical, with the demand curve (Fig. 2.1).

The demand curve (Figure 2.1) shows how the volume of consumer demand in response to changes in the prices of goods. Each point on the graph represents the specific price and the corresponding quantity of the product that the consumer has decided to buy at a given price.



Fug. 2.1. The demand curve: D – demand, Q_D – quantity of product, P – price per unit

The existence of the demand law proves these circumstances:

First, the law of demand is confirmed by law (principle) of diminishing marginal utility, according to which the increase in product consumption, the degree of saturation to it grows, and the amount of additional (marginal) utility of each additional copy of the product consumed falls. Since any buyer of the product gets less satisfaction (utility) from each subsequent instance of the goods, the consumers agree to purchase additional units of the product only if its price declines.

Second, the law of demand is confirmed by the fact that in the reduction (or rise) in the product price, the income effect and the substitution effect work.

The income effect means that the reduction in the price of goods increases real income (purchasing power) of the consumer (which is relatively richer), so he is able to buy a greater amount of cheapened goods and other goods.

The substitution effect is expressed in the fact that reducing the price of the product, the consumer increases purchase of the product, replacing them by other goods that have become relatively more expensive than this cheapened product.

In practice, the income and substitution effects are combined and lead to the fact that there is a consumer ability and willingness to buy more products at a lower price, which is a confirmation of the law of demand.

However, there are deviations from the demand law. These are situations in which the law of demand is not applied. They are:

1**. "Giffen paradox".** This effect of deviation from the law of demand is named after the British economist Robert Giffen (1837-1910), who found that during the famine in Ireland in the 19th century, the demand for potatoes also increased despite the increase in its prices, which is generally contrary to the law of demand. Giffen paradox is explained by economists as follows: "The fact that potatoes are basic food of the Irish poor. Its appreciation forced them to reduce consumption of other, more expensive and quality products. As yet the potatoes remained relatively the cheapest product; the volume

of demand for it had grown ... This situation is only possible exception to the general law of demand".[5]

Another example is attributed to Giffen is an example of the increased consumption of bread with its appreciation, so in the "Principles of Political Economy", A. Marshall (1842-1924) says: "As R.Giffen noted, bread appreciation makes such a great gap in the budget of the poorest working families, and so increases the marginal utility of money to them that they have to reduce the consumption of meat and the most expensive flour foods: as bread continues to be the cheapest of food that they are able to buy and will buy, at the same time they use it not less, but more".[6]

We can observe the "Giffen paradox" in our daily lives. With the constant and repeated appreciation in food, the demand for some of them is growing, despite the price.

Thus, **Giffen goods** are a kind of low-quality goods (i.e. goods of the lowest quality, for which demand decreases with increasing income of the consumer), the cost of which occupy a large share in the consumer household budgets, and the demand volume for that changes in the same direction under equal conditions as the price (if the price is rising, the volume demand for Giffen goods is also increasing, and vice versa). The demand curve for Giffen goods will be different from the typical schedule of demand (Figure 2.2).

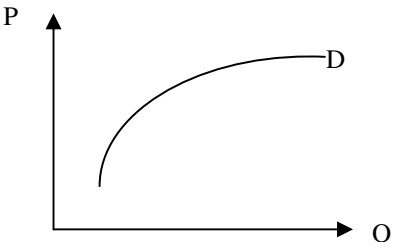


Fig.2.2. The demand curve for Giffen goods

[5] Galperin V.M. Microeconomics./ Galperin V.M., Ignatiyev S.M., Morgunov V.I. - SPb.: Economic school, 1994. V.1. - P. 43-44.

[6] Marshall A. Principles of Political Economy. M., 1983. V. 1. P. 201.

2. The law of demand does not work at **"Veblen's effect".** This phenomenon, named after the founder of the American institutionalism Thorstein Veblen (1857 - 1929) who first described it, is associated with the prestigious demand for expensive items that indicate a high social status of their customers. Status of prestigious products has the benefits that cannot get the broad masses of consumers, as they have a high price. And the reduction in prices for such goods may reduce their attractiveness, and hence, the demand for them.

Thus, the **Veblen's effect is** understood as a consumer situation where consumers have a demand curve with a positive (down and left) slope, as they are characterized by demonstrative goods consumption, i.e. to obtain utility not from the consumption, but from demonstrating their use. The Veblen's effect leads to the fact that the demand for prestigious product is in direct relation to its price, which is a departure from the classical law of demand.[7]

3. The law of demand does not work in excessive demand caused by consumer expectations of future goods appreciation.

4. The law of demand does not work in respect of valuable assets which are means of investing money and preserve their cost (gold, antiques, jewelry, art masterpieces, etc.)

It is important to note that there is a difference between "demand" and "market size".

The "market size" varies with the price of the product, thus there is a points shift on a demand curve while the demand curve is in place.

The "demand" is influenced by non-price factors (determinants), thus there is shifting of the demand curve: right-up - in increasing demand, left-down - in decreasing demand (Figure 2.3)

The non-price factors of demand, causing a shift of the curve include:

1. Change in consumer (consumers) income. For most products, increasing income leads to an increase in demand.

Goods for which demand varies in direct relation to changes in monetary income (i.e., it increases with rise in income and decreases

[7] Vechkanov G.S., Vechkanova G.R. Microeconomics. Short course. – Saint Petersburg: Publisher "Piter", 2007.

with decrease in income), are called high-quality goods or normal goods (superior goods).

Goods for which demand changes in the opposite direction from the change in income (i.e., it decreases with increasing income, and increases with the decreasing income), are called low-quality goods or inferior goods.

For example, an increase in consumer income increases the demand for normal goods such as butter, natural leather products, and reduces the demand for low-quality goods such as margarine, imitation leather products, etc.

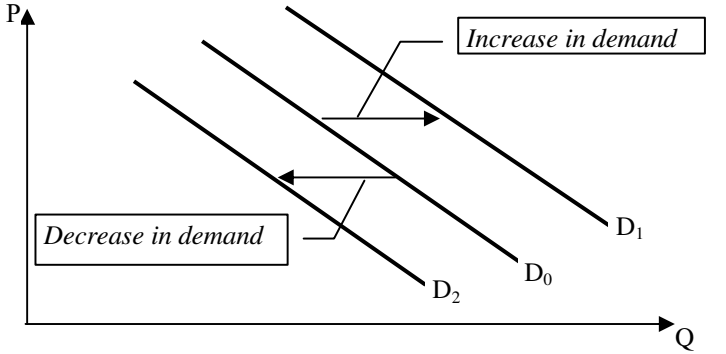


Fig.2.3. The shift of the demand curve: from D_0 to D_1 – increase in demand; from $D_{0\ to}$ D_2 – decrease in demand

2. Changes in prices of associated goods. Whether changing goods prices for associated goods will lead to an increase or decrease in demand for the product, it depends on whether this related product is replacement of our product (substitute goods, i.e. substitute) or accompanying it (complementary goods).

When the two products are substitutes, there is a direct connection between the price of one of them and the demand for the other, i.e. the demand for the other increases with appreciation of one of them.

Examples: coffee appreciation increases the demand for tea (substitute goods), reducing the price of cars is increasing the demand for gasoline.

However, many couples of goods are independent products; changes in the price of one very slightly impact or do not impact on the demand for the other.

3. Changes in consumer tastes, fashion. Suitable change for a given product in consumer tastes or preferences caused by advertising or changes in fashion will mean that demand has increased at each price. Adverse changes in consumer preferences will cause a decrease in demand and a shift of the demand curve to the left.

4. Changing the number of buyers. The increase in the number of buyers in the market causes an increase in demand. A decrease in the number of consumers is reflected by the decrease of demand.

5. Inflation expectations of buyers. Consumer expectations about future product prices, product availability and future income can change the demand. Expectation of falling prices and decrease in income leads to a reduction of the current demand for goods. The converse is also true.

So far, we have considered the demand mainly from an individual buyer (consumer) position or individual demand, which is defined as corresponding to each of the goods prices that consumers would like to buy on the market. However, multitude of buyers is typical for most commodity markets. The transition from individual demand to market demand can be easily performed by summing the individual market size of all consumers at every possible level of prices. This problem can be solved both by tabular way and graphical summation.

2.2 The theory of consumer behavior: basic methodological approaches

The parameters of market demand are formed on the basis of decisions taken by a plurality of individual consumers, each of whom comes from its own budgetary possibilities building its line of consumer behavior, as well as from the need to purchase a variety of products in the quantities and proportions that would have brought him a total maximum satisfaction from their use. Such consumer behavior in microeconomics is called rational.

Microeconomics uses the term **"utility"** to indicate pleasure or satisfaction which households (consumers) obtain from the consumption of goods or services,

Maximization of utility (i.e., the degree of satisfaction from the goods consumption) is the dominant aim of households. At the same time, there are restrictions on consumer choice. It primarily includes the dimensions of the households' real income (i.e. their consumer budgets), as well as current prices for goods and services.

In microeconomic theory of consumer behavior, there are two basic approaches to the determination of the utility:

1) cardinal approach, which is the traditional version of the consumer choice theory;

2) ordinal approach, which can be considered as the modern concept of the consumer behavior.

Let us consider in detail each of them.

The cardinal model of consumer behavior

It was developed by representatives of the Austrian School of Marginalism in the last third of the XIX century; they are U. Jevons, K.Menger, E. Böhm von Bawerk, W. Wieser, L.Valras, etc. This concept refers to the concept of marginal and total utility, as well as opportunities for their quantitative measurement.

The marginal utility (MU) is explained as extra utility that a consumer derives from the consumption of one additional unit of benefit. Sum of the marginal utilities of individual benefit instances gives total utility (TU). In other words, **the total utility** is the satisfaction that the entity receives from the consumption of the particular good's total quantity. It implies that the marginal utility is increase in the total utility of an increase in good consumption per one additional unit.

The quantity theory of consumer behavior is based on the premise of the possibility of comparing different benefits based on a comparison of their utility, measured in special units. These hypothetical utility units proposed for measuring satisfaction, which can get a person from the consumption of a good, were called **utils**.

The analysis of consumer behavior on the basis of the utility quantity theory involves two basic premises.

First, the rational consumer within a limited budget makes his purchase to get the maximum satisfaction (maximum utility) of the totality of goods consumed.

Second, each consumer can give rating in utility utils of any good consumed. It is assumed that the scale of utility measurement is defined to within a linear transformation, so it forms a cardinal, or severe, measure.[8]

Within the cardinal approach, Austrian marginalists proved **the principle (law) of diminishing marginal utility**. His point is that as the good consumption grows, degree of saturation increases, but after reaching the saturation point, the value of the marginal utility of benefit's each additional instance begins to decline. For the first time the principle of marginal utility was formulated by the German economist G.Gossen in 1854, who formulated the laws, later named after him.

The first law of Gossen says the utility of the good decreases with the increase in its consumption and zero point of total satisfaction (that is, in fact, the law of diminishing marginal utility). Starting from his first law, Gossen formulated his second law. Its essence is the total amount of goods consumed is defined in which the marginal utility of each good are equal".[9]

The second law of Gossen has the following meaning: if the goods supply is not enough for person's complete satisfaction, the aggregate greatest satisfaction from them is reached when the pleasure increase from each type of the benefits becomes identical (i.e., when the marginal utilities of each good are equal). Each entity maximizes his total utility if he distributes available resources among the different benefits, so the same satisfaction is achieved from the last unit of resource spent for each good.

Gossen's ideas were later "rediscovered" in the studies of the Austrian school and were in the basis of the theoretical concept of marginalism.

Figure 2.4. shows the curves of marginal and total utilities.

The total utility curve has a positive slope, as total utility increases with a growing number of good.

The marginal utility curve has a negative slope, as the utility of

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[8] Lukin V.B. Pricing: Text book. - M.: Moscow State University of Printing, 2001.

[9] Mayburd E.M. Introduction to the History of Economic Thought: From prophets to professors.. - M.: Delo: Vita-Press, 1996.- P. 333.

consumed additional instances of the benefit is gradually decreasing.

The total utility reaches the maximum value in reaching the saturation point with the volume of the Qn good, and the marginal utility is zero. It means that the demand for the good is fully satisfied. Thus, the principle of diminishing marginal utility is due to decrease in need intensity in process of its satisfaction and is reflected in the graph in the negative slope of the marginal utility curve and in the gradual reduction of the slope angle of the total utility.

The principle of diminishing marginal utility is in the basis of constructing a situation of consumer equilibrium in the cardinal theory.

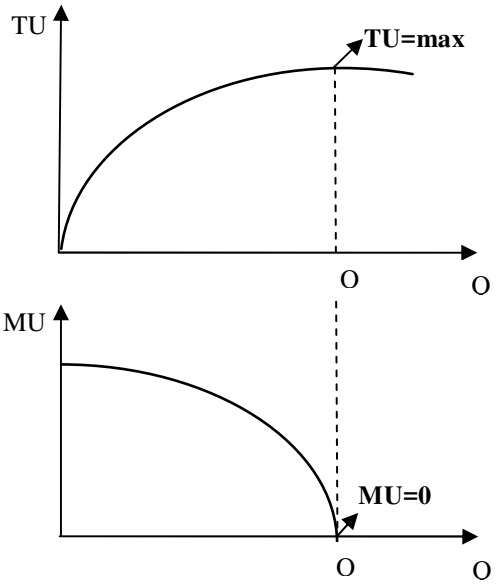

Fig.2.4. Marginal and total utility curves

From the point of view of the cardinal approach, rational consumer maximizing total utility from goods consumption with a li-

mited budget carries out his purchases so that every product purchased brought him the same marginal utility proportionally to the price of this product. In this case, the customer will receive the maximum satisfaction, i.e. maximizes utility.

The utility maximization rule, which is also called as **the consumer balance condition**, is expressed by the following formula in the cardinal theory:

$$\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y} = \frac{MU_Z}{P_Z} = \lambda, \qquad (2.3)$$

where MU_X, MU_Y, MU_Z are goods' marginal utility X, Y, Z; P_X, P_Y, $P_{Z\ a}$ are goods prices X, Y, Z; λ are money's marginal utility.

The ratio of the marginal utility of the good to its price is called the weighted marginal utility. From (2.3) formula it follows that the ratio between the marginal utilities of goods is equal to the ratio of their prices.

The ordinal model of consumer behavior

Utility rating of a commodity or commodity set proposed by cardinalists is of extremely individual character, i.e. it is based on consumers' judgmental estimate. Concerning the individual's ability to compute, even for themselves, the utility of goods purchased by him, the doubts were expressed with the appearance of this theory.

Alternative quantitative ordinal theory of consumer choice is supplyed by F. Edgeworth, V. Pareto, I.Fisher. In the 30-ies of the twentieth century, after the publication of the R. Allen and J. Hicks' works, ordinal approach had acquired a complete canonical form, becoming an accepted and dominant methodological basis of modern microeconomic theory of consumer behavior.

The ordinal utility theory is based on the less stringent assumptions than the cardinal. The essence of ordinal theory of consumer choice is that it uses not absolute but relative utility estimation when the consumer evaluates and compares not the good's individual units, but sets (consumer basket). In this case, it is not required to determine how much or how many times one basket useful than the other, it is sufficient to establish which of the two product sets is recognized as the best by him. The basis of the ordinal concept includes five axioms.

1. The axiom of well-ordering. If there are two different sets of benefits, the consumer always prefers one to another or recognizes them as equivalent (equally preferred).

2. Satiation axiom. Consumers prefer more of the good.

3. The transitivity axiom. If the consumer prefers a set A to set B, and set B to set C, he prefers set A to set C, respectively, if the set A for the consumer is equivalent to the set B and the set B is equivalent to the set C, then A and C are equal to him.

4. The axiom of transitivity allows ranking a plurality of good sets according to their preferences regardless of the order of pairwise comparisons of sets.

5. The reflexivity axiom. If there are two sets of identical good set, consumer believes that any of them better than the other.[10]

Ordinal approach to the justification of the rational model theory of consumer behavior is related to the use of the indifference curves and the budget line in the analysis.

2.3 Indifference curves and their features

Graphically, the preference system of the consumer is represented by the indifference curves, which were first introduced by the English economist F. Edgeworth in 1881.

The indifference curve is a curve which points are alternative sets of two goods (X and Y) with the same level of utility that the consumer does not care which of the sets to select (Figure 2.5).

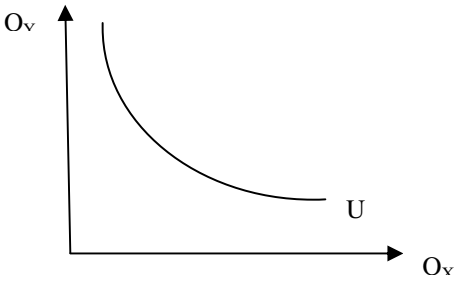

Fig. 2.5. The indifference curve: U - indifference curve, Q_X – goods' amount X, Q_Y – goods' amount Y

[10] Tarasevich L.S., Grebennikov P.I., Leussky A.I. Microeconomics: Textbook. - 4th ed., Rev. and add. - Moscow: YuraytIzdat 2006.

A set of indifference curves for one user and one pair of benefits forms **indifference map** (Figure 2.6).

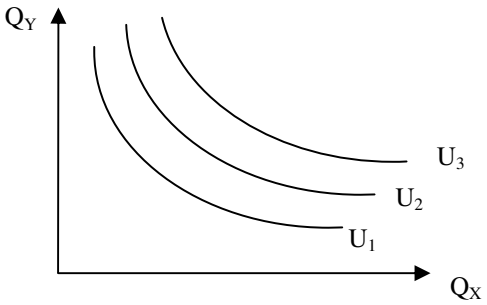

Fig. 2.6. The indifference map

It is necessary to note five basic properties of indifference curves that follow the above axioms of ordinal approach:

1) the indifference curve that lies right and up of others, is a more preferred set of goods;

2) for any pair of normal (superior) goods, indifference curves are convex to the coordinate origin;

3) the indifference curves have a negative slope;

4) the indifference curves cannot intersect;

5) the indifference curves can be drawn through any point of space.[11]

The existence of numerous consumer equivalent combinations of different amounts of the two products shows that these benefits in a particular measure are interchangeable for it. The quantitative characteristic of this interchangeability is the marginal rate of substitution.

The marginal rate of substitution of good Y by good X

[11] Selishev A.S. Microeconomics. - St. Petersburg.: Peter, 2002. - P.144.

(MRS_{XY}) is the amount of good Y, which should be reduced by increasing the consumption of good X for one unit so that the level of customer satisfaction has not changed:

$$MRS_{XY} = -\frac{\Delta Y}{\Delta X}, \quad (2.4)$$

where MRS_{XY} is marginal rate of substitution of good Y by good X; ΔX is change of good X consumption; ΔY is change of good Y consumption.

The geometric meaning of the marginal rate of substitution is that MRS_{XY} measures the slope of the indifference curve at each point. Strictly speaking, the tangent of the slope angle of the indifference curve at any point is a negative value, since the decrease in one good corresponds to an increase of one another. The marginal rate of substitution performs the same function in ordinal utility theory as the marginal utility of a cardinal theory.[12]

Increase in the utility of the added quantity of one commodity must be equal to the loss of utility from the refusal of some of the other commodity in changing the amount of consumable goods and consumer desire to stay on the same indifference curve. Consequently, the marginal rate of substitution of good Y by good X can be considered as the ratio of the marginal utility of good X to the marginal utility of good Y.[13]

This thesis can be written by the equation:

$$\Delta X \cdot MU_X = -\Delta Y \cdot MU_Y \quad (2.5)$$

Hence,

$$\frac{\Delta Y}{\Delta X} = \frac{MU_X}{MU_Y} = MRS_{XY} \quad (2.6)$$

Thus, as follows from identical equation (2.6), the marginal rate of substitution of good Y by good X can be considered as the ratio of the marginal utility of good X to the marginal utility of good Y.

Since MUx decreases as product Y is replaced by product X, and MU_Y increases accordingly, the ratio - MUx / MUy, equal to

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[12] Nureyev R.M. Microeconomics course. Textbook for high schools. - 2nd ed., Rev. - M. Publ. NORMA, 2000. - P. 130.

[13] Lukin V.B. Pricing: Text book. - M.: Moscow State University of Printing, 2001.

MRS_{XY}, decreases. It occurs by **decrease in the marginal rate of substitution** as moving down along the indifference curve, which explains its convexity to the coordinate origin.

However, there are two major deviations from this situation.

1) For a pair of complementary goods, the indifference curves are L-shaped form (Fig. 2.7). Thus $MRS_{XY} = 0$ since these goods cannot be replaced with each other, i.e. the consumer does not cede even an infinitesimal amount of one product in favor of increasing the consumption of the other.

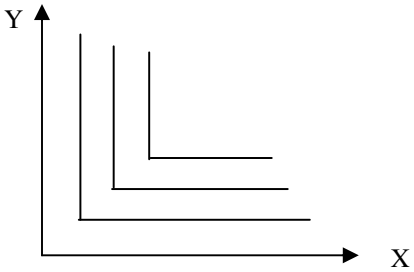

Fig. 2.7. Indifference curves in tight complementarity of goods X and Y, when MRS = 0

2) For a couple of interchangeable goods, the indifference curves are straight lines with a negative slope (Fig. 2.8). At this, MRSXY is a constant, because the consumer perceives both products as one.

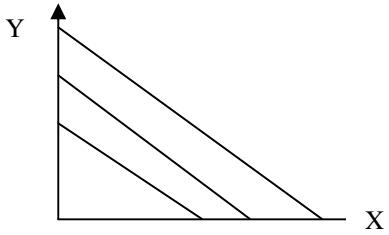

Рис.2.8. Indifference curves in the absolute interchangeability of goods X and Y, when MRS = const

2.4 Budget Line and its analysis

Rational consumer behavior aimed at maximizing the utility depends not only on his preferences, but also on his available fiscal opportunities. If consumer spends all fixed income (I) for goods X and Y in the Q_X and Q_Y quantities and at P_X and P_Y prices, the consumer's budget constraint is:

$$I = P_X \cdot Q_X + P_Y \cdot Q_Y \tag{2.7}$$

Having solved this equation with respect to Q_Y, we get the equation of the budget line:

$$Q_Y = -\frac{P_X}{P_Y} \cdot Q_X + \frac{I}{P_Y} \tag{2.8}$$

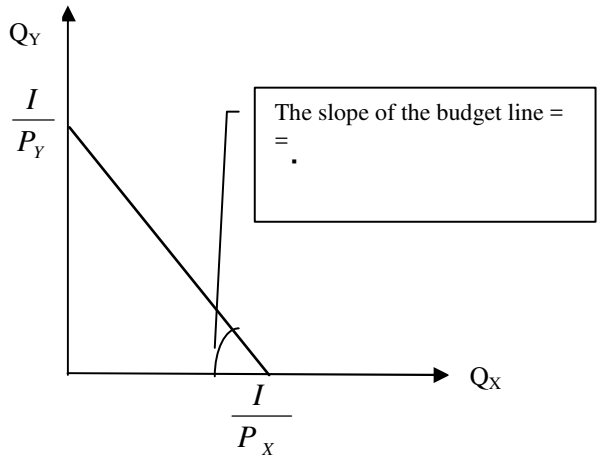

Рис. 2.9. Consumer's budget line: $\frac{I}{P_X}$ - the point at which the budget line intersects the X-axis, $\frac{I}{P_Y}$ - the point at which the budget line intersects the Y-axis

In the equation of the budget line (2.8), the ratio of prices of

goods $-\frac{P_X}{P_Y}$ determines the slope of the budget line, and the ratio $\frac{I}{P_Y}$ indicates the point of intersection of the budget line with the Y-axis (Figure 2.9). The point of intersection of the budget line with the X-axis is determined by $\frac{I}{P_X}$. Thus, **the budget line** is a line whose points are two alternative sets of goods, the purchase of which requires the same cost (Figure 2.9).

2.5 **Model of consumer equilibrium.**

The indifference curves and the budget line are used in ordinal approach to build graphical models of consumer equilibrium (or optimum). **Consumer equilibrium (optimum of consumer)** corresponds to a combination of two purchased goods, which allows extracting the maximum total utility under existing budgetary constraints. For a graphic picture of the consumer equilibrium, it is necessary to combine a map of indifference curves and budget line (Figure 2.10).

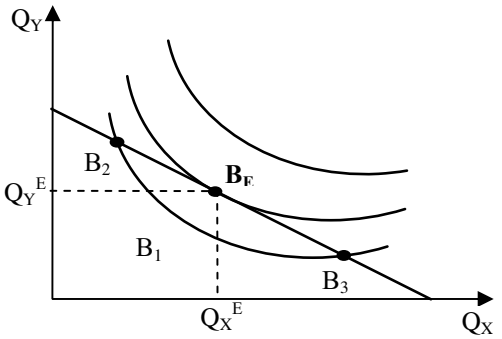

Fig. 2.10. Consumer equilibrium: the point B_E is a point of consumer optimum)

A rational consumer optimizing his choice sets two dominant purposes.

First, to utilize fully his income. Therefore, the consumer is not interested in a combination lying below the budget line shown in Figure 2.10 by point B_1. Sets lying above the budget line are inaccessible to the consumer at a given income. These sets are B_2 and B_3.

Second, to get the maximum satisfaction, i.e. to extract the maximum total utility from consumption of goods for a given budget constraint. Therefore, a rational consumer seeks to occupy the indifference curve the most distant from the coordinate origin, while remaining in his budget line. As seen in Figure 2.10, sets B_1, B_2 and B_3 provide the lowest level of utility. Moving along the budget line from the set B_1 to the set B_E, consumer moves to a higher indifference curve and, consequently, increases the utility.

The consumer optimizes his behavior, i.e., fully uses his budget and will gain the maximum utility if he gains the combination of goods corresponding to the point where the budget line is tangent to the highest of the available indifference curves. This point is called the consumer optimum (or consumer equilibrium), it is a point B_E in Figure 2.10.

It should be noted that at the consumer optimum, budget line slope (defined as $\frac{P_X}{P_Y}$) is equal to the slope of the indifference curve (which is equal to MRS_{XY}). Consequently, the condition of the optimum (equilibrium) of the consumer can be written as:

$$MRS_{XY} = -\frac{\Delta Y}{\Delta X} = \frac{MU_X}{MU_Y} = -\frac{P_X}{P_Y} \qquad (2.9)$$

As it follows from (2.9), in the consumer optimum point, the marginal rate of substitution of good Y by good X is equal to the ratio of prices of these goods.

2.6 Consumer reaction to changes in income and prices

Consumer reaction to changes in income:
line "income-consumption".

When consumer income rises at constant prices of goods, the budget line is shifted parallel to right-up, touching the more distant

indifference curves (Figure 2.11). Combining all the points of consumer equilibrium, we obtain **the line "income – consumption"** which is designated with English letters IEP (Income Expansion Path).

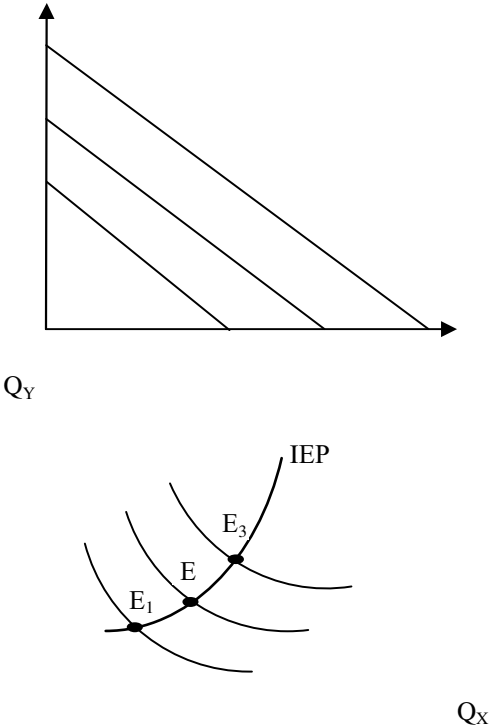

Fig. 2.11. The line "income – consumption" (IEP)

The line "income-consumption" (IEP), sometimes called the curve of the standard of living, shows how the individual consumption changes with the growth of its budget at fixed prices.

Figure 2.11 shows that the line IER is the variety of all optimal sets (E_1, E_2, E_3) in changing the consumer's income and constant price ratio.

In reducing the income, the situation is reversed: the budget line is shifted in parallel to left-down.

For normal (i.e. qualitative or superior) products, the line "income-consumption" (IEP) has a positive slope (as in our example shown in Fig. 2.11), as with income increasing their consumption increases.

The line "income-consumption" (IEP) will have a negative slope, if one of the products is low quality (i.e., inferior), that is, consumption of this product is reduced with growth of income (Figure 2.12).

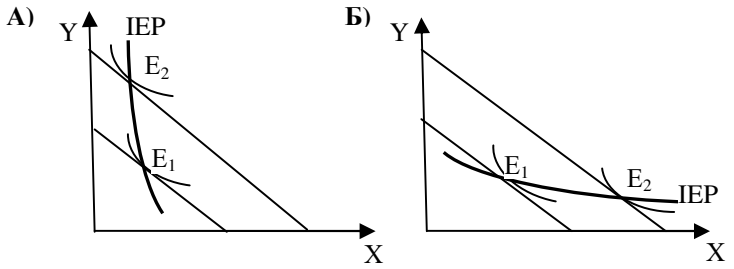

Fig. 2.12. The line "income – consumption" (IEP): A) product X is inferior; B) product Y is inferior

On the basis of the line "income – consumption", it is possible to construct the Engel curve named after German economist-statistician Ernst Engel who investigated it for the first time (1821 — 1896).

The Engel curve shows the relationship between the income of the consumer (I) and the amount of goods he purchased (Q_X).

For normal (superior) products, Engel curve has a positive slope (Fig. 2.13).

Thus the positive slope of the Engel curve for normal goods includes two options:

1) The convex Engel's curve, i.e. the slope angle of the curve increases with a growth of income, as additional acquisitions of

goods are reduced (Figure 2.13 A). This character of the curve is typical for essential commodities and food products.

2) The concave Engel's curve, i.e. the slope angle of the curve decreases with a growth of income, as additional acquisitions of goods are risen (Figure 2.13 B). Such products are luxury goods, medical services, education, recreation and tourism.

A) B)

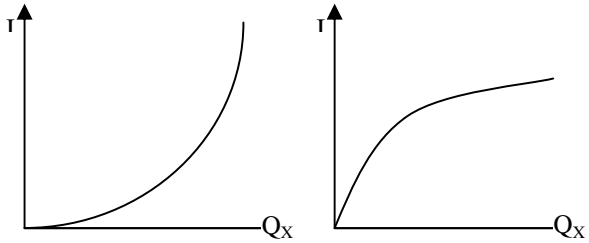

Fig.2.13. – the Engel curve for normal goods: A) the Engel curve for essential goods; B) the Engel curve for luxury goods

The Engel curve for low-quality (inferior) goods has a negative slope, as consumption of such goods is reduced with a growth of income of the consumer (Figure 2.14).

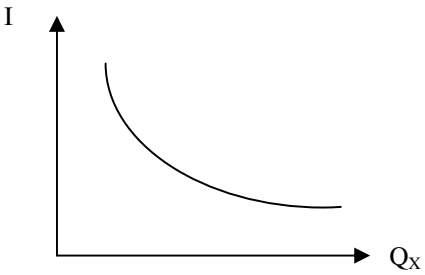

Fig.2.14. – the Engel curve for low-quality goods

Consumer reaction to changes in price:
line "income-consumption".

Change in the price of one of the goods (such as product X) in permanent income leads to a change in the slope angle of the budget line, i.e. to the rotation of the budget line: if the price of the product X is reduced (at a fixed price of product Y), budget line moves counterclockwise along the X-axis (since the acquisition of product X is increased); if the price of product X is rising - budget line moves counterclockwise.

Let's imagine that the price of product X is reduced consecutively, and then each price value will be corresponded by its budget line regarding any indifference curve. If to connect all the points of tangency, we get **the line "price-consumption"** (Fig. 2.15), which is denoted by English letters PEP (Price Expansion Path).

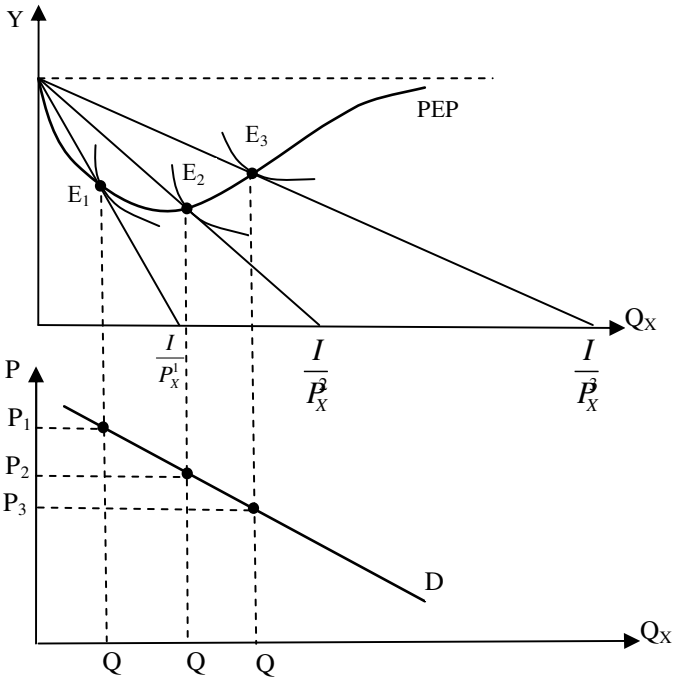

Fig. 2.15. The line PEP "price – consumption" and graphing

individual demand

Figure 2.15 (top) shows the rotation of the budget line counter-clockwise in progressively reduction of the price of a commodity X from Px^1 to Px^2 and to Px^3, and the line PEP is made. On the interval from E_1 to E_2, increase in consumption of product X is by reducing the consumption of product Y in reducing price from Px^1 to Px^2. The slope angle in this interval is negative. With a further reducing product X price, the consumer is able to increase not only the consumption of goods X, but the consumption of goods Y, as it is evidenced by the positive slope of the PEP curve on the interval to the right of E_2. In the future, when the product X price is very low, most of the consumer's income will be spent for the product Y purchase. It is shown in Figure 2.15 (at the top) with the approximation of the line PEP to the dotted line representing the maximum amount of product Y, which the consumer can purchase at his income.

In the bottom of Fig. 2.15, it is presented as graph of consumer individual demand is under construction on the basis of the line "price-consumption". In order to do this, it is necessary to drop perpendiculars to the X-axis showing the amount of product X from the consumer optimum points and to separate off the corresponding values of the product X price in the Y-axis.

Questions for discussion:

1. What objective bases corroborate the effect of the law of demand?
2. List the situations when the law of demand doesn't work.
3. What is the difference between change in demand and change in demand volume?
4. Name basic differences between the cardinal approach and the ordinal approach to the theory of consumer behavior.
5. Show the interrelation between marginal and total utility. Define the principle of diminishing marginal utility.
6. Define the axioms which give occasion to the ordinal model of consumer behavior.
7. Why does the indifference curve have a negative slope?
8. What does the flexion (curvature) of the indifference curve

mean?

9. When can the slope of budget line be changed?

10. Prove graphically the optimum (equilibrium) of consumer.

11. Prove the configuration of Engel curve for normal and low-quality goods in Kazakhstan economy.

12. Which curve in the theory of consumer behavior is used to explain the negative slope of the demand curve?

THEME 3. SUPPLY THEORY AND MODEL OF OPTIMAL BEHAVIOR OF THE PRODUCER

3.1 The supply model in the market economy.

3.2 Production with one variable factor. The law of diminishing marginal productivity.

3.3 Production with two variable factors. Isoquant and its analysis.

3.4 Budget constraint of producer: isocosts and its analysis.

3.5 The model of optimal behavior of the producer.

3.6 Patterns of long-term production and scale effect.

3.1 The supply model in the market economy.

Supply of goods is the willingness of the seller (producer) to sell (produce) product. In other words, it is the amount of the goods that sellers (producers) are willing to sell (produce) at every possible price level for a certain period of time.

Volume of supply is the maximum amount of the product that the seller (producer) is ready to sell (produce) at a given price per unit of time (day, month, year) under certain conditions.

The dependence of the volume of supply on its determinants is called the supply function.

The volume of goods supply is determined primarily by its price. **The supply price** is a certain minimum price at which a seller is willing to sell the product.

If the market price of the product rises, the producers will be interested in increasing the volume of its production and sales. Conversely, the steady trend to reducing the price of the product encourages entrepreneurs to reduce its production volume and sales.

Hence, **the law of supply**: the amount of supply of goods is in the direct dependence on the level of its price in all other equal conditions, i.e. with an increase in the goods price, the volume of its supply is increasing and vice versa.

If all factors except the price of the product, to accept as a permanent, then the supply function will represent a direct dependence of the number of products supplyed of its prices:

$$Q_S = f(P_X), \qquad (3.1)$$

where Q_S is supply size; P_X is product X price.

The supply function of goods from its price can be defined in three ways:

1 way is analytical, i.e. by a linear function of the supply:

$$Q_S = a + bP_X, \quad (3.2)$$

where a is the maximum possible supply of product X in the market, b is dependence of the supply on change in the price (at the same time reflects slope angle of the supply curve), P_X is X product price.

2 way is tabular presented in Table 3.1.

Table 3.1

The volume of supply of goods X at any given price level

P (price, KZT)	Q (volume of supply of goods X)
1	10
2	30
3	60
4	90
5	120

3 way is graphical, i.e. by the supply curve (Fig. 3.1).

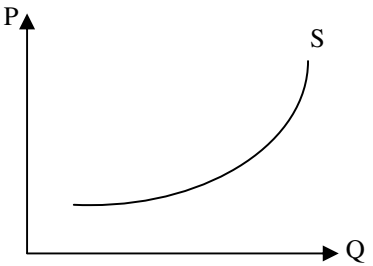

Fig. 3.1. The supply curve: S – supply, Q – amount of goods, P – goods price

It is important to note that as in the theory of demand, there is a distinction between the terms “supply” and “supply size” in the supply model.

The supply size varies with the price of the product, thus there is a displacement of the points along the supply curve, while the supply curve remains in place.

The "supply" is influenced by non-price factors (determinant), while there is a shift in the supply curve: right-down - with increasing supply; left - up - with decreasing supply (Figure 3.2).

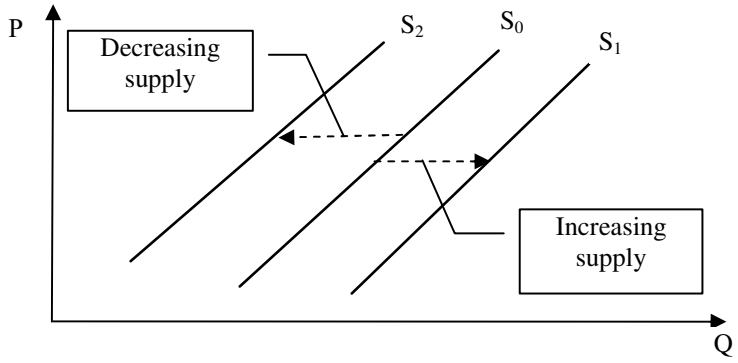

Fig. 3.2. The shift of the supply curve: from S_0 to S_1 – increasing supply; from S_0 to S_2 – increasing supply

The non-price factors of supplys which change leads to a shift in its curve include:

- Prices for resources used in the production;
- Taxes, subventions and subsidies to producers;
- The number of sellers in the market;
- Producers' expectations about the future level of prices and production conditions;
- Technological developments in production.

So far, we have considered an individual supply, i.e. supply from the perspective of an individual seller (producer). However, most commodity markets are characterized by multiple sellers (producers). The transition from individual to market supply is carried out by summing the individual supply of all sellers in the market at each possible price level.

3.2 Production with one variable factor. The law of diminishing marginal productivity.

The production in microeconomics is activities on the use of resources to create goods and services. Labor services, capital and natural resources used in the production are **the factors of production**. Goods and services are products of the manufacturing process. Productive function in the economy is operated by firms.

The firm is an economic entity having economic independence and performing three functions: it buys production factors, uses them to produce a product and sells it. The purpose of the firm is to maximize profits of the owner, - residual income after all payments to owners of production factors.[14] The main forms of business organization in the modern market economy are a corporation (joint-stock company), the individual firm and partnership.

The concepts "cost", "output", "firm operation" is interpreted quite broad in modern economics. The cost refers to all that the producer (firm) purchases to use in order to achieve the desired result. Output is any benefit (product or service) made by the firm for sale. The firm operation can mean both industrial and commercial activities such as transportation, storage and even the purchase of products with a view to resale.[15] In modern society, every firm produces, as a rule, not one but a number of economic benefits, but in the theory of microeconomics this fact is abstracted suggesting that only one product (or service) is produced in the analysis of the producer activity.

The general result of industrial activity or the amount of made products is dependent on the functioning of the main factors of production, their quantitative and qualitative level. This relationship is expressed by a mathematical function called **a production function.**

The production function is a model that expresses the economic and technological dependence on the maximum amount of product produced from the cost of factors used:

$$Q = f(K, L, M), \qquad (3.3)$$

where Q is the maximum amount of product which can be produced

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[14] Savickaya E.V. The course of lectures on microeconomics. - Moscow: Nat. fond of training, 2002. - P.78.

[15] Nureyev R.M. Microeconomics course. Textbook for high schools. - 2nd ed., Rev. - M. Publ. NORMA, 2000. - P. 158.

with this technology and these factors of production; *K* is a capital costs; *L* is labor costs; *M* is raw materials, materials costs.

For more detailed analysis, **Cobb-Douglas production function** is used:

$$Q = A \bullet K^{\alpha} \bullet L^{\beta} \bullet M^{\gamma}, \quad (3.4)$$

where *Q* is the maximum amount of product at a given production factors; *K, L, M* are the costs of capital, labor, materials; A is proportionality or scale factor (unit coupling factor); *α, β, γ* are elasticity factors of production volume, respectively, by capital, labor and materials, or the growth factor Q, attributable to the 1% of growth of the corresponding factor (with $\alpha + \beta + \gamma = 1$).

Cobb -Douglas production function has a constant elasticity of substitution of production factors, equal to one. It means that, for example, increase in the number of workers (respectively increase in gross payroll) is equivalent to increasing the capital amount that will cause exactly the same increase in production volume. Therefore, the entrepreneur does not matter due to the growth of what factors the output is increased: the same monetary unit gives the same production effect regardless of any increase in the factor it was spent.[16]

To investigate the influence of factors on the output volume, the notions of time periods are used, and all the production factors are divided into variable and fixed.

Fixed factors are factors, which are used by a firm in fixed amount during a certain period, i.e. their number does not change with the change in output.

Variable factors are the factors which use size changes for a given period and, therefore, the output of a firm changes.

According to this typology of the factors in the theory of producer behavior there are three time periods: the shortest term, short term and long term.

The shortest-term is the time interval during which the production capacity of each enterprise is fixed, i.e. all production factors are constant. However, this period is of no interest to any theoretical analysis, either for economic practice, so the mention of it is ex-

[16] Borisov E. Economic theory. - 3rd ed., Rev. and add. - Moscow: Yurayt-Izdat, 2005.

tremely rare in economics textbooks. Indeed, if the amount of production factor used does not change, then no firm output changes since the latter depends on the number of man-hours, machine hours, etc.

Short-time is the time interval during which a few (or at least one) of the production factors are constant, while the other (or at least one) factors are variable. In other words, in the short-term, some factors of production are constant, and others are variable.[17]

Long term is the time interval during which a firm can change all parameters of production, so the factors are variable (there are no constant factors). In other words, in the long-term, the firm has the ability to completely change its scale, the amount of the production means, etc., ant there is change in the number of firms operating in the industry.

The above production periods are not strictly defined intervals, the same for all industries. They do not differ in duration, but primarily conceptual, i.e. by possible changes in production factors used.[18] In other words, from the given definitions of short and the long-term it is visible that the long-term can be one month if the firm is capable to change volumes of use of all production factors during this time. On the other hand, the year can be regarded as a short-term if during the year at least one factor is constant by volume.

Next we stop on the production parameters in the short term. For this we consider a **production function with one variable factor:**

$$Q = f(X, Y), \tag{3.5}$$

where Q is production volume of company, X is the value of a variable factor , Y is a constant factor.

The production function with one variable factor is characterized by the fact that the output will be determined by the cost effectiveness of a variable factor which requires consideration of concepts such as total, marginal and average product.

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[17] Savickaya E.V. The course of lectures on microeconomics. - Moscow: Nat. fond of training, 2002. - P.78.

[18] Dolan Edwin G., Lindsay David E. Market: microeconomic model. Transl. from English. / Ed. Lisovik B., Lukashevich V. - St. Petersbur.: Avtokomp, 1992.

Total product (TP) is a total output that varies with increasing use of a variable factor.

Average Product (AP) of the variable factor is the ratio of the total product to the number of variable factor used in manufacture, i.e. it shows the amount of output that is per one unit of the variable factor

$$AP = \frac{TP}{X}, \tag{3.6}$$

where AP is average product, TP is total product, X is number of variable factor used.

Marginal product (MP) of a variable factor is the number of additional product obtained by using an additional unit of the variable resource:

$$MP = \frac{\Delta TP}{\Delta X}, \tag{3.7}$$

where MP is marginal product, ΔTP is growth of total product, ΔX is growth of the variable factor.

Next, we consider a graphical model of the function with a variable factor (Figure 3.3).

Important empirical regularities that illustrate the relationship between total, average and marginal products for the production function with one variable factor follow From Fig. 3.3:

1) when the total product (TP) is maximized , marginal product (MP) is 0;

2) the marginal product curve intersects the average product curve at the maximum point of average product;

3) the most effective use of a variable X factor occurs on the interval from point to point X_1 to point X_2. Here, the marginal product (MP) reaching its maximum value begins to decrease and the average product (AP) still increases. On this interval for each additional unit of a variable factor spent, producer receives the highest increase of the total product. Once the average product reaches maximum, increase efficiency of the variable factor use in the manufacture decreases. The cell of the total product curve (TP) after the point X_2 shows the declining efficiency of the variable factor use.

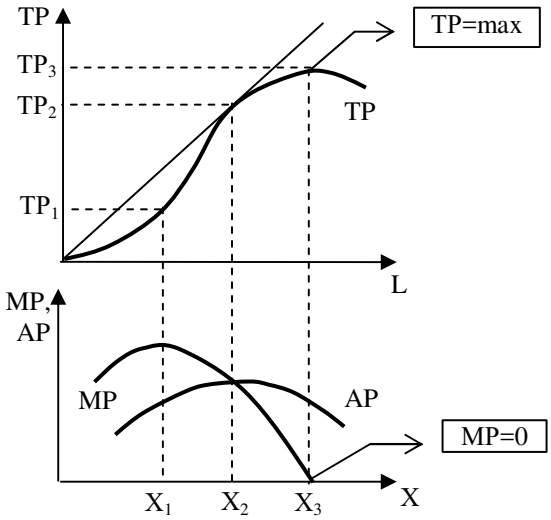

Fig. 3.3. The relationship between total, average and marginal products: TP is total product, AP is average product, MP is marginal product, X is variable factor of production

The dynamics of the marginal product is a clear illustration of **the law of diminishing marginal productivity** proved at the end of the 19th century by the American economist J.B. Clark (1847-1938) in "The Distribution of Wealth" (1899). J.B. Clark found out that at conditions when at least one factor of production remains constant, the additional increment of other factors makes less and less increase in output.[19]

Productivity of any factor of production is determined by how many units of output produced is per unit of production factor used.

For example, labor productivity is calculated as the ratio of output to the number of workers whose labor was involved in the production of this product. The more is the result of this relationship, the higher is the labor productivity.

[19] Agapova I.I. History of Economic Teaching: Lectures / Agapov I.I. - Moscow: Yurist, 2003.

The law of diminishing marginal productivity, the law of diminishing returns or the law of diminishing marginal product are different names of one law. His point is with increasing use of a variable factor of production (at constancy of other), such boundary will be reached after which the marginal product of a variable factor will decrease that will lead to decrease in relative and absolutely output volumes. In other words, the law of diminishing returns is that from a certain moment, the sequential addition of variable resource units (e.g., labor) to the permanent, fixed resources (e.g., capital or land) gives a decreasing additional, or marginal product based on the each subsequent unit of the variable resource.[20]

This law has no rigorous mathematical basis and is based on empirical observations. In addition, the law of diminishing marginal productivity operates only in the short term, as long as one of the production factors remains constant.

3.3 Production with two variable factors. Isoquant and its analysis

In the long term, all production factors become variable. Sometimes in microeconomic analysis of the long-term, additional premise that the firm uses only two factors, both of which are variable is introduced. Let's assume that in the long term, two variables X and Y are involving in the manufacture of a product, for example, respectively X is work (L) and Y is capital (K). And the production volume is constant, i.e. it is a production function with two variable factors:

$$Q = f(X, Y), \qquad (3.8)$$

where Q is output volume (Q = const), X, Y are variable factors. With each combination of these factors (e.g., labor and capital), the maximum possible output is determined. And the increase in one factor and a decrease in the other are so that the total output remains unchanged. For example, if the amount of capital is increased, therefore, the labor use is decreased. A modification of the production function with two variable factors is the isoquant.

Isoquant (or **the equal product curve**) is a curve which points represent all possible combinations of two variable production factors

[20] Zyryanov A.V. The law of diminishing returns and its impact on the cost / / http://www.elitarium.ru. - June 10, 2009.

which can be used for the production of definite amount of product (Figure 3.4).

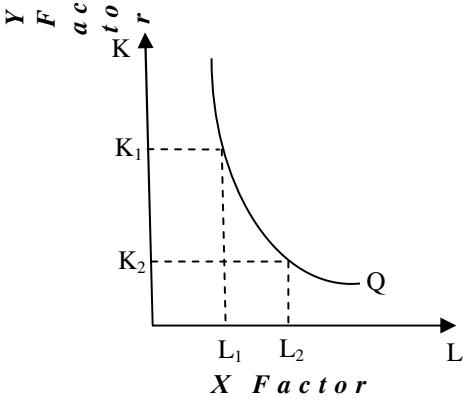

Fig. 3.4. Isoquant for the production function with two variable factors: L is labor costs, K capital costs

Isoquants are similar to the indifference curve, but with the important difference that if the indifference curves characterize consumer behavior, the isoquants reflect the producer behavior, i.e. its production function. In this case, in contrast to the indifference curves, where total customer satisfaction (utility) cannot be measured accurately, the isoquants shows the measured and well-defined production volumes.

Isoquant properties are similar to the properties of indifference curves:

1) isoquants have a negative slope associated with the fact that increasing use of one factor in definite output volume will always be accompanied by a reduction of other applicable factors;

2) isoquants are convex relative to the coordinate origin and does not intersect with each other;

3) isoquants located up and right of the other shows a larger

production volume.

The number of variable factors used (such as labor and capital) may change constantly, respectively, the maximum output volume will change (increase or decrease). Therefore, there is always a lot of isoquant or isoquant map, each of which shows the maximum output to be achieved by using certain combinations of variable resources (Figure 3.5).

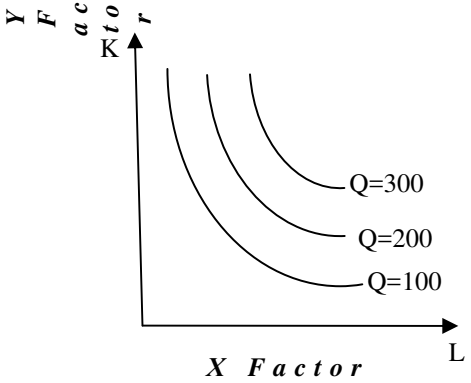

Fig. 3.5 Isoquant map

The isoquant slope (the slope ratio of the isoquant) shows how there is the technical substitution of one factor (capital) by other factor (labor) and it is called **the marginal rate of technical substitution.**

The marginal rate of technical substitution ($MRTS_{XY}$) of Y factor by X factor shows how many units are necessary to reduce the Y factor, in order to increase the use of X factor by one unit, while maintaining constant the output volume:

$$MRTS_{XY} = -\frac{\Delta Y}{\Delta X} \qquad (3.9)$$

Since the substitution of the production factors is in inverse ratio, the mathematical expression of the indicator $MRTS_{XY}$ is taken

with a minus sign

If two variable factors such as labor (L) and capital (K) are used, then:

1) The rate of technical substitution by labor capital ($MRTS_{LK}$) shows which amount of capital can be substituted by one additional unit of labor, while remaining the production volume constant:

$$MRTS_{LK} = -\frac{\Delta K}{\Delta L} \qquad (3.10)$$

2) The rate of technical substitution by capital labor ($MRTS_{KL}$) shows which amount of labor can be substituted by one additional unit of capital, while remaining output constant:

$$MRTS_{KL} = -\frac{\Delta L}{\Delta K}. \qquad (3.11)$$

Graphically, the marginal rate of technical substitution can be represented as a tangent to the isoquant at this point thus the tangent of angle of descent to the isoquant at this point corresponds to *MRTS.*

The value MRTS of production factors is determined by their marginal productivity. Thus, as the number of labor employed increases by ΔL, the output increases by $\Delta L \bullet MP_L$, and the reduction in capital volume by ΔK, reduces it by $\Delta K \bullet MP_K$. Therefore, if the output value remains constant, the increase in the number of labor employed fully compensates the reduction of the capital volume, that is, the following equality is carried out:

$$\Delta L \cdot MP_L = -\Delta K \cdot MP_K \rightarrow -\frac{\Delta K}{\Delta L} = \frac{MP_L}{MP_K} = MRTS_{LK} \qquad (3.12)$$

Under the action of the law of diminishing returns (as moving down the isoquant), **MRTS will gradually diminish.** Principle of decreasing MRTS indicates that the efficiency of any resource use is limited (i.e. as substituting capital by labor, labor productivity decreases). A similar situation occurs in the case of substitution of labor by capital.

MRTS decreasing as moving down the isoquant causes an isoquant convexity about the coordinate origin. However, there are two exceptional cases in the isoquant configuration:

1) A situation where two variable factors of production are absolutely (completely) interchangeable, i.e. $MRTS_{XY}$ = const and iso-

quants are straight lines with a negative slope (Fig. 3.6). For example, in a fully automated production condition, i.e., if a complete substitution of labor by capital is possible.

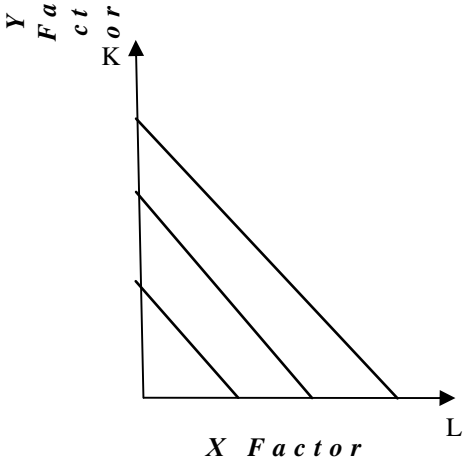

Fig. 3.6. Isoquant at the absolute interchangeability of factors, $MRTS_{XY}$ = const

2) A situation where two production factors perfectly complement each other, i.e. $MRTS_{XY} = 0$ (Figure 3.7).

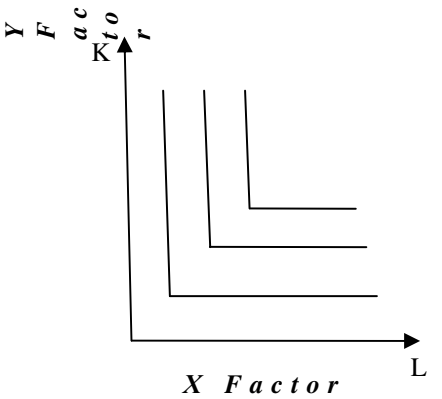

Fig.3.7. Isoquant at perfect complementarity of factors,

$MRTS_{XY} = 0$

3.4 Budget constraint of producer: isocosts and its analysis.

Isoquant demonstrated ability to get a specific output by different technological ways (with different combinations of resources used), or in other words, the mutual substitutability of factors makes the question of what combination of resources most serves the interests of the rational producer?

Isocosts line or isocosts allows maximizing the output data at cost or minimizing the costs of this output. Let's consider its essence.

Any producer buying factors for the production organization has set parameters of his budgetary possibilities. Let's assume that two variables of factors X and Y are used in the production of goods which have a certain price, fixed at the time of analysis - the P_X and P_Y respectively. The producer may acquire these factors in certain combinations with the condition not to go beyond his budget constraints. Producer's expenditures for the purchase of X factor is $P_X \bullet X$ and Y factor respectively is $P_Y \bullet Y$. Then the total costs of the producer (C) will be equal to:

$$C = P_X \bullet X + P_Y \bullet Y \qquad (3.13).$$

Having solved this equation with respect to Y, we obtain the isocosts equation:

$$Y = -\frac{P_X}{P_Y} \cdot X + \frac{C}{P_Y} \qquad (3.14)$$

Isocosts (or **isocosts line**) is the line which points are all possible combinations of two factors of production which acquisition requires the same cost (Figure 3.8).

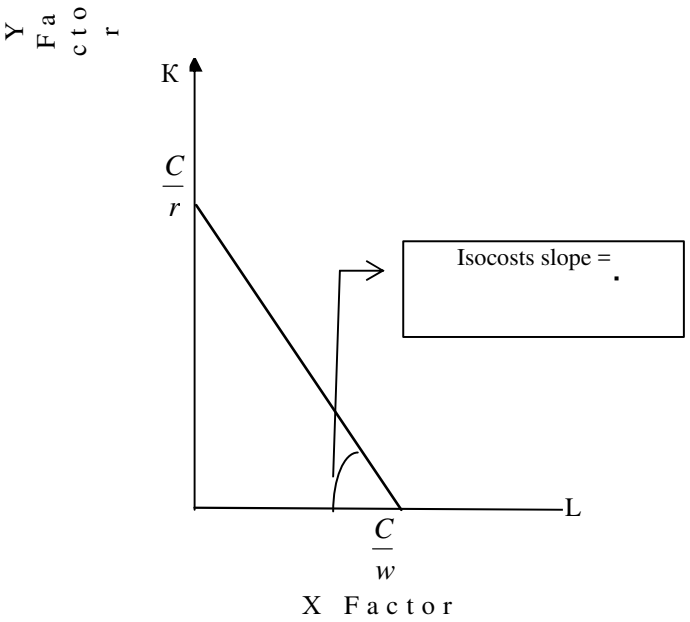

Fig. 3.8. Producer's isocosts: $\frac{C}{w}$ is point where isocosts intersects X-axis, $\frac{C}{r}$ is point where isocosts intersects Y-axis

Graphically producer's isocosts looks the same as a budget line of the consumer, with the difference that isocosts reflects the production parameters. At constant factor prices, isocosts is a straight line with a negative slope (Fig. 3.8).

In isocosts equation (3.14), the ratio of production factors prices $-\frac{I}{P_X}$ determines the slope of the budget line, and the ratio $\frac{C}{P_Y}$ indicates the point of isocosts intersection with Y-axis. The point of isocosts intersection with X-axis is determined by ratio $\frac{C}{P_X}$.

When there are two factors of production such as labor and capital, it is possible to write the equation of the budget constraint (3.13) and Isocosts (3.14) in the special form, i.e. in the case where the X factor is labor (L), and Y factor is capital (K). Thus, the budget constraint has the form in this case:

$$C = w \cdot L + r \cdot K \qquad (3.15),$$

where C is total costs, w is the wage rate (as the labor price), L is labor amount employed in production, r is interest rate (as the capital price), K is the amount of capital used.

Then the Isocosts equation using labor and capital can be written as:

$$K = -\frac{w}{r} \cdot L + \frac{C}{r} \qquad (3.16).$$

In the Isocosts equation for labor and capital (3.16), the ratio $-\frac{w}{r}$ shows the slope of the budget line, the ratio $\frac{C}{r}$ indicates Isocosts intersection point with Y-axis, and Isocosts intersection point with the X-axis will be determined by ratio $\frac{C}{w}$. (Figure 3.8).

In producer's budget change (at constant prices for resources), Isocosts shifts: parallel to right-up – in increasing the producer's budget and parallel to left-down - in reducing the budget.

Price change for one of the production factors (e.g., for X factor) at permanent income leads to a change in the slope angle of Isocosts, i.e. to its rotation: If the price of X factor is reduced (at a fixed price of Y factor), isocosts shifts counterclockwise along X-axis (because the acquisition of X factor is increased); if the price of X factor increases, Isocosts shifts counterclockwise.

3.5 The model of optimal behavior of the producer.

The task of the rational producer consists is in fact that its scarce cash (budget) for the purchase of production factors to produce the maximum amount of product, i.e. to take the most distant isoquant from the coordinate origin.

Isoquant touch with isocosts determines the position of **the producer's equilibrium (optimum)**, it allow achieving maximum

output with full use of his existing budget which can be spent for the purchase of production factors (Fig.3.9).

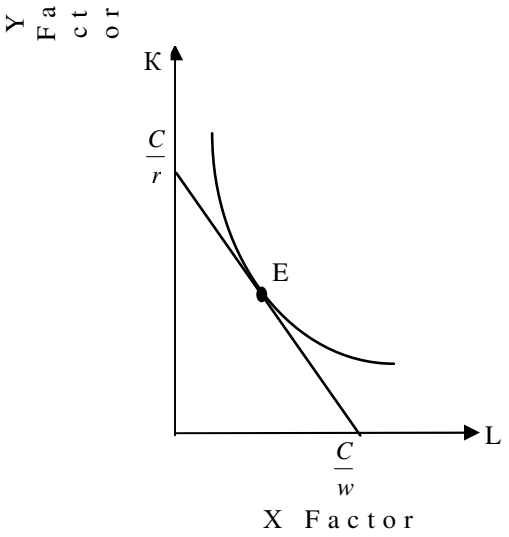

Fig. 3.9. The producer's equilibrium: point E is optimum point

As at producer's optimum point, the isoquant slope (defined by $MRTS_{XY}$) and the isocosts slope (defined by the ratio of production factors prices $-\frac{I}{P_X}$) are equalized, i.e. **the condition of producer's equilibrium (optimum)** can be written as:

$$MRTS_{XY} = -\frac{\Delta Y}{\Delta X} = \frac{MP_X}{MP_Y} = -\frac{P_X}{P_Y} \qquad (3.17)$$

In using labor and capital for the producer's optimum position, the identity of (3.16) can be written as:

$$MRTS_{LK} = -\frac{\Delta K}{\Delta L} = \frac{MP_L}{MP_K} = -\frac{w}{r} \quad (3.18)$$

On the basis of the identity (3.16) and (3.17), we can determine the producer's optimum position as ratio equality between the prices of the production factors and changes in these factors.

A rational firm (i.e. profit maximizing) using two variables of partially interchangeable factors to produce a given volume of production will tend to choose a combination of these resources, which will be the cheapest by cost measurement. Thus, the task of rational producer is first, to minimize the costs for any given amount of production, and second, to maximize profits.

To derive rules for the use of production factors (resources), it is necessary to introduce the concepts of marginal product in terms of money (or the marginal resource revenue product) and the marginal resource cost.

The marginal resource revenue product (or **the marginal resource product in terms of money, MRP**) shows the increase in total revenue as a result of applying additional unit of a variable factor.

The marginal resource product in terms of money (MRP) is equal to the marginal revenue product (MR) of the company and the marginal resource product (MP).

The marginal revenue of the firm (MR) is additional revenue from the production and sale of one additional unit of product.

Thus, the marginal resource revenue is given by:

$$MRP = MR \times MP \quad (3.19)$$

The marginal resource cost (MRC) is an additional cost of the firm by the acquisition of an additional unit of a production factor.

Buying a production factor, the enterprise should compare the revenue of this factor to the cost to buy it, namely, the marginal resource product of labor (MRP) with the marginal resource cost of labor (MRC). It is clear that additional units of a variable factor will be purchased for as long as their productivity (marginal resource revenue) is a positive value. The maximum profit will be achieved in the case of full equality of MRP and MRC.

Therefore **the effective resources use rule** is expressed by the equation:

$$MRP = MRC \qquad (3.20)$$

The effective resources use rule (3.20) means that in order to maximize profits, each producer (firm) must use additional units of a variable factor as long as each additional unit of the resource allows growth of the total income exceeding growth of the total costs.[21] In other words, the firm optimizes the purchase of each resource in accordance with rule MRP = MRC, purchasing additional units of the variable resource as long as the marginal resource revenue is equal to the marginal resource cost.

The cost minimization rule for any given volume of output (also known as **the least cost rule**) follows from rules of the resources use. The essence of this rule: minimizing costs and the optimum combination of factors is achieved when every last currency (tenge, dollar, etc.) spent for the purchase of each factor gives the same growth rate in total output, i.e. the similar marginal product. Mathematically, the rule of minimizing costs for any given volume of output (or the rule of least-cost) is expressed as follows:

$$\frac{MRP_X}{P_X} = \frac{MRP_Y}{P_Y} = \frac{MRP_Z}{P_Z} \quad , \qquad (3.21)$$

where MRP_X, MRP_Y, MRP_Z are marginal resources used revenue X, Y, Z; P_X, P_Y, P_Z are prices of resources X, Y, Z.

From the viewpoint of rational behavior of producer, the rule of least costs means that a relatively expensive production factor will be replaced by relatively cheaper. So, for labor (L) and capital (K): if $MRP_L / P_L > MRP_K / P_K$, the firm will minimize its costs by replacing capital by labor. In the process of this change, the marginal labor product (and hence its marginal revenue) will be reduced (according to the law of diminishing marginal productivity), and the marginal capital product (and its marginal revenue) will grow. Replacement of capital by labor will be as long as there is equality suspended marginal revenue factor at appropriate prices, i.e. as long as the equality us achieved (3.21). Conversely, if the $MP_L / P_L < MP_K / P_K$, then a rational firm should substitute labor by capital in order to achieve equality (3.21).

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[21] Nureyev R.M. Microeconomics course. Textbook for high schools. - 2nd ed., Rev. - M. Publ. NORMA, 2000. - P. 162.

However, costs minimization at a given production volume does not mean that the volume provides the firm with the best income. Costs minimization is a necessary but insufficient condition for profit maximization. Therefore **the profit maximization rule** is a further modification of the cost minimization rules. As noted above, the firm optimizes the purchase of each resource in accordance with rule MRP = MRC. In this case, the marginal costs of resource purchase are equal to its price, i.e. MRP = MRC = P. Allowing for it, we can re-write the above formula derived as follows:

$$\frac{MRP_X}{P_X} = \frac{MRP_Y}{P_Y} = \frac{MRP_Z}{P_Z} = 1 \qquad (3.22)$$

or

$$MRP_X = P_X, \quad MRP_Y = P_Y, \quad MRP_Z = P_Z \qquad (3.23)$$

The profit maximization rule in a competitive market means that the marginal products of all the resources in value terms are equal to their prices, or that every resource is used as long as its marginal product in terms of money will not be equal to its price.[22]

Following those conditions (3.22) means that the firm operates efficiently, i.e. the optimal combination of resources is provided, minimizing production costs with the only possible level of output that maximizes profit.

3.6 **Patterns of long-term production and scale effect.**

Let's assume that resource prices remains constant in long-term whereas producer's budget increases constantly. In this case, isocosts will shift right-up every time touching an indifference curve, i.e. new points of producer's equilibrium will be made.

By connecting all points of touch of isoquant with isocosts (optimum point), we can get a curve called the "development path"[23] or a firm growth line (isocline)[24]. This curve shown in Fig. 3.10 by OS line is an optimal trajectory of the firm's economic expansion, as it

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[22] Nureyev R.M. Microeconomics course. Textbook for high schools. - 2nd ed., Rev. - M. Publ. NORMA, 2000. - P. 164.

[23] Nureyev R.M. Microeconomics course. Textbook for high schools. - 2nd ed., Rev. - M. Publ. NORMA, 2000. - P. 170.

[24] Selishev A.S. Microeconomics. - St. Petersburg.: Peter, 2002. - P.194.

includes all combinations of the two factors (e.g., labor and capital), which the firm will select to minimize costs for each output.

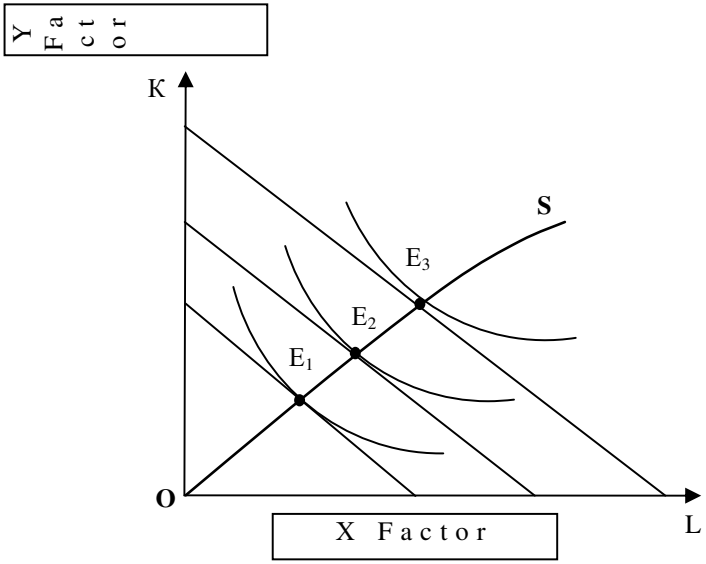

Fig. 3.10. OS line is firm's growth line (isocline, "the delopment path")

In addition, the "development path" curve (firm's growth line) shows the ratio growth rate between the factors in the process of expanding production, i.e. features of the growth of production scale (Figure 3.11).

If the distance between the isoquant does not change, it indicates that there is a constant scale economy (constant scale effect or constant production returns to scale), i.e., an increase twice in the number of factors used in the production leads to an increase twice in production too (Fig. 3.11 A).

If the distance between the isoquant decreases, it indicates the growing economies to scale (positive scale effect or increasing re-

turns to scale), i.e. an increase twice in the number of production factors used leads to an increase more than twice in production (Fig. 3.11 B).

If the distance between the isoquant increases, it indicates a decreasing economy to scale (negative scale effect), i.e. an increase twice in the number of production factors used leads to an increase less than twice in output (Fig. 3.11). In decreasing returns to scale, to create large-scale production is unprofitable. The reason for the low efficiency in this case, as a rule, is additional costs associated with the cumbersome production management system, the difficulties of in-house coordinating of large-scale production.

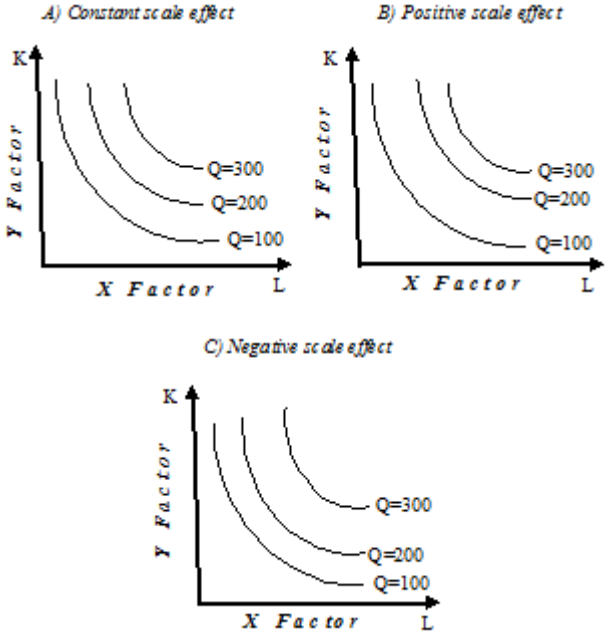

Fig. 3.11. Production scale growth effect: A) Constant scale effect; B) Positive scale effect; C) Negative scale effect

In the case of a positive effect to production scale, the firm must continue to increase the production volume as it leads to relative

economy of resources. The negative effect to production scale suggests that the minimum effective size of the enterprise has been made and further production increase is impractical. Thus, the parameters of the "development path" curve allows not only to establish the optimal combination of resources used to maximize the output volume and minimize production costs, but also to determine the minimum effective size of the enterprise in the industry.

Questions for discussion:

1. Name the non-price determinants of supply.
2. What temporary production periods are allocated in the microeconomic analysis of the producer behavior? What are the characteristics of these time periods?
3. What is the economic significance of production function?
4. What empirical regularities exist between the total, average and marginal products of variable factor in the production with a single variable factor?
5. Why does the law of diminishing marginal productivity have the external character?
6. What causes the negative slope of the isoquant?
7. Give all the possible ways to calculate the MRTS.
8. What is the economic sense of Isocost?
9. Prove graphically the equilibrium (optimum) position of producer.
10. How do the least-cost rules and profit maximization rules work?
11. How do the effects of production scale influence the optimal size of enterprise? Give examples of influence of production scale effects on the activity of Kazakhstan business-sector.

THEME 4. THE MODEL OF MARKET EQUILIBRIUM AND PROBLEM OF ITS STABILITY

4.1 The mechanism of the interaction between supply and demand.

4.2 The problem of market equilibrium stability. The "Cobweb" dynamic model.

4.1 The mechanism of the interaction between supply and demand.

In the market in the interaction between consumer demand and producers (sellers) supply, **the market equilibrium** is formed (point E in Fig. 4.1), i.e. the situation when the demand volume for the product is equal to the volume of its supply at a certain price level. The price and the corresponding sales (PE, QE) are also called equilibrium, corresponding to the equilibrium point. The equilibrium state of the market is also called **optimal.**

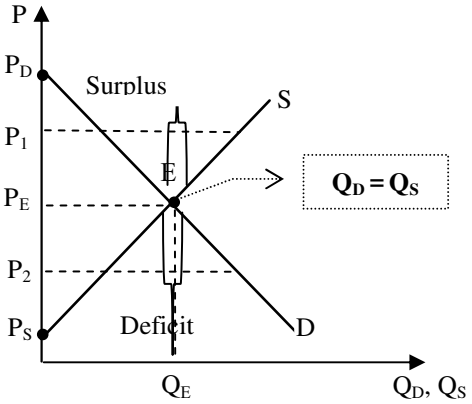

Fig. 4.1. Market equilibrium and deviations from it: E is point of market equilibrium, P_E is equilibrium price, Q_E is equilibrium volume of sales, P_D is maximum demand price, P_S is minimum supply price

The equilibrium price (P_E) is the price, balancing supply and demand.

Formation of the equilibrium price is a process that requires a certain amount of time. Buyers come from the demand price (P_D in Fig. 4.1), i.e. maximum possible price they are willing to pay for the product. Vendors come from the supply price (PS in Fig. 4.1), i.e. the minimum price they are willing to sell the product. As a result of the interaction of these two forces, formation of the equilibrium price appears which benefits are both for buyers and sellers.

The gain (surplus) of the consumer is the difference between the product's maximum price the consumer is willing to pay for a given quantity of goods, and the equilibrium price he really pays. Since the equilibrium price is usually lower than the maximum supplyed consumer prices, surplus value (gain) of the consumer can be represented graphically by area of triangle P_EEP_D (see Fig. 4.1).

The gain (surplus) of the seller (producer) for each product unit is the difference between the equilibrium price received by producers, and the minimum price a seller is willing to sell the product. Due to the fact that the equilibrium price is usually higher than the minimum price sellers are willing to sell the goods, the amount of surplus (gain) of the seller can be represented graphically by area of triangle P_EEP_D (see Fig. 4.1).

The price the goods are actually sold or purchased on the market is called **the market** (or selling). And the market price may be different from the equilibrium because it does not coincide with the equilibrium and the actual volume of sales (production) of goods.

Let's suppose, due to the impact of certain market factors, the market (selling) price of the goods settled down above the equilibrium, for example, at P1 level (see Fig. 4.1). Then people willing to sell the goods is more than willing to buy it in the market, i.e. the supply volume of goods exceeds the demand volume ($Q_S > Q_D$) and makes the surplus (overproduction) of product. In this situation, the sellers wanting to reduce trade surplus will reduce the price, and producers - to reduce its production. In other words, the goods surplus will "push" the market price down. With the reduction in the market price, the market size value of consumer for the product will grow. It will continue as long as the trade surplus will not disappear and a balance is reached in the market again.

In opposite situation, when the market price (P_2) is lower than

equilibrium, there is deficit of goods in the market, as people willing to buy is turned out to be more than willing to sell it ($Q_D > Q_S$). Deficit of goods will "push" the market price up. With the growth of the market price, an increase in the volume of its supply will be, while reducing surplus demand. As a result of all these processes on the market, a balance is reached again.

Until now, considering the problems of market equilibrium, we started from the "fixity" of supply and demand curves. However, the imbalance is possibly by reasons related with the shift of demand and/or supply curve under the influence of non-price factors (Fig. 4.2 and Fig. 4.3)

First, we consider the effects of changes in demand and shift of its curve. Let's assume that as a result of increasing consumers' income, demand for a product has increased. It will lead to a shift to right-up of the demand curve (Figure 4.2 A). As a result, the equilibrium price and the equilibrium volume of sales increase.

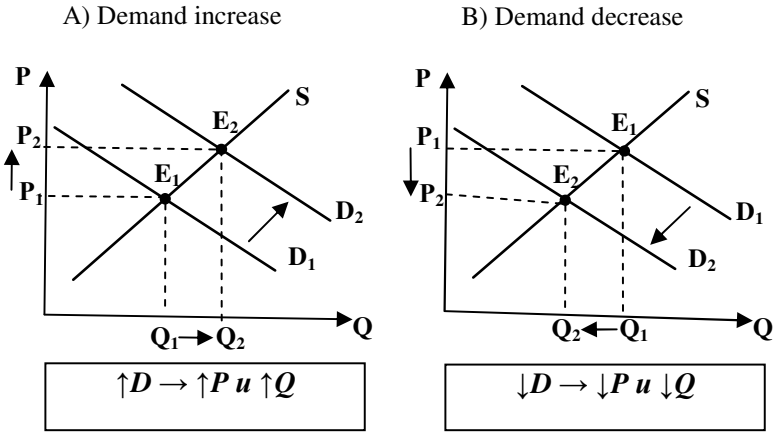

Fig. 4.2. The effects of the shift of the demand curve: A) in increasing demand; B) in decreasing demand

The reverse reaction of the market will be experienced in decreasing demand and a shift of the demand curve to left-down (Fig. 4.2 B): the equilibrium price and sales volume decline.

Now, let's consider the effects of changes in supply and a shift

in the supply curve (Figure 4.3).

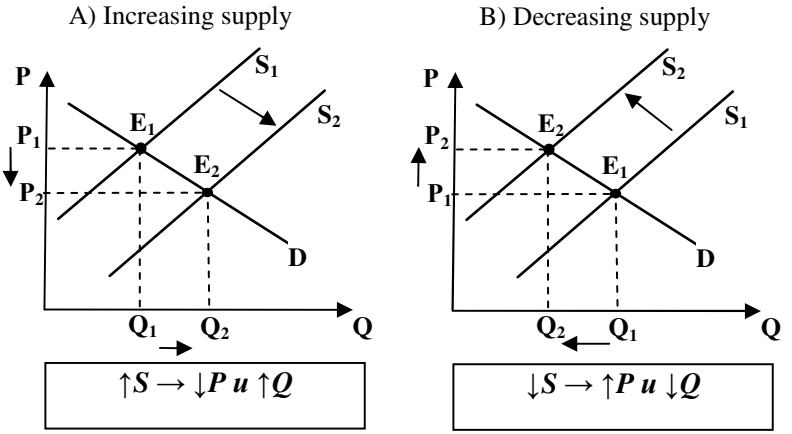

Fig. 4.3. The effects of the shift of the supply curve: A) in increasing supply; B) in decreasing supply

Let's suppose now that rise in the cost of raw materials has occurred (or state imposed strict requirements on protection of the environment), which will lead to a reduction in the production volume and sales of goods, i.e. shift of the supply curve to left-up (Figure 4.3 B). As a result, the equilibrium price will rise, and the equilibrium volume of sales will decline. In the opposite situation, with an increase in supply and a shift of its curve to right-down (Figure 4.3 A), a reduction in the equilibrium price and the equilibrium growth in sales will occur.

4.2 The problem of market equilibrium stability. The "Cobweb" dynamic model

The ability of the market, derived from the equilibrium state, to return again to it under the influence of its internal (including pricing) mechanism is called equilibrium stability.

Stable market equilibrium is reached when the deviation of the market price from equilibrium (e.g. P_1 and P_2) are gradually paid off, tending to the equilibrium level of P_E.

The establishment of equilibrium is often a result of cyclical fluctuations in prices, which are damped. In case of damped fluctuations, the equilibrium is reached after a period of time T_E, as it shown in Fig. 4.4 (A).

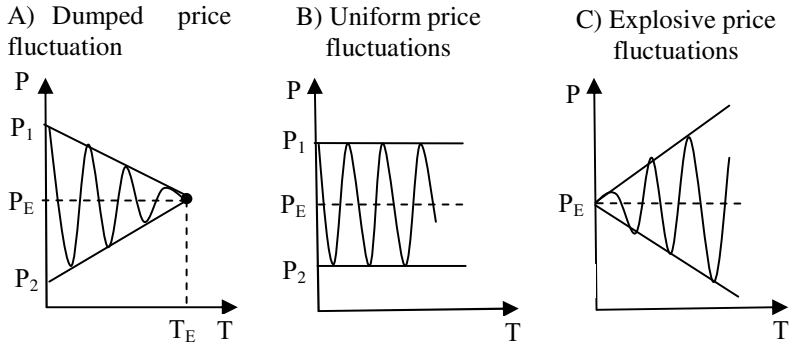

Fig. 4.4. Fluctuations of market price: A) Dumped price fluctuation is equilibrated; B) Uniform price fluctuations is not equilibrated; C) Explosive price fluctuations is not equilibrated

The market equilibrium and the equilibrium price are not formed when price fluctuations are uniform or explosive nature, as it shown in Fig. 4.4 (B, C).

In the analysis of the equilibrium stability in microeconomics, dynamic models that take into account the time factor are used. A simple dynamic model is the so-called “cobweb model”, illustrating the formation of market equilibrium as a result of the damped fluctuations (Fig. 4.5).

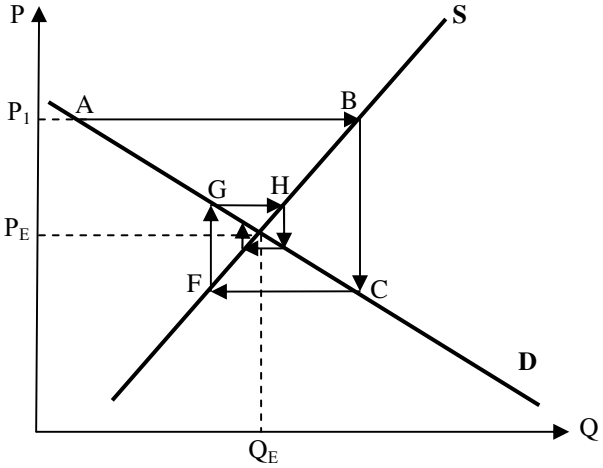

Fig. 4.5. Dumped price fluctuation (the slope angle of the supply curve is steeper than the slope angle of the demand curve) and the formation of stable equilibrium in the cobweb model)[25]

The equilibrium stability in the cobweb model is defined by the slope angles of the supply and demand curves, or rather, the nature of demand and supply elasticity (the concept of elasticity in detail is in theme 5).

The equilibrium will stable if the slope angle of supply curve is steeper than demand curve (Figure 4.5), i.e. when the supply elasticity is less than the demand elasticity of price. The process of adjustment goes through a number of cycles. The initial step is supply surplus (AB), which leads to reduction in the market price (BC). As a result, there is demand surplus (CF) which "pushes" the market price up (FG), which leads to new supply supply (GH), and so on until equilibrium is established as a result of such damped fluctuations of market prices.

The opposite to stable equilibrium situation is unstable equilibrium (Fig. 4.6).

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[25] Nureyev R.M. Microeconomics course. Textbook for high schools. - 2nd ed., Rev. - M. Publ. NORMA, 2000. - P. 95.

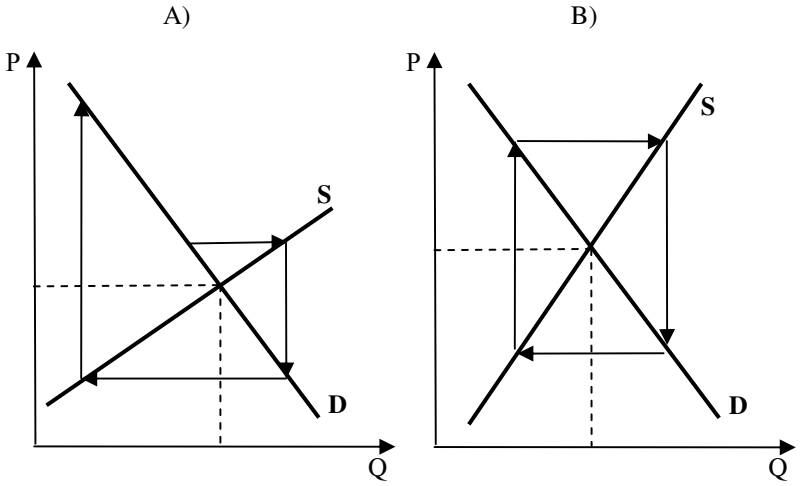

Fig. 4.6. The unstable equilibrium in the cobweb model: A) explosive fluctuations (the slope angle of the demand curve is steeper than the slope angle of the supply curve), B), regular fluctuations around the equilibrium point (the slope angles of the demand and supply curve are equal)

Unstable equilibrium occurs in two main ways:

1) If the slope angle of the demand curve is steeper than the slope angle of supply curve (i.e., demand is less elastic by costs than supply), as it shown in Fig. 4.6 A, and the price fluctuations are explosive, increasingly removing the starting point from the equilibrium point, at the end, the equilibrium is not established.

2) If the slope angles of supply and demand curves are equal (Fig. 4.6 B), the market price will be making regular uniform fluctuations around the equilibrium price and the equilibrium is not established.

Investigation of the stability of market equilibrium is of great practical importance. If the market is equilibrium stability, it is self regulated due to effective price mechanism and, therefore, such market does not need additional regulation by the state. If the market equilibrium is unstable, state regulation of the market is necessary (through tax levers, grants, establishment of fixed prices).

Analysis of the cobweb model leads to an important conclusion that the slope angles of supply and demand curves (i.e., the nature of demand and supply elasticity) are important for understanding the logic of functioning the market mechanism and the model of consumers (buyers) and producers (sellers) behavior in the market. It is therefore necessary to focus mainly on the concept of supply and demand elasticity, which is dedicated to the next theme.

Questions for discussion:

1. What is the practical value of market equilibrium model? What forces balances the market?
2. Contrast the concepts of "equilibrium price" and "market price".
3. How is the market balance restored in the cases of market price deviation from equilibrium price?
4. How does the consumer surplus occur?
5. How does the producer surplus (seller) occur?
6. "The consumer profit can be increased only at the expense of producer profit". Is it true? Why?
7. What are the effects of changes in demand and supply for the whole picture of market equilibrium?
8. How are the conditions of stable equilibrium achieved in the cobweb model?
9. In which case is the equilibrium in the cobweb model not established?
10. Explain constant agiotage about deficiency and increase of market price for buckwheat in Kazakhstan from the viewpoint of market balance model.

THEME 5. CONCEPT OF DEMAND AND SUPPLY ELASTICITIES.

5.1 Model of the demand elasticity and its practical significance.
5.2 Model of the supply elasticity and the time factor

5.1 Model of the demand elasticity and its practical significance.

A special place in the study of the possible reactions of the economic agents (consumers and producers) to change any market determinant is the concept of elasticity, which is defined as a reaction measure of one variable economic value to changes in another variable.

The demand elasticity is a reaction measure of the demand to change in price and non-price factors.

There are 3 types of demand elasticity:

1) The price elasticity of demand;
2) The revenue elasticity of demand;
3) The cross-elasticity of demand.

The price elasticity of demand shows the relative change in the demand volume under the influence of price changes by one percent:

$$E_D^P = \left| \frac{\Delta Q_D / Q_D}{\Delta P / P} \right| = \left| \frac{\text{Changes in demand volume, in \%}}{\text{Changes in price, in \%}} \right|, \qquad (5.1)$$

where E_D^P is price elasticity of demand; $\Delta Q_D/Q_D$ is relative change in demand volume (in %); $\Delta P/P$ is relative change in price (in %).

Since, according to the law of demand, demand volume and $\Delta Q < 0$ decline with appreciation, then in order to avoid a negative number, a minus sign or a module are entered.

If:

$E_D^P > 1$ – the demand is elastic, i.e. a one percent change in price leads to a change in the demand volume by more than 1% (or small changes in price lead to significant changes in the demand volume, i.e. demand is very sensitive to changes in commodity prices).

$E_D^P < 1$ – the demand is inelastic, i.e. a one percent change in price leads to a change in the demand volume by more than 1% (or

significant changes in price lead to small changes in the demand volume, i.e. demand is insensitive to changes in commodity prices).

$E_D^P=1$ – a unit elasticity demand, i.e. a one percent change in price leads to a one percent change in the demand volume.

There are also two extreme cases of price elasticity of demand (Figure 5.1):

1) If $E_D^P = 0$ - the demand is non-elastic, i.e. change in product price does not cause any changes in the demand volume for the product. In other words, demand is insensitive to price changes. For example, the demand for essential goods (salt, matches, bread, etc.), as well as the demand for many important drugs are characterized by absolute inelastic. Absolutely inelastic demand is graphically represented by a vertical line.

2) If $E_D^P = \infty$ - the demand is elastic, that is, any slight decrease in prices leads to unlimited demand, and any slight increase in price leads to a complete rejection of this product consumption. In other words, a perfectly elastic demand means that there is only one price at which the product will be purchased by consumers. An example of the perfectly elastic demand is the demand for the product of individual seller in a market of perfect competition. Perfectly elastic demand is a horizontal line.

Graphically different price elasticity of demand for the product can be expressed through a different slope of the demand lines: elastic demand graphically will look like a flatter line, inelastic demand - a steeper line. In other words, the steeper (less) the slope angle of the demand curve, the more inelastic demand (i.e. demand is less sensitive to the price).

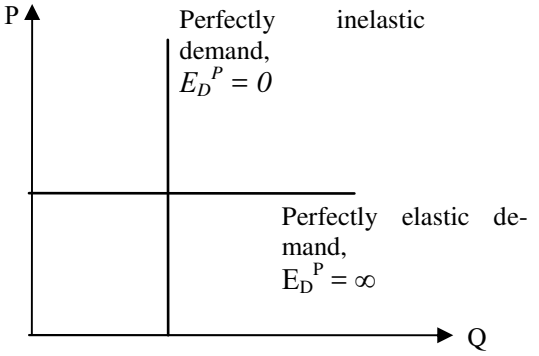

Fig. 5.1. Extreme cases of price elasticity of demand

For a linear function of demand, the value of the elasticity E_D^P will be different in different parts of the demand curve (see Figure 5.2), taking values from 0 (at D_1) to ∞ (at D_2).

This fact is easily explained by arithmetic. The fact that in the upper left corner, percentage change in the number of products is large, each step represents a significant (in percentage) change. Conversely, the percentage change in the price is rather modest size, as the base where is the comparison is relatively high. It explains why $E_D^P > 1$, and in the lower right corner $E_D^P < 1$.[26]

The concept of price elasticity of demand is of great practical importance. The elasticity of demand is an important factor influencing the pricing of the company, since change in total revenue from a firm's sale (gross revenue) in changing product price depends on the price elasticity of demand. It means that the value of price elasticity of demand is often crucial to the rational firm, which is necessary to find the optimal price that will ensure maximum revenue, and thus profit maximization.

[26] Nureyev R.M. Microeconomics course. Textbook for high schools. - 2nd ed., Rev. - M. Publ. NORMA, 2000. - P. 98.

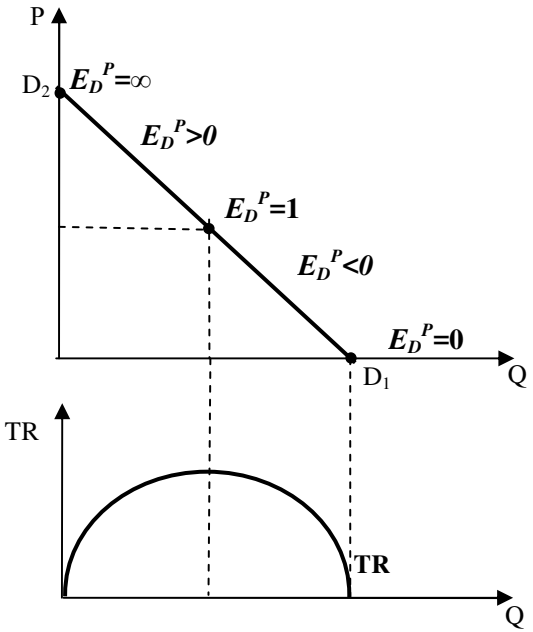

Fig. 5.2. The elastic properties of the linear demand function and the relationship of the sale revenue (gross revenue): D_1D_2 is linear demand function, TR is sales revenue (gross revenue)

Total revenue from product sale (or gross revenue, TR) is the total revenue earned from the product sale which is equal to the product of the products sold number to its price:

$$TR = P \times Q \quad , \tag{5.2}$$

where *TR* is total revenue (gross revenue); P is price of product unit; Q is product sale volume.

If demand is price elastic ($E_D^P>1$), a slight reduction in price causes a significant increase in the demand (sales) volume, and therefore the total revenue (TR).

And, conversely, in the elastic demand, a slight rise in price will lead to a significant decrease in sales volume and, consequently, to a

decrease in sales revenue.

If demand is price inelastic ($E_D^P < 1$), then even the most significant price reduction will lead to a slight increase in the demand (sales) volume, i.e. a decrease in total revenue. Conversely, in the inelastic demand, significant price rise will lead to a slight decrease in sales as a result of sales revenue increase.

Thus, the relationship of the demand elasticity and sales revenue (gross revenue) are expressed by the following rules of thumb:

1) In elastic demand, sale revenue of goods is changed in the direction opposite to change in the goods price (if the price raises, revenue falls and vice versa: if the price falls, revenue increases).

2) In the inelastic demand, sale revenue of goods is changed in the same direction as the goods price (if the price raises, revenue increases, and vice versa: if the price falls, revenue falls).

3) In the unit elastic demand, price change has no impact on the change in total revenue which remains constant.

These rules of thumb are presented in Table 5.1.

T a b l e 5 . 1

The relationship between the price elasticity of demand and the sales revenue (gross revenue)

Valueof elasticity factor	Influence of change in the price (P) on sale revenues (gross revenue, TR)	
	Rise in price (↑P)	Reduction P (↓P)
$E_D^P > 1$, Elastic demand	↓TR	↑TR
$E_D^P = 1$, Unit elastic demand	TR = const	
$E_D^P < 1$, Inelastic demand	↑TR	↓TR

Thus, if a company knows the character of the elastic demand for their goods, it can determine what actions need to be taken with respect to price, to ensure the maximization of revenue. It should be noted that in this case we are talking about the firm-price monitor who is trying to find a price that will ensure maximum revenue, which is possible only in conditions of imperfect competition (pure

monopoly, monopolistic competition, oligopoly, etc.). In general, the accounting elastic demand in developing its pricing is essential to optimize its behavior in the market.

The main factors that influence the price elasticity of demand are:

1. The degree of urgency in meeting needs: the higher it is, the less elastic the demand for the product.

2. The availability of goods substitutes: the more goods-substitutes, the more elastic the demand for the product.

3. The share of goods in the consumer budget: the higher this share, the higher the price elasticity of demand).

4. The quality of goods: is this product a luxury item (the demand for such products is usually elastic) or essential goods (demand for most of them is inelastic).

5. Good threshold level: the more the level of the consumer good, the more elastic the demand for it.

The revenue elasticity of demand shows the relative change in demand under the influence of changes in consumer revenue by one percent:

$$E_D^I = \frac{\Delta Q_D / Q_D}{\Delta I / I} = \frac{\text{Change in demand, in \%}}{\text{Change in revenue, in \%}} \qquad (5.3)$$

where $E_D{}^I$ is revenue elasticity of demand; $\Delta Q_D/Q_D$ is relative change in demand volume (in %); $\Delta I/I$ is relative change in revenue.

If $E_D{}^I < 0$, this product is inferior, i.e. an increase in income leads to a demand fall for this benefit. For example, with an increase in revenue, consumer reduces the margarine consumption, replacing it with butter; reduces the potatoes consumption, replacing it with other vegetables (cucumbers, tomatoes, etc.).

If $E_D{}^I > 0$, the goods are normal (i.e., qualitative or superior). Moreover, the normal products can be divided into three groups:

1) Essential goods which demand is growing slower than revenue growth ($0<E_D{}^I<1$) and therefore has a limit of saturation (e.g., bread, salt, matches, etc.).

2) Nonessential goods (or everyday demand), which demand is growing to the extent of the revenue growth ($E_D{}^I = 1$).

3) Luxury goods or durable goods which demand outruns reve-

nue growth ($E_D^I > 1$) and therefore does not have the saturation limit.

This classification does not coincide with the frequent needs classification according to their priority, because the needs are met complex and do not have any priority. Let's note that for individuals with different levels of income (or for the same person at varying levels of income); the same benefits can be either luxury goods, or essential goods.[27]

Position there must be a benefit with $E_{DI} > 1$ for a particular consumer for each good with revenue elasticity of demand of less unit ($0 < E_{DI} < 1$), is called the law of Engel.

The cross-elasticity of demand shows the relative change in demand for this product under the influence of changes in the price of other goods by one percent

$$E_D^{XY} = \frac{\Delta Q_X / Q_X}{\Delta P_Y / P_Y} = \frac{\text{Change in demand for product, in \%}}{\text{Change in product price, in \%}}, \quad (5.4)$$

where E_D^{XY} is revenue elasticity of demand; $\Delta Q_X/Q_X$ is relative change in demand for product X; $\Delta P_Y/P_Y$ is relative change in demand for product У.

If:

$E_D^{XY}>0$ – these products are interchangeable (substitutes);

$E_D^{XY}<0$ — these products are complementary;

$E_D^{XY}=0$ – these products are independent of each other.

5.2 Model of the supply elasticity and the time factor

Elasticity of supply shows the relative change in supply under the influence of changes in the goods price by one percent:

$$E_S = \frac{\Delta Q_S / Q_S}{\Delta P / P} = \frac{\text{Change in supply volume, in \%}}{\text{Change in price, in \%}}, \quad (5.5)$$

where E_S is elasticity of supply, $\Delta Q_S/Q_S$ is relative change in supply volume (in %); $\Delta P/P$ is relative change in price (in %).

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[27] Galperin V.M., Ignatiyev S.M., Morgunov V.I. Microeconomics. – in 2 V. SPb.: "Economic school" institute, 2004.

If:

$E_S>1$ – the supply if elastic, i.e. a one percent change in price leads to a change in supply volume by more than 1 % (or small changes in price lead to significant changes in the supply volume i.e. supply is very sensitive to changes in commodity prices).

$E_S<1$ - the supply is inelastic, i.e. a one percent change in price leads to a change in supply volume by more than 1 % (or significant changes in price lead to small changes in the supply volume i.e. supply is insensitive to changes in prices).

$E_S=1$ - the supply is unit elastic, i.e. a one percent change in price leads to a one percent change in supply volume.

There are also two extreme cases:

1) If $E_S=0$, the supply is perfectly inelastic, i.e. change in product price does not cause any changes in the supply volume. In other words, the supply is not sensitive to price changes.

Graphically perfectly inelastic supply is a vertical line.

2) If $E_S=\infty$, the proposal is perfectly elastic, that is, any slight appreciation causes unlimited supply growth, and any slight reduction in price leads to a complete abandonment of the production and sales of the product. In other words, perfectly elastic supply means that there is only one price by which the product will be produced (sold) by producers (sellers).

Perfectly elastic supply is a horizontal line.

To understand the supply elasticity, great practical importance is the time factor.

In the shortest term, supply is perfectly inelastic (Es = 0). Therefore, an increase (decrease) in demand leads to a rise (reduction) in prices, but in no way it isn't reflected in the supply size

In a short term, supply is more elastic ($E_S>1$). It is reflected in the fact that the increase in demand results in not appreciation, but also production increase, as firms in the short term increase the use of some of the production factors to expand production to meet rising demand.

In a long-term, the supply is almost perfectly elastic ($E_S=\infty$), so an increase in demand leads to a significant increase in supply, even at constant prices or insignificant appreciation

Questions for discussion:

1. Why is it necessary for a firm to carry analysis of price elasticity of demand for its production? What is the relationship between price elasticity of demand and sales revenue (gross revenue) of a firm?

2. What can the numerical value of coefficient of demand elasticity for income and coefficient of cross-elasticity be used for?

3. Why does the factor of time have paramount value for an indicator of elasticity of demand?

4. Analyze the features of price elasticity of demand for services of natural monopolies in Kazakhstan.

THEME 6. BEHAVIOUR OF FIRM IN THE CONDITIONS OF COMPETITIVE MARKET

6.1. Main features of the market of the perfect competition

6.2. Maximization of profit and optimum output of competitive firm in the short-term and long-term periods.

6.1. Main features of the market of the perfect competition

The market structure is characterized by the perfect competition if any of sellers (buyers) isn't capable to have essential impact on the price that is possible in the presence of the following conditions:

1. Large number of buyers and sellers:

- the share of separate firm makes less than 1% of the total amount of sales in the market;

- the agreement between firms is excluded.

2. Uniformity of production offered in the market, i.e. goods of various firms operating in this market, are identical and don't differ by criteria of quality, conditions of service, advertizing, packing and other signs.

3. Absence of the market power, i.e. capability to influence on market price from the certain seller or the buyer;

4. There are no barriers to entry for the introduction on the market of new firms, and also the free exit from this industry is possible. It is characterized by free inflow of the equities from an industry in an industry (production factor mobility).

5. Equal access of all market subjects to all types of market information. This transparency of the market means that all buyers have the complete information about product characteristics and the prices, and producers have information on production technology, the prices of production factors.

The firm implementing the products in the competitive market is called competitive firm, these firms don't possess the market power, i.e. can't influence on market price and act as "agreeing to the price".

The majority of the agricultural markets are similar to the markets of perfect competition. For example, thousands farmers grow up wheat which is bought by thousands buyers. As a result any farmer

and any buyer can't affect wheat price. Besides, the stock market on the competitive structure is also similar to perfect competition.

One of conditions of perfect competition is broken, there is a market of imperfect competition which consist of monopolistic competition, an oligopoly, monopoly, a monopsony, etc.

The perfect competition represents an ideal image of the competition, sellers and buyers possess broad freedom of the behavior, and any of them isn't capable to dictate to another that what, how, and what price to buy. It is possible to come nearer to perfect competition, fully – it isn't achievable.

The product demand of separate firm in the conditions of perfect competition is a horizontal line. It means that the firm can sell any product quantity, without influencing the price. The product demand of separate competitive firm is absolutely elastic at the market price.

In the conditions of the perfect competition the marginal income is equal to market price.

In the conditions of perfect competition when there are a lot of producers, none of them can't have essential impact on the price of made products. For firms the price develops objectively, irrespective of their will and desire therefore each of firms acts as the receiver of the price. If to postpone for abscissa axes product quantity of Q, and for ordinate axes — the price P, their interrelation is represented direct, parallel abscissa axis (see fig. 6.1). It means that elasticity of demand at the price of infinitely bike.

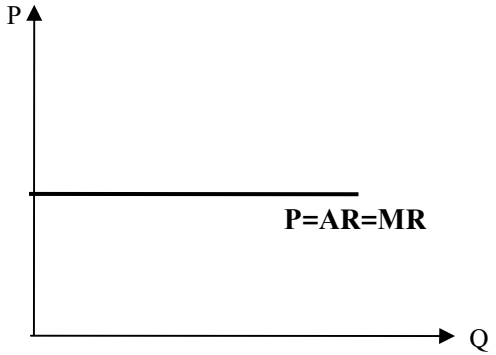


Fig. 6.1. The price, average and marginal income in the conditions of the perfect competition

6.2. Maximization of profit and optimum output of competitive firm in the short-term and long-term periods.

The firm purpose is profit maximization. Profit maximization is reached by a way:

1) determinations and achievements by firm of optimum production volume;

2) establishment of an optimal price.

In the market of perfect competition the firm doesn't possess the market power and acts as "agreeing to the price", the unique way of profit maximization by competitive firm is a determination and achievement of optimum production volume.

The optimum production volume maximizing profit of firm is determined by 2 ways:

1) comparison of total income (TR) to total costs (TC), optimum production volume is considered the difference between TR and TC is maximum.

2) comparison of marginal income (MR) and marginal costs (MS), optimum production volume is reached equality between MR and MS (MR=MC).

We will consider both methods, i.e. comparison of TR and TC (fig. 6.2).

The comprehensive income represents the straight line leaving the beginning of coordinates, and total costs turn out summing of curve fixed and variable costs. The maximum profit is made when the gap between TR and TC is greatest (CD piece). Points A and B are points of critical production volume. To a point of A and after a point B total costs exceed a comprehensive income (TC > TR), production is economically unprofitable and inexpedient. In the range of production from Q1 point to Q2 point the entrepreneur gets profit, maximizes of the release, equal Qopt. Its task is to be fixed in the similar vicinity of a point of D in which slopes of marginal income (MR) and marginal costs (MS) are equal: MR = MS. So, a condition of profit maximization is equality of a marginal income to marginal costs, i.e. for profit maximization the firm increases release amount to a point, where MR = MS. **It is the main condition of profit max-**

imization for all firms in the market perfect and imperfect competition.

For competitive firm MR=AR=P is shown in the second part of fig. 6.2. Production should be continued to a point E, i.e. crossing of a curve of marginal costs with the line of marginal income (MC=MR) which is the line of the price and the line of average income (MR=P=AR). In the conditions of perfect competition the price develops from firm and is perceived as set, the firm can increase production until marginal costs won't be made even to their price. If MC < P, production can to increase, if MC > P, production is performed at a loss and it is necessary to stop. In fig. 6.2, the optimum production volume maximizing profit, is the production volume Qopt, which MR = MS.

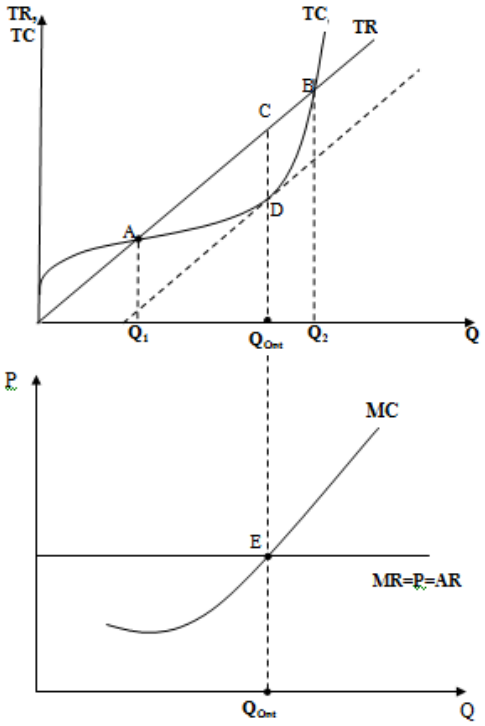


Fig.6.2 Determination of optimum production volume through the TC and TR, and also equality of MS and MR.

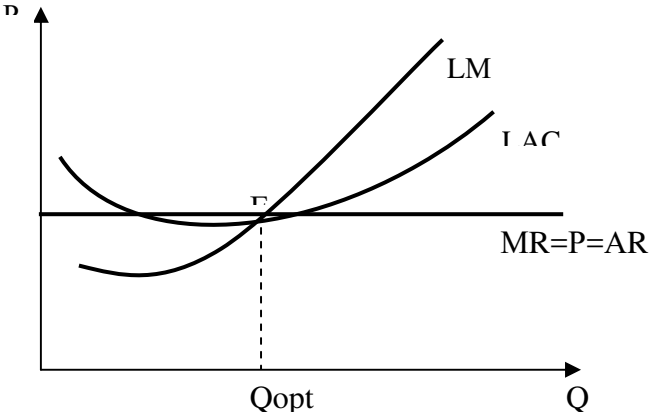
So, a condition of receipt of economic profit is: **MC=MR=P>AC.**

When **MC=MR=P=ACmin,** the firm works at self-sufficiency level, i.e. covers the economic expenses and gets normal profit. In the market the increase of amount of release will lead to losses.

When **MC=MR=P<ACmin, but P>AVC** the competitive firm incurs losses. But the firm shall remain in an industry and continue production to minimize losses, and then she will be able to gain certain total income which allows it to cover AVC and part of FC. If the firm makes the decision on the termination of the activities, losses of firm will be more.

The firm shall stop the activities and leave an industry if when **P<AVCmin.**

In the conditions of perfect competition in the long-term period (fig. 6.3) the maximum of profit is reached when is carried out equality: MR = LMC = P = LAC, where LMC – long-term marginal costs, LAC – long-term average costs.



THEME 7. BEHAVIOUR OF FIRM IN THE CONDITIONS OF NON-COMPETITIVE MARKET STRUCTURE

7.1. Market of the monopolistic competition: the main lines and features of maximizing revenues

7.2. Oligopoly and its models.

7.3. Characteristics of pure monopoly. Maximizing revenue by monopoly in the short-term and long-term periods.

7.4. Indicators of the monopoly power.

7.5. Monopoly power and efficiency problems.

7.1. Market of the monopolistic competition: the main lines and features of maximizing revenues

Monopolistic competition is a type of imperfect competition such that many producers sell products that are differentiated from one another (e.g. by branding or quality) and hence are not perfect substitutes.

Characteristic features of the market with the monopolistic competition:

1. The goods of each firm trading in the market are imperfect substitute of the goods realized by other firms.

The product of each seller possesses exclusive qualities and characteristics which are intended for some buyers preferred his goods to goods competitor company. **Differentiation of goods** means that the subject sold in the market isn't standardized. It can occur because of the valid qualitative differences between products or estimated differences which result from distinctions in advertizing, prestige of a trademark or "image", connected these goods with possession.

2. In the market there is a large number of sellers, everyone satisfies a small, but not microscopic share of a market demand for the general type of the goods realized by firm and its competitors.

The sizes of market shares of firms exceed 1% at the monopolistic competition, i.e. percent which would exist at the perfect competition. In a typical case it is the share of firm from 1% to 10% of sales in the market within a year.

3. Sellers in the market don't reckon with reaction of the rivals when choose establishment of the price of the goods or a choice of reference points on the volume of annual sales.

This feature is a consequence of a large number of sellers in the market with the monopolistic competition i.e. if the certain seller reduces the price, then the gain of sales volume will occur not at the expense of one firm, and at the expense of many. It is improbable that any certain competitor will bring considerable losses of the share in the market because of reduction of sale price of any separate firm. Competitors have no reasons to react to it change of the policy as the solution of one of firms doesn't influence substantially their opportunities to take revenues. The firm knows it and doesn't consider any possible reaction of competitors when chooses the price or the purpose on sales.

4. In the market there are conditions for a free entrance and an exit.

At the monopolistic competition it is easy to found firm or to leave the market. The favorable environment in the market with the monopolistic competition will involve new sellers. But the entrance on the market isn't easy as it was at the perfect competition, new sellers often experience difficulties with the new trademarks and services for buyers. The existing firms with the settled reputation can keep the advantage over new producers. The monopolistic competition is similar to a situation of monopoly, separate firms possess ability to control the price of the goods. It is also similar to the perfect competition, each goods sales many firms, and in the market there is a free entrance and an exit.

We will consider features of maximizing revenue in the conditions of the monopolistic competition.

We will analyse behavior of the firms operating in the conditions of the monopolistic competition in determination of the price and output. The curve of demand for a product of firm of the monopolistic competition is descending. It is elastic, than a curve of demand of the monopolist because the seller in the conditions of the monopolistic competition faces a large number of the competitors making the interchanging goods.

The curve of demand isn't horizontal, as at the perfect competition. First, the firm in the conditions of the monopolistic competition has less competitors, secondly, services of these competitors represent close, but imperfect substitutes.

Degree of elasticity of a curve of demand of firm in the conditions of the monopolistic competition will depend on number of competitors and degree of differentiation of services. The more the number of competitors, the more will be elasticity of a curve of demand of each seller, i.e. the situation will come nearer to the pure competition.

The curve of demand of firm has an inclination down, but doesn't coincide with a curve of the marginal income, which inclination more cool (fig. 7.1). The firm possesses some exclusive power, she will establish the price and output, as firm – the monopolist.

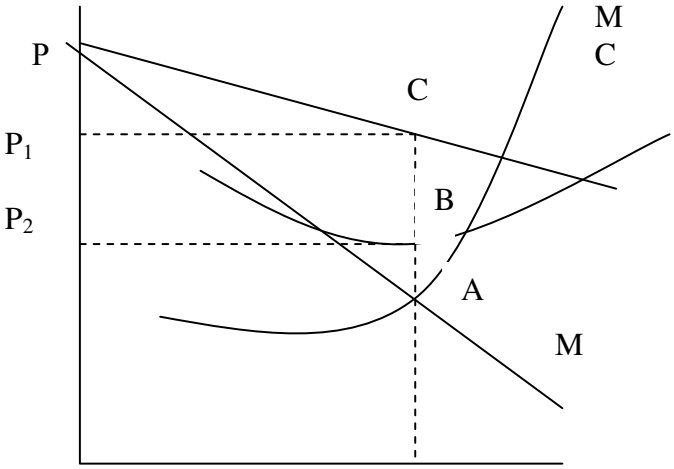


Fig. 7.1. Maximizing revenue of firm of the monopolistic competitor in the short-term period

The firm chooses output when the marginal income is equal to marginal expenses, but the price is more, than marginal expenses. The firm gets revenue of P1, P2, C, B.

In the long-term period there is a tendency to receiving normal revenue or to revenueability of the firms operating in the conditions of the monopolistic competition. In case of receiving revenues in the short-term period it is possible to expect that economic benefits will attract new competitors, the introduction on the market is simple.

When the majority of firms faces losses in the short-term period, there will be a mass exit of firms from branch in the long-term period. The remained firms will find out that losses gradually give way to normal revenues.

Fluctuations of the short-term period are leveled and established balance when the curve of demand is a tangent to a curve of average expenses in the long-term period (fig. 7.2).

On graphics the firm covers the expenses, i.e. is revenueable. The volume of the services QE is balance volume. Any deviation from this output leads firm to losses.

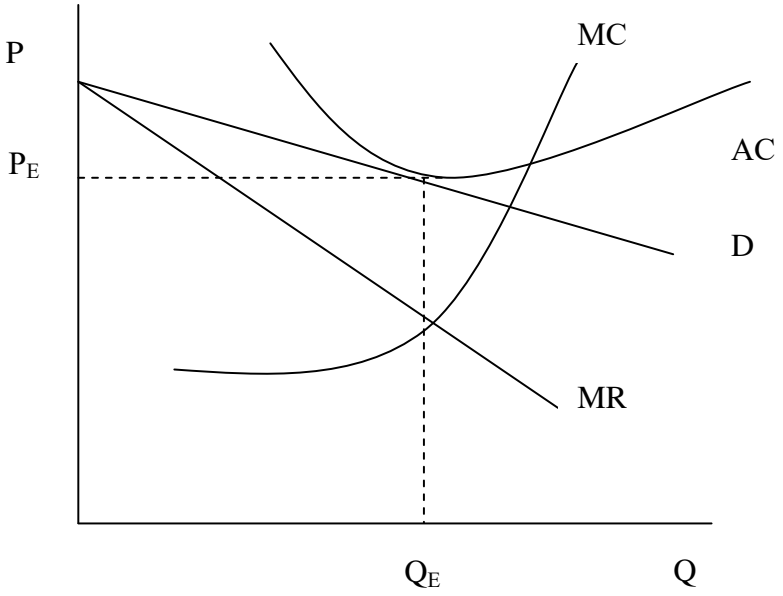


Fig. 7.2. Long-term balance of the monopolistic competitor

There are complicating factors interfering receiving normal revenue in the long-term period. First, some firms can make services which to competitors are extremely difficult for reproducing. Or the firm has the patent which gives long-term advantage over the rival. Such firms can get small economic revenues in the long-term period. Secondly, the introduction can be marginaled to financial barriers. Thirdly, as a result of differentiation on the basis of placement and availability losses and revenues are lower than the normal can remain in the long-term period.

The situation when the producer for the efforts gets only normal revenue, isn't favorable neither for him, nor for society. Producers take steps for improvement of position of balance in the long-term period. It is reached by differentiation of a product. Special emphasis can be put on the valid distinctions, on creation of the imagined distinctions by means of advertizing and the corresponding sales promotion. The firm will try to keep the revenues to further improvement of goods, by improvement of quality and quality of service, increase in volume and improvement of quality of advertizing.

Differentiation of production means the offer to the consumer a number of types, styles, brands and degrees of quality. It means advantages to the consumer. A variety of consumer tastes is satisfied fully.

7.2. Oligopoly and its models

An oligopoly is a market form in which a market or industry is dominated by a small number of sellers (oligopolists). Oligopolies can result from various forms of collusion which reduce competition and lead to higher prices for consumers. Oligopoly has its own market structure. The goods realized by oligopolistic firms, maybe differentiated and standardized.

On the oligopolistic markets works from two to ten firms of which a half and more general sales of a product in the share.

On the oligopolistic markets some firms can influence on the price by big shares in the general let-out quantity of goods. Sellers in the oligopolistic market know when their rivals change the prices or the let-out sales volume, consequences will affect revenues of all

firms in the market. Sellers realize the interdependence. Each firm in branch recognizes change of its price or release will cause reaction from other firms. Reaction which any seller expects from the competing firms in response to changes established to them the prices, of the volume of release or change of activity in the field of marketing, is the major factor defining its decisions. Reaction for which certain sellers wait from the rivals, influences balance on the oligopolistic markets.

Specific features oligopolistic markets:

1. Some major companies (3-5) supply all market. The product can be differentiated and standardized.

2. Some firms in oligopolistic branch possess large market shares. Some firms in the market are capable to influence the goods price, varying its existence in the market.

3. Firms in branch understand the interdependence.

We will consider oligopoly models. There is no uniform standard concept of an oligopoly though is developed a number of its models.

Conscious rivalry: oligopolistic price wars.

Each firm in the market to seek to maximize revenue and assumes that her competitors will firmly adhere to the initial price.

Price war - a cycle consecutive reduction of the price by the firms competing in the oligopolistic market. It is one of many possible consequences of oligopolistic rivalry. Wars of the prices are good for consumers, but are bad for revenues of sellers.

Firms are involved in this war. Each seller thinks that another won't react to his reduction in price, each of them has a temptation to increase sales, reducing the prices. Reducing the price of low price of the competitor, each seller can seize all market and can increase revenue, but the competitor answers with reduction in price. War of the prices proceeds while the price doesn't fall to the level of average expenses. Price wars are unrevenueable to oligopoly, and to consumers – are revenueable.

Unfortunately for consumers, price wars are usually short-lived. Oligopolistic firms test a temptation to enter among themselves cooperation for to establish the prices and to divide the markets that

to avoid prospect of price wars and their unpleasant impact on revenue.

Models of the theory of games. Theories of games is a way of the analysis of interdependent behavior when decisions of one participant has impact on the solution of another. We analyze the market where compete two firms (duopoly). Each firm in the market of an oligopoly seeks to realize the opportunities. Each firm considers actions of competitors and assumes that competitors similarly arrive in relation to it. It is based on determination of balance in the oligopolistic market according to Nash. Balance according to Nash means that any of firms won't be able to increase the prize unilaterally.

Model broken curve of demand (fig. 7.3). It is developed for an explanation of hardness of the prices in the market of an oligopoly. The price of goods is established. The demand curve at the prices above the established price is elastic. Firms of branch assume that price increase of the established price will give to decrease in demand for their goods because competitors won't follow them. Reduction of price of the established prices will give below to inelastic demand because competitive firms will also reduce the prices. Sharp change of elasticity of a curve of demand of firm at the established price gives a curve of a broken form. The firm reduces the price because of sharp falling of receipts, reduction of price by the competitor leads to sharp falling of the marginal income. Any growth of marginal expenses happening on a broken piece of a curve of the marginal income won't lead to the change in price at firm.

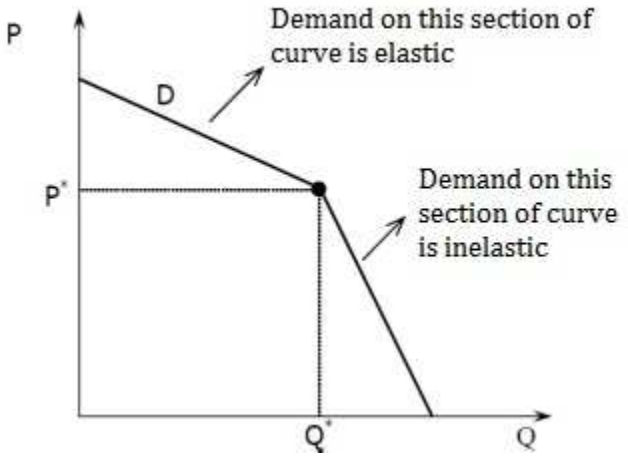


Fig. 7.3. Model broken curve of demand

Model of conscious rivalry. The firm makes the decision to increase sales volume for maximizing revenue. Reduces the price of the production, thinking that her competitors won't reduce in reply the prices. All competitors do such assumptions, each of them has a temptation to increase the volume of sale reducing the prices. And between them begins war of the prices. War of the prices proceeds before balance establishment: P = AC = MC. Temporarily benefits from war of the prices is buyers. Consequences of war of the prices push firms to secret arrangement or cooperation.

Model of price leadership. Firms can coordinate the actions in an implicit form. Such opportunity exists in branch where there is a dominating firm which provides a considerable share of the industry offer. The leading firm establishes the price and volume of release for maximizing revenue for themselves. Other firms of branch in the price policy prefer to follow the leader. Interest of participants of the market available of the leader is explained by that the leader assumes burden of research of the market and development of the optimum price. The conducted firms are afraid of price war from the leader.

Model of the blocking pricing. The pricing marginaling an entrance to branch of new firms is carried out from leaders. They temporarily refuse the exclusive power in the market, establishing temporarily market price at the level of the minimum long-term expenses. Such price policy deprives of firm of economic revenue, but at the same time will make penetrations of "strangers" into branch impossible.

In economics, **a cartel** is an agreement between competing firms to control prices or exclude entry of a new competitor in a market. It is a formal organization of sellers or buyers that agree to fix selling prices, purchase prices, or reduce production using a variety of tactics. Cartels usually arise in an oligopolistic industry, where the

number of sellers is small or sales are highly concentrated and the products being traded are usually commodities. Cartel members may agree on such matters as setting minimum or target prices (price fixing), reducing total industry output, fixing market shares, allocating customers, allocating territories, bid rigging, establishment of common sales agencies, altering the conditions of sale, or combination of these. The aim of such collusion (also called the cartel agreement) is to increase individual members' revenues by reducing competition. If the cartelists do not agree on market shares, they must have a plan to share the extra monopoly revenues generated by the cartel.

3. Characteristics of pure monopoly. Maximizing revenue by monopoly in the short-term and long-term periods.

A pure monopoly exists when a single firm dominates a market for a particular product, such as the dominance that Microsoft has for operating systems or that the government has for particular public services. Although monopolies are rarely pure, their primary characteristic is that they are price makers — they can set the price of their product without worrying about any competition. This greatly increases the producer surplus for the monopolist and reduces consumer surplus for the buyers of the product.

To achieve this so-called market power, a monopoly must have several characteristics. First, it must be a single seller in the market. Secondly, there must be no close substitutes for the product or there must be some other economic barrier that prevents users from using substitutes. For instance, there are several computer operating systems available that consumers can use, but because many people have already made significant investments in hardware and software that require specific operating systems, they cannot easily switch — they are locked into their choices.

Thirdly, there must be significant barriers to entry so that no competitors can enter the market. These 3 characteristics must all be present for a monopoly to exist; otherwise, a monopoly would be reduced to an oligopoly, a monopolistic competition, or even pure competition.

Another characteristic of monopolies is that they do not need to advertise their product to increase market share. They generally use

public relations and advertising to increase awareness of their products and to maintain a good relationship with their buyers.

Maintenance of pure monopoly demands existence of barriers to an entry to branch which prevent the competition of new sellers to the monopolist. It is possible to allocate some main types of barriers to an entry to branch where one firm dominates:

1) Exclusive rights, patents and copyright – the monopoly is called **closed**.

2) *The scale effect* indicates what happens to the demand for the firm's inputs as the firm expands production. As long as capital and labor are "normal inputs," the scale effect increases both the firm's employment and capital stock. Emergence of the second firm in this branch will lead to that both firms will be divided by the market and any of them won't reach rather large volume of the production allowing to minimize average expenses and to get economic revenue. Therefore the scale effect is a natural barrier to the accession to the monopolized branch of new firms, and the monopoly formed by means of this barrier is called natural. The firm which can provide all market demand for any goods with smaller average expenses, than what would be possible if two or more firms would deliver the same quantity of goods, is called as natural monopoly. The natural monopoly can make goods with lower long-term average expenses, than two smaller firms. Natural monopolies can make the enterprises on gas, energy power, water supply, telecommunications, etc.

3) Property on the most important sources of raw materials. The monopoly can be also supported as a result of possession of all sources of a concrete resource necessary for production of the monopolized goods.

4) Need of heavy capital initial investments for production opening.

5) high expenses on advertizing, etc.

The firm possesses ***the monopoly power*** when it has opportunity to influence the price of the goods, changing quantity which she is ready to sell. Degree to which the monopolist can exercise the exclusive power depends on availability of close substitutes on its goods and its shares in this market.

The firm with exclusive power is firm which at discretion establishes the price of the goods, but doesn't accept it as this, and unlike the competitive firm which is "price recipient", the monopoly is "price hunter".

The competitive firm acts "price recipient" and sells any quantity of goods at the same price. The monopoly doesn't agree to the price as something this. In process of increase in volume of release the price by all means has to fall because the curve of demand is directed down. For the sake of an advance in price the monopolist is compelled to reduce output (sales) because consumers always answer an advance in price with reduction of purchases of this benefit.

The competitive firm maximizing revenue has to reveal only the optimum volume of release. The firm monopolist pursuing the same aim has to not only define the optimum output maximizing revenue but also to establish the optimum price, the providing maximum arrived. In this sense it is more difficult to operate monopoly, than competitive firm. Maximizing revenue, the monopolist at first determines the volume of release and only after that establishes the price of the production.

The marginal income of the monopolist is less than a price of goods since because of elastic demand to sell an additional commodity unit to the monopolist it is necessary to reduce the price. Therefore the sold units will bring in less income. The interrelation between the price, the marginal income, total income and elasticity of demand at the price is shown in fig. 7.4.

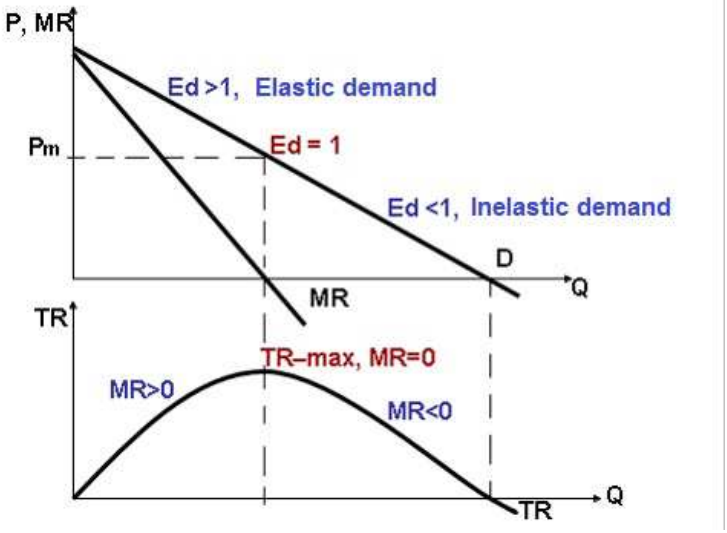


Fig. 7.4. Interrelation between elasticity of demand, the marginal income and revenue of the monopolist

Also the interrelation between the price, the marginal income, total income and elasticity of demand at the price can be shown (table 7.1.):

Table 7.1

Interrelation between E_d^p, MR, TR.

Elasticity of demand at the price (E_d^p)	Marginal revenue (MR)	Total revenue (TR)
Inelastic	Negative	Decrease
Single elasticity	Zero	Doesn't change
Elastic	Positive	Increase

Maximizing revenue by exclusive firms in the short-term period is carried out in the conditions of the competitive market. The monopolist has a marginal income less than a price, and demand is elastic. The graphic analysis of short-term exclusive balance is given in fig. 7.5.

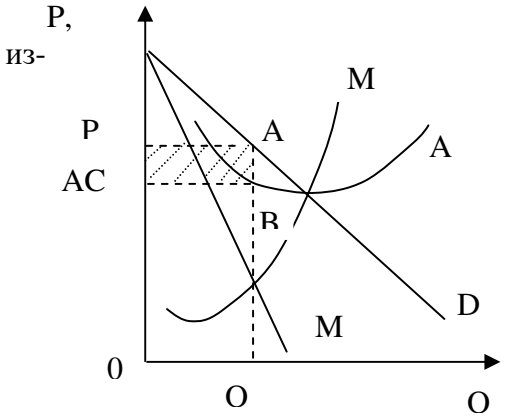


Fig. 7.5. Maximizing of revenue by monopolists in the short-term period

The monopoly firm maximizes revenue, letting out the quantity of goods Qm corresponding to a point where MR=MC. Then she establishes Pm price taking into account elasticity of demand. At this price the firm gets revenue (Pm-ACm) on a commodity unit. The general economic revenue is equal to Qm (Pm-ACm) (the shaded area). The monopolist will regulate the price for ensuring elasticity of demand for the product.

In the long-term period we have the rule of maximizing revenue:

MR = LRMC

In the long-term period is important existence of barriers to an entry to this branch, differently the economic revenue getting by the monopolist will attract in branch of new sellers. The offer will be increased and market price will fall to the level of average expenses and the positive economic revenue will disappear, having decreased to zero, i.e. normal revenue. Maintenance of monopoly in long-term aspect is impossible without existence of barriers to an entry to branch.

4. Indicators of the monopoly power

The firm possesses the monopoly power when it has opportunity to influence the price of the goods, changing quantity which she is ready to sell. Degree to which the monopolist can exercise the monopoly power depends on availability of close substitutes on its goods and its shares in this market.

The monopoly power is an ability of firm to establish the price above marginal expenses, changing output. Measurement of the exclusive power is carried out by Lerner's index and Herfindahl's index and his shares in this market.

Lerner's index allows to calculate the difference relation between the price and marginal expenses to the price:

$$L=(P-MC)/P,$$

where L-Lerner's index or monopoly power, P-price, MC-marginal costs of production.

L is meaning from 0 to 1. The more than L, the degree of the monopoly power is more.

Herfindahl's (H) index allows to estimate concentration of the market by an assessment of the share of the market S measured as a percentage deliveries of each firm for sale in this market, and summation of the squared shares of the market at each firm:

$$H=S_1^2+S_2^2+S_3^2\ldots S_N^2,$$

where S_1,S_2 and etc. firm market shares.

Sources of the monopoly power are: elasticity of a market demand for production of firm, number of firms, interaction between firms, and existence of barriers to appearance of new competitors.

5. Monopoly power and efficiency problems

Monopoly power is the ability to control prices and exclude competition in a given market. If a firm can profitably raise prices without causing competing firms to expand output and drive down prices, that firm has monopoly power.

Proving the existence of monopoly power through indirect evidence requires a definition of the relevant market.

The monopoly power doesn't provide effective release of goods. Effective release of goods is provided in the absence of opportunity to increase a net gain from its consumption, making available bigger or smaller quantity of these goods. A marginal condition of

efficiency is: MV = MS, where MV - marginal usefulness, MS - marginal expenses. Absolutely competitive markets provide effective release of goods and for all markets is carried out P=MB=MC. Absolutely competitive markets provide effective release of goods and for all markets is carried out P=MB=MC. In the conditions of the monopolistic market, monopoly price is higher than the marginal income, and marginal expenses are equal to the marginal income: Pm>MR=MC. The monopoly firm makes less, than the volume of effective release. The monopolist, exercising the power, establishes the price one goods higher, than his marginal expenses. In the conditions of the market of the monopolistic competition the part of capacities isn't used that means not effective use of limited resources. The monopolistic power limits competition functions as market mechanism. We listed social expenses of the monopolistic power. There are benefits to society from the monopolistic power.

The listed social expenses of the monopolistic power cause need of control of the monopolistic power. It is carried out through the antimonopoly policy and its tools. Among the measures directed on control of the monopolistic power it should be noted the following:

- control of an oligopolistic pricing;
- ban of secret arrangement and secret agreement;
- ban of merges and absorption if they lead to creation of monopoly;
- ban of anti-competitive activity of firms, such as unfair competition, deceptive advertizing and marking.

Questions for discussion:

1. Why monopolistic competition is called intermediate market structure between pure monopoly and perfect competition?
2. How can long-term balance be established in the field of monopolistic competition?
3. Define the distinctions of the oligopolistic market from the market of monopolistic competition.
4. What models of oligopoly can help explain the invariance of prices, interdependence of decisions and temporary refusal of monopoly power?
5. How is the monopoly power of a firm manifested?

6. Why is the marginal income taken from monopolist's sales of goods less than the price of goods?

7. How does monopolist choose the produce amount maximizing the profit?

8. Give examples of market of monopolistic competition, monopolistic and oligopolistic markets in Kazakhstan. What state institutes in Kazakhstan limit monopolization in economy?

II SECTION. MACROECONOMICS: THE APPLIED MODELS OF BEHAVIORS OF MACRO-SUBJECTS ON THE COMMODITY MARKET

THEME 8. MODERN MACROECONOMICS AND ITS METHODOLOGICAL TOOLKIT

8.1 Subject and methodological specifics of macroeconomics.
8.2 The main macroeconomic schools and currents.

8.1 Subject and methodological specifics of macroeconomics

The macroeconomics is the second level of the modern economic theory after microeconomics.

If the microeconomics studies economic behavior of certain market subjects (firms and house farms, the consumer and the producer), but a subject of studying of macroeconomics is functioning of national economy as uniform system.

The macroeconomics researches the phenomena and the problems which are the general for all economic system, and also operates with such aggregated (integrated) sizes, as a gross internal product, the national income, aggregate demand, the aggregate supply, aggregate consumption, investments, savings, an overall price level, unemployment rate, a public debt, etc. So, the main objects of the macroeconomic analysis are: economic growth, economic (business) cycle, unemployment, inflation, budget deficit, public debt, balance of payments, exchange rate, macroeconomic policy, etc.

Macroeconomics, as other economic sciences, uses the general and specific methods of research. General scientific methods are scientific abstraction, analysis and synthesis, induction and deduction, principle of historical and logical unities, economic-mathematical modeling, etc.

Also the macroeconomic uses own specific methods and the principles of research.

The main specific method of macroeconomic is aggregation; this is association of separate elements, the phenomena and processes

in economy in a whole - in the unit (set). Aggregation is connected with a method of the scientific abstraction which essence consists in derivation from temporary, casual characteristics of the studied phenomena and in allocation of their intrinsic lines and regularities. Through aggregations is made allocation and group of macroeconomic agents, the macroeconomic markets, macroeconomic interrelations and macroeconomic indicators[28].

Aggregation of market subjects allows to allocate four macroeconomic subjects:

- sector of house farms,
- business sector (firms),
- public sector (state),
- foreign sector (table 8.1).

T a b l e 8 . 1

Characteristic of the main macroeconomic subjects

Macro-subjects	The types of economic activity	The behavioral functions considered in the macro analysis
1	2	3
Sector of house farms	1. Supply of factors of production (labor, earth, capital, entrepreneur abilities); 2. Consumption of goods and services (consumer function); 3. Savings remaining after payment of taxes and consumer expenses of part of the personal income (savings function)	Consumer function; Savings function
Business sector (firms)	1. Purchase of factors of production; 2. Production of goods and services (production function); 3. Purchase of investment goods,	Production function; Investment function

[28] Tarasevich L.S., Grebennikov P.I., Leusskiy A.I. Macroeconomics: Textbook. — The 6th edition, corrected and added. — M.: High education, 2006.

	the equipment, for expansion of	

Table 8.1 continuation

1	2	3
	process of production, providing a gain of a stock of the capital and compensation of wear of the capital (investment function or investment)	
Public sector (state)	1. Purchase of goods and services for ensuring of functioning of public sector and performance of public functions 2. Production of the public benefits (defense, law and order protection, science, culture, education, health care, social protection, etc.); 3. Redistribution of the national income (through system of taxes and transfers); 4. The supply of money in economy 5. The economy regulation	Regulating function (direct and indirect participation in economy); Redistributive function
Foreign sector	1. International trade (export and import of goods and services) 2. Movement of the capitals (export and import of capital, i.e. financial assets).	Function of the international exchange by the benefits

Aggregation of the markets gives the chance to allocate four macroeconomic markets:

1) the real market (or the market of the benefits) is the market in which goods and services (or real assets) are bought and sale;

2) the financial market is the market where financial assets (money, securities) are sale and bought. The financial market shares on two segments: a) monetary market, b) securities market (actions, bonds, etc.);

3) the resource market is the market where economic resources are sale and bought. In the macroeconomic analysis, the resource market is presented by a labor market and the capital market

as regularities of their functioning allow to explain macroeconomic processes;

4) the currency market is the market in which national monetary units (currencies) of the different countries exchange at each other and is formed the exchange (exchange) rate[29].

The time factor in the macroeconomic analysis plays large role, in this regard the importance is given to expectations of economic subjects. (The problem of expectations was put forward in economic science by the Swedish economist, the Nobel Prize laureate on economy (1974) G.K. Myrdal (1898-1987)).

The economic expectations share on 2 types:

1) **the expectation of ex post** – it is an assessment of economic subjects of the past, the gained experience, the actual estimates of the past;

2) **the expectation of ex ante** – it is future plans, intentions and projections of the market subjects which are cornerstone of their economic behavior.

In the macro analysis are allocated 3 types of expectations of ex ante: static, adaptive, rational[30].

The theory of static expectations proceeds from this economic subjects in the future are guided by the same parameters of market conditions which take place in the present. For example, the rate of inflation of next year is expected equal to a rate of inflation of the current year.

The concept of adaptive expectations assumes that the behavior of economic subjects is based on last experience, on correction of the expectations, from the mistakes made in the past.

The theory of rational expectations (supplyed in the 70th years of the XX century by the American economist R. Lucas) recognizes that the behavior of economic subjects is based on their projections of the future developed from the analysis of all information available to them (including, from the analysis of economic policy of the state pursued at present).

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[29] Khudokormov V.G. The history if economic doctrines. Part II. – M.: MSU publishing house, 1994.

[30] Lusse A.V. Macroeconomics: short course. – Saint Petersburg: Piter, 2001. – 21 p.

Static expectations are used in Keynesian models, adaptive – in monetarist models, rational – in neoclassical concepts.

The macroeconomic analysis can have positive and standard character. The positive macroeconomic analysis is connected with research of the actual functioning of economic system, it answers a question "that is?". The standard macroeconomic analysis defines aspects of development of economy are desirable or undesirable, it has recommendation character and answers a question "how has to be?".

Specifics of the macroeconomic analysis are general use of economic models. **The economic model** is the simplified idea of economic phenomena in the form of the formalized descriptions (verbal, logical, graphic and algebraic) for detection of economic dependences.

Any macroeconomic model is abstract, has lines of assumptions, allows to concentrate on basic elements of the studied phenomenon and their interrelations. The analysis of macroeconomic models allows to receive reliable idea of character of occurring economic events, to predict their course and to develop recommendations about economic policy.

Macroeconomic models include exogenous (external) and endogenous (internal) variables.

Exogenous (external, autonomous, independent) variables are the initial information which is setting from the outside before creation of model. Endogenous (internal) variables are result of model work; arise in model in the course of the solution of an objective.

Macroeconomic models can be classified by various signs:

1) the method of representation of studied economic process or the phenomenon: graphic, economic-mathematical models, verbal models;

2) the degree of generalization: theoretical and practical models;

3) the duration of analyzed processes: short-term, medium-term and long-term models;

4) the quantity of the economic subjects involved in the analysis: the simple (simplified) models – presented by only house farms and firms; difficult models – with participation of the state, the financial market and foreign sector;

5) the degree of coverage of foreign sector: the closed models - presented by only national economy; open models – with inclusion in the analysis of foreign sector;

6) the nature of reflection of a factor of time: the static – the factor of time isn't considered; the dynamic – time acts as a factor; the dichotomizing - a comparative statics[31].

So, the research space of the macroeconomic theory includes the phenomena, processes and the problems which are the general for all economic system, causes need of use of specific methodological tools.

8.2 The main macroeconomic schools and currents

As the independent branch of economic science, macroeconomics was created in the 30th years of the XX century, while formation of microeconomics belongs to the last third of the XIX century and goes back to neoclassical school (A. Marshall, L. Walras, K. Menger).

The term "macroeconomics" was used in the article in 1933 by the known Norwegian scientist – the economist-mathematician, one of founders of econometrics, the Nobel Prize laureate is Ragnar Frisch[32]. The modern macroeconomic theory originates from 30th years of the XX century. The catalyst was the world economic crisis of 1929-1933 (or "A great depression"), brought to strong decline in production and significant increase of mass unemployment in the majority of the western countries. Fundamental work of the outstanding English economist, the representative of the Cambridge school, lord John Maynard Keynes (1883-1946) "The general theory of employment, percent and money" was connected with the Great depression which left in 1936 that laid the foundation of the macroeconomic theory.

The importance of the book of Keynes "The general theory of employment, percent and money" was so great that in economic science there was the term "Keynesian Revolution", marking emer-

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[31] Vechkanov G.S., Vechkanova G.R. Macroeconomics, the 2nd edition.– Saint-Petersburg: Piter, 2004. – 22 p.

[32] Matveeva T.U. Macroeconomics. – the 5th edition, corrected. - M.: HSE publishing house, 2007.

gence of the Keynesian theory, the made counterbalance to the classical microeconomic analysis (neoclassical model).

J. M. Keynes and his followers proved that the competitive market mechanism isn't able to provide the stable economic growth, a full employment and uninterrupted operation of reproduction without intervention of the state which they considered as a factor of activization of business and economic life.

The practical foundation of the Keynesian reformist concept of market economy laid the politician of "a new course" of F.D. Roosevelt, directed on overcoming of a deep economic crisis of 1929-1933 and based on "Keynesian recipes" state regulation.

So, since the post-war period and up to the 70th years of the XX century, the macroeconomic policy in the countries with the developed market economy was based on Keynesian ideas of state regulation of economy. The concepts formulated by Keynes, were developed and added by his followers – J. Hicks, A. Hansen, P. Samuelson.

The Keynesian model was used till 70th years of the XX century because adequately described economy. But in the 70^{th} years there was a new problem – stagflation, i.e. a combination of stagnation (considerable decline in production, high unemployment) with high inflation. Many scientists saw the reason of a similar situation in active intervention of the government in economy. There was the so-called Keynesian counterrevolution connected with revision of a classical paradigm and emergence of the doctrine of monetarism (or the Chicago school) which leader was Milton Friedman (1912).

Monetarists got back to idea about self-control of the market and nominated a problem of need of regulation of monetary weight to the central place. The monetarism generated a new wave of the economic theories based on ideas of market self-control and the concept of rational expectations, having created new neoclassical macroeconomics.

The new neoclassical macroeconomics or "new macroeconomics" is an extreme form of monetarism. Representatives of "new macroeconomics", adhering to postulates of neoclassical school in fiscal and monetary policy, modified and strengthened many ideas of monetarists therefore their theoretical concept often name "monetarism

of the second sort". New neoclassics - prominent economists, as Robert Barro, Robert Lucas, Thomas Sargent, Neil Wallace.

The comparative analysis of four main macroeconomic schools (neoclassical, Keynesian, monetaristic and new macroeconomics) is provided in table 8.2 on key of theoretical - methodological positions.

T a b l e 8 . 2

The comparison of positions of the main macroeconomic schools on key theoretical - methodological problems[33]

Theoretical - methodological problems	A. Neoclassical school	B. Keynesian school	C. Monetarism	D. New macroeconomics
1	2	3	4	5
1. The nature of the competition in economy	1. The perfect competition.	1. The imperfect competition.	1. It is necessary to seek for the perfect competition.	1. As in 1A
2. The flexibility (or rigidity) prices	2. All prices in economy are the absolutely flexible.	2. The nonflexible (rigid) prices	2. It is necessary to achieve flexibility of the prices.	2. As in 2A
3. The rationality of behavior of economic subjects	3. The economic subjects act rationally, proceeding from maximizing the benefit.	3. The economic subjects are irrational, are guided by subjective factors (tradition, psychology, etc.) and static expectations.	3. The economic subjects act according to the concept of adaptive expectations.	3. The economic subjects act according to the concept of rational expectations.
4. The influence of money and monetary factors on economy	4. The economy is divided into two absolutely autonomous sectors: monetary and real (neoclassical dichotomy). Money is neutral,	4. Money isn't neutral. There is a mechanism of interaction of the monetary market with real sector. The neoclassical dichotomy	4. Money is neutral in the long-term period. In the short-term period they aren't neutral	4. Money is absolutely neutral in long-term, and in short-term the periods.

[33] It is made on a basis: Selishev A.S. Macroeconomics. – Saint-Petersburg: Piter, 2002. – p. 47.

	i.e. doesn't influence real variables	doesn't exist.		

Table 8.2 continuation

1	2	3	4	5
5. The economy regulation	5. The economy is self-regulated that is provided with the flexible prices. Interventions of the state it isn't required.	5. The economy isn't self-regulated, there are deviations from an equilibrium state. It is necessary active state intervention.	5. The state intervention in economy has to be limited.	5. The state shouldn't interfere in economy.
6. The "Aggregate Demand — the Aggregate Supply" model («AD-AS»)	6. In the AD-AS model the leading role belongs to AS (Seius's Law: "The supply creates own demand")	6. In the AD-AS model the leading role belongs to AD.	6. As in 6A.	6. As in 6A.
7. The achievement of a full employment	7. On a labor market balance is established at a full employment and the aggregate supply is fixed at the level of natural release. The curve of AS is vertical.	7. The full employment is unattainable owing to features of a labor market (rigidity of a nominal salary). The curve of AS is horizontal.	7. As in 7A.	7. As in 7A.

So look the features of subject space and the methodological device of the modern macroeconomic theory.

Questions for discussion:

1. Define the subject field of macroeconomics as a science.
2. Name the features of methodological means of macroeconomic analysis.
3. What are the features of creating macroeconomic models?
4. Why are the expectations in macroeconomics made important?
5. Why did macroeconomics arise in the 30s of XX century? What event in the 30s of XX century caused the interest to macroeconomics?

6. What macroeconomic schools are widespead nowadays?

7. What theoretical-methodological problems do the main macroeconomic schools differ in?

8. What means of economic policy (Keynesian or monetaristic) are given preference to in Kazakhstan economy?

9. At the initial stages of reforming Kazakhstan economy the preference was given to mainly Keynesian methods of regulation. Why? What postulates of macroeconomic schools is the economic policy of Kazakhstan based on now?

THEME 9. MODEL OF THE ECONOMIC CIRCULATION AND SYSTEM OF NATIONAL BOOKKEEPING

9.1 Model of an economic circulation of the income and expenses, resources and products.

9.2 Macroeconomic indicators of system of national accounts: concepts and calculation methods.

9.3 The price index: concept and main models.

9.1 Model of an economic circulation of the income and expenses, resources and products

The features of behavior of macroeconomic subjects in the macromarkets and economic interrelations are analyzed through models of a circulation of the income and expenses, resources and products (or models of circular streams), circulation of real streams of products representing the scheme and the resources balanced by counterflows of the monetary income and expenses (fig. 9.1).

In macroeconomic allocate two types of quantitative variables: stocks and streams.

The stock is the indicator measured as quantity at present. **The stream** is the size changed as quantity in unit of time. For example, if the property of the consumer is treated as a stock, its income and expenses are streams. Savings and investments are stream sizes, and the saved-up capital is a stock. GNP is the stream size, the national wealth is stock size.

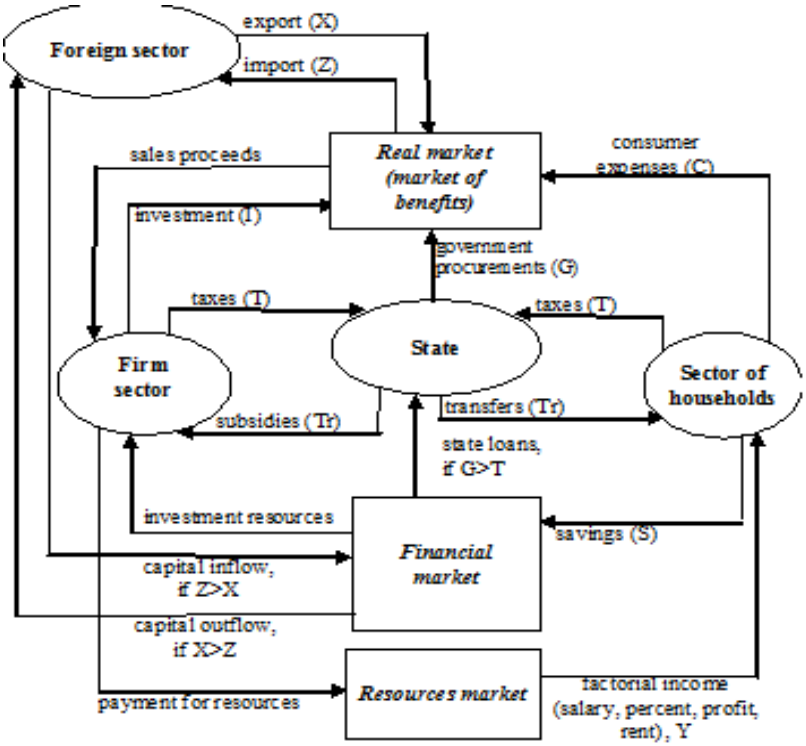

Fig. 9.1. Model of an economic circulation of the income and expenses, resources and products [34]

We will consider model of an economic circulation (fig. 9.1) which included four macrosubjects (house farms, firms, the state, foreign sector) and three main markets (the market of the benefits, the market of resources and the financial market). For to make goods and services, firms in the resource market (the market of factors of production) buy economic resources (work, the earth, the capital and enterprise abilities), its owners (and sellers) are households. Buying factors of production of firm incur expenses – payments for resources. Payments arrive in the order of house farms; they are their

[34] Dollan E. J., Landsay D. Macroeconomics /translated with Engl. – Saint Petersburg: «Litera plus», 1997. - 408 p.

factorial income (Y), i.e. a salary (for a factor work), a rent (for a factor the earth), percent (for a factor the capital) and profit (for factor of entrepreneur ability). The sum of the earned factorial income of house farms forms the national income (Y).

House farms pay taxes (T) to the state from gained income (Y), and the located income (i.e. the income after payment of taxes: Yd=Y-T) distribute on consumption (C) and savings (S).

Consumption (C) is expenses of house farms of the located income (Yd) on purchase of goods and services at firms in the real market. Firms sell the benefit at market prices, gain income (sales proceeds) from their sale which then in the market of resources pay to households a payment for the economic resources.

That part of the income of house farms which remains at their order after payment of taxes and implementation of consumer expenses is called as savings (S). The most widespread forms of savings are deposits in commercial banks, investments in securities, etc.

If households in a year spend less, than earn (they form savings), firms feel need for additional resources for providing and expansion of production (investment). It causes need of existence of the financial market, i.e. system of special financial and credit institutes (banks, insurance companies, stock exchanges, investment funds, etc.) which function consists in mobilization of temporary free money (savings) of the population and granting them as investment resources to firms on the terms of urgency, recoverability and availability at a price.

Transformation of savings of households in investment resources of firms happens two ways: 1) the households provide the savings to financial intermediaries (to banks, investment companies, etc.) from whom firms take the credits; 2) the households get the securities on the savings issued by firms, providing them with investment resources. The investment resources of firm received in the financial market use for implementation of investments (I), i.e. buy the investment benefits (means of production: cars, equipment, etc.).

The major macroeconomic subject - the state - participates in an economic circulation the next ways:

1) collects taxes (T);

2) pays the state transfers (Tr) - i.e. gratuitous social payments from the state budget to certain categories of persons (a grant, social benefit, a subsidy, pension, scholarship, etc.) within redistribution of the national income. The difference between taxes and transfers is called net taxes (Tn);

3) acts the buyer in the market of the benefits, carrying out government procurements or the government expenditures (G) - i.e. expenses of public institutions and the organizations on purchase of goods and services, and also compensation to workers in a public sector;

4) makes indirect impact on economy, regulating quantity of money in economy.

The public expenditures and net taxes, usually don't coincide in size. Excess of taxes over the public expenditures forms the budgetary surplus (or surplus, T>G), called by also state savings. Excess of the public expenditures over taxes is called as budget deficit (G>T). Budget deficit is financed by a currency issue (an inflationary way), external loans or by placement of the state securities (the state loans) in the financial market.

The foreign sector participates in a circulation of the income and expenses of national economy through export (X), import (Z) and capital movement.

The ratio of export and import is reflected in trade balance. The difference between export and import forms net export (Xn = X-Z). If net export is positive size (X > Z), it is positive net export or positive balance (surplus) of trade balance, if it is negative size (X < Z), it is negative net export or negative balance (deficit) of trade balance.

Deficit of trade balance (excess of expenses from import over the income from export, i.e. negative net export) can be financed from external (foreign) loans other countries or the international financial organizations, or to sale to foreigners of part of financial assets (private and state securities). In both cases at deficit of trade balance (X < Z) on the domestic financial market of the country there is an inflow of money from foreign sector that carries the name of inflow of the capital which allows to finance deficit of trade balance.

If the income from export exceeds expenses on import (X > Z) that means surplus (surplus) of trade balance (i.e. positive net ex-

port), there is a capital outflow from the country, in this case foreigners sell to this country the financial assets and receive necessary money for export payment.

So, negative net export forms net inflow of the capital, positive net export is net outflow of the capital.

In market economy, expenses of one subject are the income of other subject. In this regard all budgets of macroeconomic subjects are interconnected and the circulation represents set of these budgets in their interrelation.

The budget of house farms: $Y = C + T + S$.

The budget of firms: $Y + Z = C + I + G + X$.

The budget of state: $G = T + (G - T)$.

The budget of foreign sector: $Z = X + (Z - X)$.

If budgets are balanced, from the scheme of a circulation we allocate the following conclusions:

1) the national product is equal to the national income;

2) the aggregate demand (AD) is equal to the aggregate supply (AS);

3) the aggregate income (Y) is equal to aggregate expenses (E).

The aggregate expenses on a national product are equal to the sum of expenses of all macroeconomic agents: households, firms, state and foreign sector:

$$E = C + I + G + X. \quad (9.1)$$

The aggregate income or the national income (Y) are used on consumption of domestic and import goods, savings and payment of taxes:

$$Y = C + S + T + Z. \quad (9.2)$$

If the aggregate expenses are equal to the aggregate income, the national product is equal to the national income (E = Y):

$$C + I + G + X = C + S + T + Z \quad (9.3)$$

or

$$C + I + G + Xn = C + S + T. \quad (9.4)$$

Equality (7.4) is called the main macroeconomic identity. The size of aggregate expenses is equal to cost of gross domestic product (GDP):

$$Y = E = C + I + G + Xn. \quad (9.5)$$

Proceeding from equality of a national product and the national income we have:

$$C + I + G + X = C + S + T + Z\,. \qquad (9.6)$$

After transformation we will receive:

$$I + G + X = S + T + Z\,. \qquad (9.7)$$

The left part of identity (9.6) - (I+ G + X) - represents "injections" or inflows to aggregate demand. "Injections" consists of expenses (besides consumer) on financing of a national product - an investment, government procurements, expenses on export.

The right part of identity (9.6) - (S + T + Z) - is called "leaks" or outflows from aggregate demand. "Leaks" is a part of the income which isn't used by house farms for purchase of production made within the country are savings, tax payments and expenses on import.

So, from identity (8.7) follows that the economic system is in balance if "leaks" from a circulation are equal to "injections".

The condition of the closed simple economy (without participation of public sector and foreign sector) is described by the following macroidentities:

$$\left.\begin{array}{l} Y = C + I \\ Y = C + S \end{array}\right\} \Longrightarrow I = S\,. \qquad (9.8)$$

The identity (9.8) is the main macroidentity of balance in simple economy.

For open economy (with foreign sector) with the state participation:

$$Y = C + I + G + Xn$$

$$YD \text{ (the located income)} = Y + TR - TA$$

$$YD = C + S \Rightarrow C = YD - S \Rightarrow C = Y + TR - TA - S \Rightarrow$$

$$Y = Y + TR - TA + I + G + Xn - S \Rightarrow$$

$$S - I = \underbrace{G + TR - TA}_{BD - \text{the budget deficit}} + Xn$$

$$S - I = (G - T) + Xn$$

or

$$S - I = BD + Xn^{35}\,. \qquad (9.9)$$

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[35] Dornbush P., Fisher S. Macroeconomics /Translated with English. – M.: MSU PH: INFRA-M, 1997. – p.61.

The identity (9.9) is macroidentity of balance in open economy. It shows excess of savings over investments is equal to sum of deficit of the state budget and balance of trade balance in the balanced economy. Thus, if S = I, it is possible one of the following situations:

1) double deficit (simultaneous deficit of the state budget and trade balance). Budget deficit (BD = 0) is expressed in deficit of trade balance (Xn = 0), i.e. budget deficit is financed at the expense of foreign loans and there are net inflow of the capital to the country;

2) double positive balance (positive balance of the state budget and trade balance). The budgetary surplus (BD = 0) at positive balance of trade balance (Xn = 0), i.e. there are net outflow of the capital from the country.

The model of an economic circulation of the income and expenses, products and resources illustrates regularities of behavior of macroeconomic subjects in the macroeconomic markets, the main economic interrelations and interdependence.

9.2. Macroeconomic indicators of system of national accounts: concepts and calculation methods

Calculation of the major macroeconomic indicators is made in the **system of national accounts (SNA)**.

The System of National Accounts (SNA) is the internationally agreed standard set of recommendations on how to compile measures of economic activity. The SNA describes a coherent, consistent and integrated set of macroeconomic accounts in the context of a set of internationally agreed concepts, definitions, classifications and accounting rules.

In addition, the SNA provides an overview of economic processes, recording how production is distributed among consumers, businesses, government and foreign nations. It shows how income originating in production, modified by taxes and transfers, flows to these groups and how they allocate these flows to consumption, saving and investment. Consequently, the national accounts are one of the building blocks of macroeconomic statistics forming a basis for economic analysis and policy formulation.

The SNA is intended for use by all countries, having been designed to accommodate the needs of countries at different stages of

economic development. It also provides an overarching framework for standards in other domains of economic statistics, facilitating the integration of these statistical systems to achieve consistency with the national accounts.

SNA was created in the 20th years of the XX century and until recently was applied only in the western statistics. SNA is constantly improved: it was reconsidered and modified in 1958, 1963, 1965, 1968, and 1993. Introduction in domestic practice of SNA was begun since 1988 for reduction of the domestic statistical reporting and methods of the economic analysis in compliance with world practice.

SNA consists of:

- three main indicators of aggregate release (output): gross national product (GNP); gross domestic product (GDP); net national product (NNP);

- three indicators of the aggregate income: national income (NI); personal income (PI); located personal income (LPI)[36].

The main macroeconomic indicators characterizing results of economic activity of the country are the gross national product (GNP) and the gross domestic product (GDP).

Gross domestic product (GDP) is the market value of all officially recognized final goods and services produced within a country in a year, or other given period of time. GDP per capita is often considered an indicator of a country's standard of living.

Gross national product (GNP) is the market value of all the products and services produced in one year by labor and property supplied by the residents of a country.

In closed economy GNP is equal to GDP.

In open economy GNP exceeds GDP at a size of the net factorial income (NFI) received from abroad:

$$GNP = GDP + NFI \qquad (9.10)$$

or

$$GDP = GNP - NFI\,. \qquad (9.11)$$

Net factorial income (NFI) is the difference between payments received from the foreign sector by citizens and payments made to foreigners who may be employed to make a good

[36] Matveeva T.U. Introduction in macroeconomics. – the 5th edition, corrected. - M.: HSE PH, 2007.

or provide a service domestically. This number is the difference between the gross domestic product and the gross national product[37].

Gross domestic product (GNP) joins only the cost of final products to avoid the repeated (double) account.

The final products are production which goes to final consumption, and aren't intended for further production processing or resale. Intermediate production goes to further process of production, processing or resale.

For calculation of GDP (GNP) can be used three methods:

1. expenses (a method of end use);
2. income (a distributive method);
3. value added (a production method).

At calculation of GDP (GNP) for expenses (a method of end use) are summarized:

1. consumer expenses of households (C)
2. gross internal private investments, i.e. investment expenses of firms (I)
3. government procurements of goods and services (G);
4. expenses of foreign sector on net export (Xn)

Consumer expenses (C) = expenses of households on the current consumption + expenses on goods of long using (except for expenses of households on housing purchase) + expenses on services.

Investment expenses (I) are expenses of firms on purchase of investment goods (i.e. means of production).

Investment expenses include: investments into fixed capital, investments into housing construction, investments into stocks.

If investments into fixed capital and an investment into housing construction are the fixed investments, investments into stocks is changing part of investments. At calculation of gross domestic product on expenses joins the size of change of stocks which happened within a year, doesn't join the size of inventory holdings.

At calculation of gross domestic product on expenses, investments are **gross internal private investments (I)** which represent the sum recovery investments (i.e. depreciation) and net investments.

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[37] Vechkanov G.S., Vechkanova G.R. Macroeconomics, the 2nd edition.– Saint Petersburg: Piter, 2004. – p. 67.

Recovery investments or depreciation (D) are the investments, directed on compensation of the costs of wear of fixed capital, i.e. is the cost of the consumed capital.

Net investments (In) are the additional investments increasing the sizes of the capital of firms.

Net investments = net investments into fixed capital + net investments into housing construction + investments into stocks

So, **gross investments** is the sum of net investments and depreciation ***(I = D + In).***

Government procurements of goods and services (G) consists of the public expenditures on the maintenance of public institutions and the organizations ensuring safety, a law and order, political management, economy regulation, and also the public expenditures on social economic infrastructure and compensation of employees of public sector.

The structure of the public expenditures doesn't join the state transfer payments, i.e. gratuitous payments from the state budget to certain categories of persons (a grant, social benefit, a subsidy, pension, scholarship, etc.).

Net export (Xn) represents a difference between the income from export (X) and expenses on import (Z) of the country and corresponds balance of trade balance: ***Xn = X – Z.***

So,

$$GDP_{expenses} = C + I + G + Xn \; . \qquad (9.12)$$

The biggest component of GDP (GNP) is consumption (C) - makes 60% from GDP (GNP), and the most changeable component of GDP (GNP) is an investment (I).

At calculation of **GDP on the income** (on a distributive method) are summarized the following sizes:

1. total size of all factorial income of households: salary, rent, interest income, profit.

2. indirect taxes on business are the taxes paid by consumers in the price of goods, called also taxes on consumption (a value added tax, excises, the import duties, etc.);

3. **depreciation**.

So,

GDP_{income} = total size of all factorial income of households (salary, rent, interest income, profit) + indirect taxes + depreciation

At calculation of **GDP (GNP) on a value added method** (a balance method) is sum of all value added costs, made in economy in a year on all branches and types of productions.

The Value Added (VA) is the cost created in the process of production at this enterprise and covering a real contribution of the given enterprise in creation of costs of the final product[38]. The value added is by a deduction of cost of raw materials and the materials bought from suppliers from market price of production of the enterprise.

In SNA the unprofitable part are equals to profitable, i.e. the monetary income (Y) gained from production of goods and services, made in this year is equal to GDP (GNP), and GDP (GNP) is equal to the volume of expenses on purchase of goods and the services made in this year or:

$$Y = GDP = C + I + G + Xn \; . \qquad (9.13)$$

In the cost of GNP (GDP) **don't join**:

1) financial transactions:

a) state transfer payments (a grant, social benefit, a subsidy, pension, scholarship, etc.);

b) private transfer payments (financial aid from sponsors, parents, etc.);

c) purchase and sale of securities;

2) resale of the supported goods;

3) work on itself (for example, services of the housewife, people are built the house, repairs the apartment, etc.);

4) the cost of goods and the services made in shadow economy.

GDP (GNP) has two types: nominal and real.

Nominal GDP is GDP calculated in the current market prices of the current (reporting) year. Two factors have impact on the size of nominal GDP:

1) change of real output

2) price level change.

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[38] Economics /A.S.Bulatov.-M.:Bek,1995.- p. 206.

For measurement of real gross domestic product, it is necessary "to clear" nominal GNP from impact of change of price level.

A real GDP is an inflation-adjusted measure of the total production of goods and services within the borders of a country. The base year can be chosen any year.

(9.14)

Real GDP = Nominal GDP \ Price index

The price index expresses the change of an overall price level of wide group of goods for a certain period (usually year).

In base year nominal GDP is equal to real GDP, and the price index is equal to 100% or 1.

When the price index more than 100% or 1 (i.e. takes place inflation), at calculation of real GDP (GNP) occurs updating of nominal GDP (GNP) towards reduction is called deflation of GDP (GNP).

When the price index less than 100% or 1 (i.e. the takes place deflation), at calculation of real GDP (GNP) occurs updating of nominal GDP (GNP) towards increase is called inflation GDP (GNP).

The interrelation between nominal and real gross domestic product (GNP) is defined by a formula:

(9.15)

Deflator of GDP = Nominal GDP \ Real GDP

So, the deflator of GDP (GNP) expresses distinctions between nominal and real GDP (GNP) and is used for definition of a rate of inflation.

Allocate indicators of the actual and potential GDP (GNP).

The actual GDP (GNP) is GDP (GNP) at an employment rate of resources. **Potential GDP (GNP)** is the GDP (GNP) made in the conditions of a full employment of resources, called by also natural release.

The Net National Product (NNP) represents an exact indicator created and bought by the population of this country of goods and services in a year; it includes only net investments and doesn't include depreciation. Therefore:

NNP = GNP – Depreciation.

If NNP - indirect taxes on business, we gain national income.

The National Income (NI) is the aggregate income earned by owners of economic resources, i.e. the sum of the factorial income. The National income can be gained in two ways:

а) if to subtract indirect taxes from NNP:

$$NI = NNP - indirect\ taxes;$$

б) if to summarize all factorial income gained by house farms in economy: salary; rents; interest income; profit of corporations.

If the national income is the income "earned" by households, income really gained by the population is reflected in an indicator of the personal income.

The Personal Income (PI) is the aggregate income gained by the population. For example, the profit of corporations shares on three parts: 1) profit tax of corporations (paid to the state); 2) dividends (distributed part of profit) which the corporation pays to shareholders; 3) the retained profits of corporations remaining after calculations of firm with the state and shareholders and is the one of internal sources of financing of net investments of firm. From three components of profit arrive in the order of firms dividends only, the profit tax of corporations goes to the state income, and the retained profits remain at the disposal of firms. Besides, the population receives a salary minus contributions to social insurance, and also can receive transfer payments from the state (pension, a grant, social benefits, etc.). Therefore the personal income is determined by a formula:

$$PI = NI - contributions\ to\ social\ insurance - profit\ tax\ of\ corporation - the\ retained\ profits\ of\ corporation + transfers\ payment.$$

The located personal income (LPI or Yd) is a part of the personal income which remains at house farms after payment of individual income taxes:

$$LPI = PI - individual\ income\ taxes$$

или

$$Y_d = Y - T. \qquad (9.16)$$

Households spend the located personal income for consumption (C) and savings (S):

$$LPI\ (or\ Y_d) = C + S. \qquad (9.17)$$

9.3 The price index: concept and main models

The price index is a relative indicator of change of an overall price level for a certain period of time (usually in a year).

Define three main types of a price index:

1) consumer price index;

2) price index of producers;

3) deflator of GNP (GDP).

The Consumer Price Index (CPI) is defined on the basis of the cost of a market consumer basket which includes a set of goods and the services consumed by a typical city family within a year.

GNP deflator, is defined on the basis of the cost of all set of final goods and the services made in economy within a year, and represents the relation of nominal GNP to real GNP.

Differences of CPI from a deflator of GDP consist in the following:

1) CPI is defined on the basis of only the prices of the goods included in a consumer basket, and the deflator of GDP considers all goods made by economy[39].

2) CPI is measured the cost of the fixed set of goods which doesn't change year by year. The set of the benefits used for calculation of a deflator of GNP, changes from the made products and services in economy in different years.

3) At calculation of CPI are considered import consumer goods, when defining a deflator of GNP only the goods made by national economy.

4) CPI is defined by the principle of an index of Laspeyres where as scales (volumes) are used the fixed sets of the benefits of base year[40]:

$$I_L = \frac{\sum_{i=1}^{n} P_i^t Q_i^0}{\sum_{i=1}^{n} P_i^0 Q_i^0}, \qquad (9.18)$$

where: I_L – Laspeyres index, P_i^t – price of i goods in the current year; P_i^0 - price of i goods in the base year; Q_i^t - quantity of i goods in the current year; Q_i^0 - quantity of i goods in the base year.

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[39] Matveeva T.U. Introduction on Macroeconomics. – the 5th edition, corrected. - M.: HSE PH, 2007.

[40] ,[40] Agapova T.A., Seregina S.F. Macroeconomics: The textbook/. The 6th edition, stereotype.. – M.: «Delo I servis» PH, 2004. – p. 35-36.

The deficiency of an index of Laspeyres: it doesn't accept change of structure of consumption in the current year, and also replacement of consumption of expensive benefits with cheaper, and therefore Laspeyres's index are overestimated by price level growth in economy.

The deflator of GNP is determined by the principle of an index of Paashe where as scales (volumes) are used sets of the benefits of the current year[41]:

$$I_P = \frac{\sum_{i=1}^{n} P_i^t Q_i^t}{\sum_{i=1}^{n} P_i^0 Q_i^t}, \qquad (9.19)$$

where: I_P – Paashe's index, P_i^t – price of i goods in the current year; P_i^0 - price of i goods in the base year; Q_i^t - quantity of i goods in the current year; Q_i^0 - quantity of i goods in the base year.

The deficiency of an index of Paashe: it underestimates price level growth in economy, doesn't consider dynamics of a growth in prices in the current year in comparison with the future.

Because Laspeyres's index and Paashe's index can't adequately reflect change of /;overall price level. For exact calculation can be used the called "ideal" index of Fischer which represents an average geometrical of Paashe's index and Laspeyres's index[42]:

$$I_F = \sqrt{I_P \cdot I_L}, \qquad (9.20)$$

where: I_P- Paashe's index; I_L – Laspeyres's index.

For definition of an overall price level and rate of inflation can be used GDP deflator and CPI. CPI forms a basis for calculation of rate of change of cost of life and "poverty line" which are developed programs of social security.

The Price Index of Producers (PIP) determines the cost of a basket of goods of production appointment (intermediate production).

41

42 Agapova T.A., Seregina S.F. Macroeconomics: The textbook/. The 6th edition, stereotype.. – M.: «Delo I servis» PH, 2004. – p. 36.

PIP, as well as CPI, is statistically counted as an index with scales (volumes) of base year, i.e. as Laspeyres's index.

CPI considers staple prices and semi-finished products, PIP measures the prices of retail trade, CPI is less than PIP. These differences do CPI by the sensitive indicator of a business cycle which signals about overall price level changes for some time before they will come.

So, macroeconomic indicators of system of national accounts and price indexes allow considering results of economic activity of market subjects at stages of production, distribution, an exchange and consumption of a public product, give the chance to the state to define the purposes and reference points of macroeconomic policy.

Questions for discussion:

1. Name nominal and real streams in the model of circulation of income and expenses, products and resources.
2. List all "leaks" (outflows) from aggregate demand and "injections" (inflows) to aggregate demand.
3. Name the conditions when economic system (income and expenses in model of circulation) will be in balance. Give the main macroeconomic identities.
4. What are the differences between "streams" and "stocks"?
5. Name the stock and stream variables (stream values).
6. What are the reasons for emerging of the difference between GNP and GDP? In what economy GNP is equal to GDP?
7. What are the differences between the indexes of GNP and NNP?
8. Show the distinctions between final and intermediate product and reveal the problem of double repeated account.
9. What types of economic transactions and operations are not included in GNP (GDP)?
10. Reveal the essence of three methods of GNP/GDP calculation (according to income, expenses, added value).
11. What is the necessity of calculation of real GNP along with nominal GNP?
12. When does inflation of GNP take place (in case of inflation or deflation), and deflation of GNP (in case of inflation or deflation)?

13. Nominal GDP in Kazakhstan in 2014 came out at 35275,1 billion tenge. GDP deflator was 107,1. How much did real GDP came out at and what happened: inflation or deflation of GDP?

THEME 10. MACROECONOMIC BALANCE ON THE COMMODITY MARKET: «AD-AS» MODEL

10.1. The model of aggregate demand and its components.
10.2. The model of aggregate supply and its factors.
10.3. Macroeconomic balance and its concepts.

10.1. The model of aggregate demand and its components

The aggregate demand (AD) is a total size of planned expenses of macroeconomic subjects (households, firms, the state and the abroad) on purchase of final goods and the services made in national economy, at each possible price level.

The structure of aggregate demand consist of the following components:

1) consumer demand on final goods and services (or consumer expenses - C);

2) investment demand on capital goods and services (or investment expenses - I);

3) demand of state on the goods and services (or state expenses - G);

4) demand of foreign firm on net export (or net export, Xn).

The aggregate demand is equal to volume of national production:

$$AD = GNP = C + I + G + Xn \; . \qquad (10.1).$$

The curve of aggregate demand shows various volumes of goods and services (real GNP) which consumers, firms and the state are ready to buy at any possible price level (fig. 10.1).

The price level is lower, the households, firms, the state and the abroad will want to acquire big part of real volume of national production. Than price level is higher, they will want to buy the smaller volume of a national product. Thus, dependence between the price level and real volume of GNP which is shown demand, is the return, and is explained the negative inclination of curve AD.

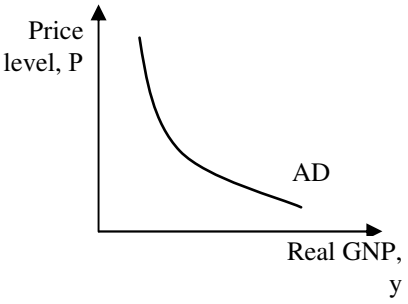

Fig. 10.1. The curve of aggregate demand AD

The aggregate demand and its volume is influenced by a number of factors which divide not price and price factors.

Price factors change the volume (size) of aggregate demand; it is expressed in displacement of points on curve AD.

According to the classical quantitative theory of money and equation of an exchange of I. Fischer:

$$MV = Py\,, \qquad (10.2)$$

where: M – quantity of money in economy; V – the speed of the circulation of money; P – overall price level; y – real volume of production (income).

From the equation of an exchange of Fischer (10.2) follows:

$$y = \frac{M}{P} \cdot V\,, \qquad (10.3)$$

where $\frac{M}{P}$ - the real cash remains (real cash desk or real stocks of money) at the population.

The equation (8.3) explains a negative inclination (i.e. an orientation down) of curve AD: the growth in prices (P ↑) reduces real stocks of money at the population ($\frac{M}{P}$ ↓), that that conducts to reduction in aggregate demand (Y or AD↓).

The negative inclination of curve AD is connected with three price factors:

1) effect of an percent rate (Keynes's effect);

2) wealth effect or real cash remains of the population (Pigu's effect);

3) effect of import purchases[43].

The effect of percent rate (Keynes's effect) is described follows: increase of price level conducts to increase in demand for money, at the invariable volume of the monetary suuply attracts increase of an percent rate, it conducts to decrease in the volume of investment of firms and decrease in consumer expenses (households increase the savings), conducts to reduction of aggregate demand:

$$P\uparrow \Rightarrow MD \text{ (demand on money)} \uparrow \Rightarrow r \text{ (percent rate)} \uparrow \Rightarrow I\downarrow \Rightarrow \Rightarrow AD\downarrow.$$

The sense of a wealth effect or the real cash remains of the population (Pigu's effect, the proved English neoclassic economist Arthur Cecil Pigu) is connected: the growth of prices leads to reduction of wealth and the real cash remains at the population ($\frac{M}{P}$), it leads to reduction of consumer expenses (C) and to reduction of aggregate demand:

$$P\uparrow \Rightarrow \frac{M}{P}\downarrow \Rightarrow C\downarrow \Rightarrow AD\downarrow.$$

Effect of import purchases: the growth of prices within the country at the stable prices of import leads to increase of import and reduction of export, so to reduction of aggregate demand in national economy:

$$P\uparrow \Rightarrow X\downarrow,\ Z\uparrow \Rightarrow Xn\downarrow \Rightarrow AD\downarrow.$$

Besides the specified price factors, aggregate demand is influenced also by not price factors that conducts to displacement of curve AD: to the left-down - at AD reduction; to the right-up - at increase in AD.

Not price factors of aggregate demand treats factors which influences consumer expenses of house farms (investment expenses of firms, the public expenditures, net export):

1) the factors influencing volume of consumption of house farms:

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[43] Ivashkovskiy S. N. Macroeconomics: The textbook. – the 2nd edition, corrected, added. — M.: Delo, 2002.

- changes in population;
- changes of the located income;
- changes in income tax;
- changes in consumer expectations, etc.

2) the factors influencing on level of investment expenses:
- prospects of receiving profits to the capital;
- change of taxes on business;
- existence of the state subsidies, soft loans to investors;
- technological level of production and uses of capacities;

3) the changes in the public expenditures (they are connected with political decisions of the country leaders);

4) the factors influencing on changes in net export:
- change of an exchange rate;
- change of conditions in foreign markets, etc.

It is important to consider two major not price factors of aggregate demand: change of the supply of money and the speed of the circulation of money.

For example, the increase of the supply of money and/or growth of speed of the circulation of money will lead to growth of aggregate demand, it will be reflected by displacement of curve AD to the right – up, growth of taxes will lead to decrease in aggregate demand and will move curve AD to the left-down (fig. 10.2).

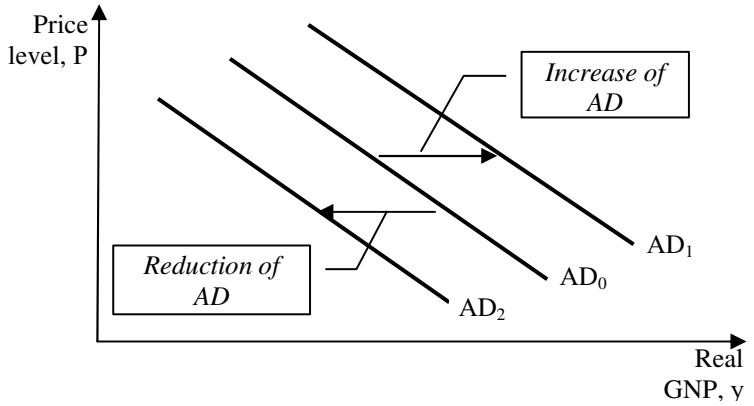

Fig.10.2. The displacement of curve AD under the influence of not price factors

10.2 The model of aggregate supply and its factors

The aggregate supply (AS) are a total of final goods and services which can be made and it is offered in economy at each possible price level (in other words, it is the volume of real GNP).

The dependence between the price level and volume of the aggregate supply (volume of a made national product) is a straight line because the increase in an overall price level creates incentives for production and the supply of additional quantity of goods and services, and reduction of prices causes reduction of production of the benefits. Therefore **the curve of the aggregate supply AS** showing volume of aggregate release of goods and services at different values of an overall price level has a positive inclination.

At creation of curve AS allocate three sites (or area)

1) Keynesian (horizontal) area;

2) intermediate (deviating up) area;

3) classical (vertical) area (fig. 10.3).

Any one primary type of curve AS locates in various concepts. Basic distinctions take place in justification of short-term curve AS, the type of long-term curve AS doesn't cause disagreements.

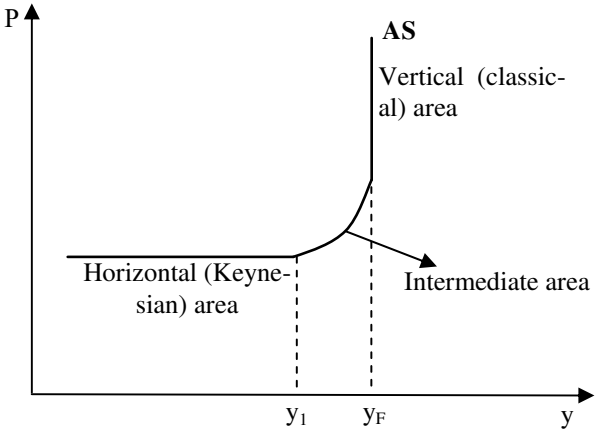

Fig. 10.3. The curve of aggregate supply AS (y_F – the volume of production at a full employment)

The Keynesian (horizontal) area of a curve of the aggregate supply reflects submission of the Keynesian theory about economy functioning, i.e. is based on the following prerequisites:

1. describes behavior of economy in the short-term period;

2. the economy functions in the conditions of a part-time employment of resources;

3. the prices, a nominal salary and other nominal sizes are rigid and nonflexible (don't change during certain time);

4. real sizes (the release volume, employment, the real wage, etc.) are more mobile, react to market fluctuations.

So, the Keynesian (horizontal) area characterizes a short-term macroeconomic situation when the national product changes and price level remains to constants.

The classical (vertical) area of a curve of the aggregate supply is based on the following prerequisites of the classical and neoclassical macroeconomic concept:

1. is described the behavior of economy in the long-term period;

2. the economy functions in the conditions of a full employment of factors of production when the actual GNP is equal to potential GNP, i.e. the national product is fixed at the level of natural release (yF);

3. the volume of release doesn't depend on price level, and is defined only by quantity of factors of production and a technological level;

4. the prices and a nominal salary are flexible.

So, the classical (vertical) area characterizes a long-term macroeconomic condition when the overall price level changes, and the real output is constant, i.e. fixed on a full employment level.

The intermediate area of a curve of the aggregate supply characterizes situation in economy in the medium-term period when it change the real volume of national production and price level.

The aggregate supply and its volume are influenced by a number of factors and consist of not price and price factors.

The price factors change the volume (size) of the aggregate supply, it is reflected in displacement of points on curve AS.

Not price factors are technological level, labor productivity, change of conditions of business, change in price for resources, change of a tax policy of the state, etc.

Not price factors conduct to change of the aggregate supply, it is reflected in displacement of curve AS:

1) to the left-up – at reduction of the aggregate supply,

2) to the right-down – at its increase.

For example, decrease in taxes on producers will increase the volume of the aggregate supply and will be reflected by displacement of curve AS to the right-down, and the increase in the prices at resources will lead to reduction of the aggregate supply and displacement of curve AS to the left-up (fig. 10.4).

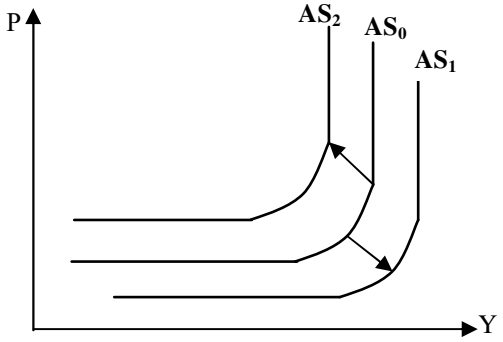

Fig. 10.4. The displacement of curve of aggregate supply (AS_0) under the influence of not price factors: from AS_0 to AS_1 – increase of aggregate supply; from AS_0 to AS_2 – reduction of aggregate supply

10.3. Macroeconomic balance and its concepts

The crossing of curves of aggregate demand and the aggregate supply determines the equilibrium price level and equilibrium real volume of national production.

Changes in balance are connected with change of aggregate demand and/or the aggregate supply under the influence of not price factors. We will consider consequences of change of aggregate de-

mand which depend on what piece of a curve of the aggregate supply – Keynesian, intermediate or classical – there is an economy.

So, the increase in aggregate demand under the influence of not price factors (displacement of curve AD to the right-up) gives:

а) on Keynesian (horizontal) area – to the increase of real volume of production of final goods and services, but doesn't touched the price level;

б) on classical (vertical) area – to the increase of price level, thus the real output can't go beyond the level "at a full employment" (y_F);

в) on intermediate area – to the increase of real volume of production and price level (fig.10.5).

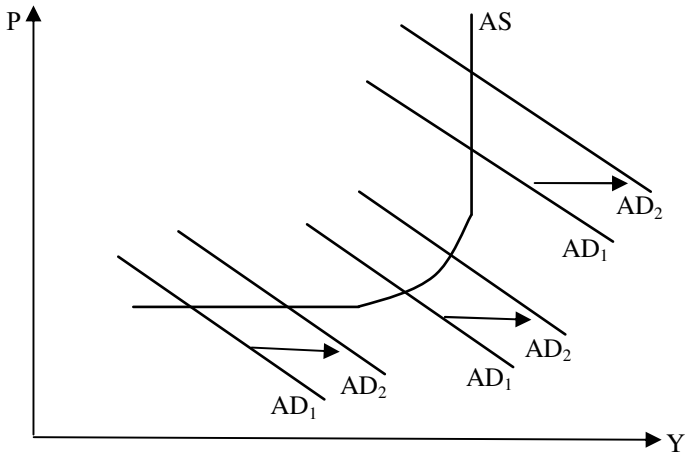

Fig. 10.5. Consequences of increase in aggregate demand on Keynesian, intermediate and classical areas of a curve of the aggregate supply

There are 2 main concepts of macroeconomic balance.

Basic provisions of neoclassical model of macroeconomic balance (its foundation was laid in the XVIII century within classical school):

1. In economy there is a perfect competition.

2. If takes place of the perfect competition, all prices and nominal indicators (a nominal salary, a nominal rate of percent) are flexible.

3. The flexibility of the prices results in balance, balance in the markets is established and restored automatically, works the principle of "an invisible hand" (i.e. market self-control) of A. Smith and it isn't required the state non-interference (the principle of "laissez faire").

4. The economy is in a condition of a full employment of resources therefore the volume of release is equal to potential GNP (natural release).

5. The central problem of economy is the problem of limitation of resources that actualizes a problem of production and the aggregate supply. In economy there is “Seius's law”, according to which: "The supply creates own demand". The aggregate supply is given a crucial role in establishment of macroeconomic balance. The neoclassical model is the model studying economy from the aggregate supply.

6. The volume of release doesn't depend on price level, and is defined only by quantity of factors of production and a technological level. Technological progress and expansion of production capabilities are process long, long-term. Therefore the classical model is the model describing the long-term period.

7. The economy shares on two autonomous independent sectors: real and monetary, is called the principle of "a nonclassical dichotomy". The monetary sector and monetary (nominal) variables doesn't influence real sector and real variables that is called the principle of "a neutrality of money". In neoclassical model the monetary market is absent, and the real sector is presented by three markets: market of the benefits, labor market and market of borrowed funds.

From provisions of classical model of macroeconomic balance follows that the market economy is self-regulated, long crises are impossible, and temporary disproportions between the aggregate demand and the aggregate supply are liquidated through the mechanism of the flexible prices.

However the world economic crisis of 1929-1933 ("A great depression"), showed insolvency of many postulates of classical macroeconomic model, idea about self-control of market economy.

The reasons of the Great depression, way of its overcoming and the recommendation about prevention in the future of similar economic crises were investigated and proved by J. M. Keynes in his well-known book "The General Theory of Employment, Percent and Money" (1936).

Basic provisions of **Keynesian model** of macroeconomic balance:

1. In economy there is an imperfect competition.

2. As a result of the imperfect competition of the price and nominal variables (a nominal salary, a nominal interest rate) are rigid, nonflexible. Rigidity of the prices (the salary making a basis of all market prices in economy) on Keynes is caused by the following main reasons:

- the market relations are made by contracts in which the prices is fixed for a certain period (1-3 years) and during this period the contractual prices can't change;
- oligopolistic and monopolistic practice of pricing in the real markets, when the prices are fixed at monopolistic high level;
- actions of labor unions which in collective agreements with businessmen stipulate a certain size of a nominal salary below which businessmen have no right to employ workers;
- the state establishes the minimum size of a salary below which businessmen have no right to pay to workers at their hiring.

3. Because of rigidity of the prices, balance of the markets is established not on a full employment level of resources, i.e. takes place the unemployment becoming a serious economic problem. Unemployment conducts to decrease in the income of the population, reduction of consumer expenses, investments and aggregate demand, therefore – to recession (stagnation), i.e. decline in production. Expenses of the private sector (consumer and investment expenses) aren't able to provide effective demand (i.e. the volume of aggregate demand equal to the potential volume of release at a full employment), in economy there has to be an active economic subject in the

person of the state, stimulating aggregate demand. Thus, Keynes proved need of state regulation of economy.

4. The problem of aggregate demand, instead of problem of the aggregate supply (it takes place in classical model) becomes the main economic problem (in the conditions of a part-time employment of resources) in Keynesian model. The aggregate demand (instead of to the aggregate supply) is given a crucial role in establishment of macroeconomic balance. The Keynesian model is the model studying economy from aggregate demand.

5. The macroeconomic policy of the state on regulation of aggregate demand influences economy in the short-term period, the Keynesian model is short-term model. The Keynesian methods of regulation of economy through impacts on aggregate demand (measures of fiscal policy), high degree of the state intervention in economy were for the developed countries during the period after the II world war.

However emergence and strengthening the stagflation processes in economy from the middle of the 70th years put a problem of stimulation of production and the aggregate supply. "The Keynesian revolution" is replaced "new neoclassical counterrevolution". Main streams of new neoclassical macroeconomics are presented by monetarism, school "supply economy" and the concept of rational expectations. The main attention in new neoclassical concepts ("new macroeconomics") is paid to the analysis of microeconomic fundamentals of macroeconomics, and also the economy analysis from the aggregate supply in the short-term period.

Questions for discussion:

1. Name the price and non price factors of AD. How do they influence the AD dynamics?
2. Define the price and non-price factors influencing the AS dynamics.
3. Explain the concept of "macroeconomic balance".
4. What are the basic provisions of the neoclassical concept of macroeconomic balance?
5. What prerequisites is the Keynesian model of macroeconomic balance based on?

6. What model of macroeconomic balance (neoclassical and Keynesian) is the most suitable for positive and normative analysis of macroeconomic sphere in the Republic of Kazakhstan?

THEME 11. MODELS OF CONSUMER DEMAND AND SAVINGS IN THE NATIONAL ECONOMY

11.1 The consumer demand as component of aggregate demand.

11.2 Neoclassical models of consumption and savings.

11.3 Models of consumption and savings in the Keynesian theory.

11.4 Model of multiplication of autonomous expenses in the Keynesian concepts.

11.1 The consumer demand as component of aggregate demand

In the developed countries in the general structure of aggregate demand consumer expenses of house farms occupy the greatest specific weight (about 60% of gross domestic product). Therefore, dynamics of a consumer demand defines dynamics of development of all economy.

Consumption is the individual and sharing of the consumer benefits, and in a cost form - is the sum of money which to be spent by the population for purchase of consumer goods and services.

The savings are part of the income which remains at the disposal of households after payment of taxes and consumer expenses. **The savings** are delayed on future consumption. Therefore the consumer choice at macro level depends on decisions of house farms how to dispose of the income: what part to spend today and what to postpone for the future.

The factors influencing consumption, are:

1. the size of the located income;
2. percent rate for deposits, consumer credits;
3. the size of wealth of a household;
4. real value of the money which is available for the economic subject (real cash remains or real cash desk): increase of the real cash remains conducts to growth of consumption and, as a result, to increase in aggregate demand (Pigu's effect).

All concepts of a consumer choice can be divided into two groups:

1) the size of the income is endogenous parameter, and a major factor of consumption is the percent rate (neoclassical model);

2) the size of the income is the exogenous parameter and a major factor of consumption (J.M.Keynes's, A.Smith's, J.Duesenberry's, F.Modigliani's, M.Friedmen's models).

11.2 Neoclassical models of consumption and savings

The prerequisites of neoclassical function of consumption are:

1) the theory of an intertemporary consumer choice of Irving Fischer, formulated in microeconomic aspects;

2) the concept of the endogenous income according to which economic subjects don't face restrictions on a labor market therefore determine the size of the income, proceeding from criterion of maximizing usefulness from two benefits: income and free time[44];

3) the size of consumption of households is decreasing function from a percent rate, and savings is increasing function from a percent rate.

Chain of reasoning in neoclassical model is as follows: households consider savings as the postponed consumption, seeking to maximize consumption volume in the long-term period. The parameter expressing degree of preference of the current consumption to the future is the percent rate. Than it is higher, especially effective there are savings and postponed future consumption, and the lower is the current consumption is more preferable. Therefore, savings are in direct dependence on an interest rate, and consumption is in inverse relationship from a percent rate.

In the neoclassical concept the prerequisite moves forward that each subject determines the size of the income, proceeding from developed on a labor market of level of a real salary and profitability of the property. The motivation of the individual defining his behavior on a labor market follows from aspiration to ensure a certain standard of living: maximum level of the income and free time. Then function of usefulness of the economic subject can be presented:

$$U = max\ U(Y, F), \qquad (11.1)$$

where Y – income; F – free time.

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[44] Vechkanov G.S., Vechkanova G.R. Macroeconomics, the 2nd edition.– Saint Petersburg: Piter, 2004. – p. 22.

The budgetary restriction of the subject reflecting its opportunities for achievement of the purposes in each time point is expressed by the equation:

$$Y = w \bullet N + r \bullet V, \qquad (11.2)$$

where w – real rate of salary; N – working hours; r – profitability from property or percent rate; V – the volume of the property.

So, each subject defines, what is the time to it to work, and how many to have a rest, proceeding from the preferences expressed by its function of usefulness (11.1) with the opportunities, reflected in the budgetary restriction (11.2), that is solves a problem of optimization of the usefulness[45]. The graphic solution of this optimizing task is submitted on fig. 11.1.

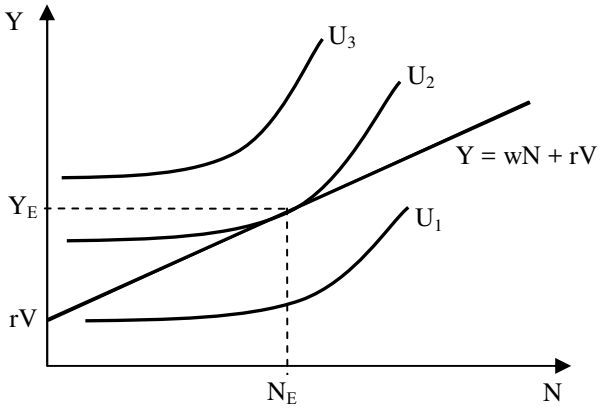

Fig. 11.1. The Determination of the optimum income Y_E and working hours N_E, necessary for its achievement

The point of a contact of the budgetary line from one of curves of indifference determines the size of the working hours (Ne) necessary for obtaining the optimum income (Ye).

From the theory of an intertemporary consumer choice of I. Fischer, we will present life cycle of the subject it is divided into two periods. In the first period the individual gains labor income, distri-

[45] Lusse A.V. Macroeconomics: the short course. – Saint Petersburg: Piter, 2001. – p.21.

buting it on consumption and savings, in the second period – gains labor income and the income from the property created as a result of savings, and completely it consumes. We will determine optimum volumes of consumption in the first and second periods.

In fig. 11.2 the point of a contact of the budgetary restriction from one of curves of indifference shows volumes of consumption of the first and second periods. Growth of the income shifts the budgetary line up and the subject can reach higher curve of indifference, having provided higher consumption level in both periods. Growth of a rate of percent will lead to increase in the income from property (rV). In this case households are given opportunity less to work, increasing free time. At increase of a rate of percent the same utility level will be provided with reduction current and increase in future consumption.

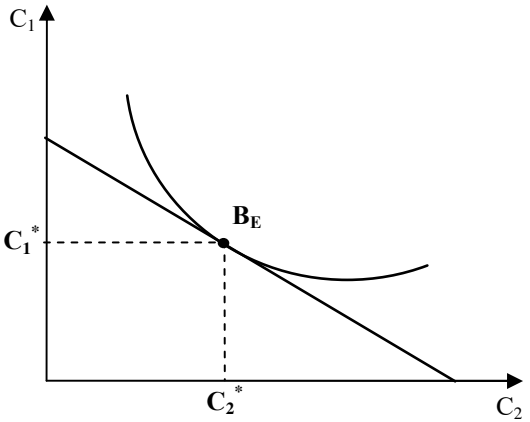

Fig. 11.2. Optimum volumes of consumption of a household in the 1st and the 2nd the periods

So, **neoclassical function of consumption is decreasing function from a percent rate.** Thus the current income acts as endogenous size. Neoclassical function of consumption:

$$C = C\left(\frac{1}{r}\right). \qquad (11.3)$$

Neoclassical function of consumption can be presented as follows[46]:

$$\boldsymbol{C(r) = C_0 - C_r \cdot r + C_v \cdot V}, \qquad (11.4)$$

where $C(r)$ – neoclassical function of consumption; C_0 – autonomous consumption, is those vital expenses which each subject incurs from the size of a rate of percent or the income ($C_0 = -S_0$); C_r – limit tendency to consumption on percent rate; r – percent rate; C_v - limit tendency to consumption according to the income from property.

Savings are in direct dependence on percent rate and neoclassical function of savings is:

$$\boldsymbol{S(r) = -C_0 + C_r \cdot r = S_0 + C_r \cdot r}\ . \qquad (11.5)$$

Allocate a nominal and real percent rate.

The nominal percent rate is the rate which isn't considering inflation.

The real percent rate is the rate considering inflation (reflects real purchasing power of the income).

According to I. Fischer's equation:

$$\boldsymbol{i = r + \pi} \quad \text{or} \quad \boldsymbol{r = i - \pi}\ , \qquad (11.6)$$

where i – nominal percent rate; r – real percent rate; π – the level of the inflation.

11.3 Models of consumption and savings in the Keynesian theory

In the Keynesian concept parameters of consumer behavior are interpreted essentially otherwise, than in the neoclassical theory:

1) the size of the income acts as an exogenous factor;

2) the volume of consumption of households depends on the current located income;

3) income distribution on consumption and savings doesn't depend on the current percent rate (i.e. not from objective economic parameter), depends on subjective preferences of consumers (traditions, public installations, psychological features, etc.). Keynes specified that the probability of that a household will change consumer

[46] Селищев А.С. Макроэкономика. – СПб.: Питер, 2002. – С. 84.

expenses as a result of fluctuations of an interest rate to some points, is very low.

The theory of consumption offered by J. M. Keynes, received the name of **the theory of the absolute income**. Consumption is direct function from the located income:

$$C = C\,(Yd)\,, \qquad (11.7)$$

where Yd – the located income which is equal to $Y - T$[47].

The increase of the income leads consumption to increase absolutely, but is reduced relatively. It is "the basic psychological law" of Keynes, according to it "people are inclined to increase the consumption with income growth, but to a lesser extent, than grows the income". The located income shares on consumption and savings ***(Yd = C + S)***. Consumption and savings increases with a growth of the located income. Keynes, proceeding from "knowledge of a human nature" and detailed studying of last experience, came to a conclusion that with income growth more to preserve desire of people, is caused by the following reasons:

- aspiration to provide a reserve on a case of unforeseen circumstances;
- aspiration to provide the old age, to educate children;
- desire to provide the income in a percent form;
- desire to enjoy feeling of independence;
- intention to provide necessary means for commerce;
- desire to leave inheritance;
- avarice[48].

Psychological factors of consumption and savings are reflected in certain behavioural coefficients which Keynes called "average propensity to consumption" and "average propensity to savings", "marginal propensity to consumption" and "marginal propensity to savings".

Average propensity to consumption (APC) is a share of consumer expenses in the located income:

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[47] Потребление есть функция располагаемого дохода Yd. Но так как Y и Yd линейно связаны, то в целях упрощения мы иногда будем использовать Y вместо Yd.

[48] Вечканов Г.С., Вечканова Г.Р. Макроэкономика, 2-е изд.– СПб.: Питер, 2004. – С. 91.

$$APC = \frac{C}{Y}. \quad (11.8)$$

Average propensity to savings (APS) is a share of savings in the located income:

$$APS = \frac{S}{Y}. \quad (11.9)$$

According to Keynes, **average propensity to consumption** (the share of the income directed on consumption) decreases in process of the income growth as the rich are inclined to preserve more, than those who is poor:

$$\boldsymbol{Y\uparrow \Rightarrow APC\downarrow}.$$

Marginal propensity to consumption (MPC or C_Y) is the relation of a gain of consumer expenses on unit of a gain of the located income, i.e. is the size at which consumption will increase with a growth of the income on one unit:

$$C_Y = MPC = \frac{\Delta C}{\Delta Y}, \quad (11.10)$$

and $0 < C_Y < 1$.

In the short-term period marginal propensity to consumption (MRS or Cy) is a constant and is defined by national features of the country and expresses subjective (psychological) preferences concerning distribution of the income to consumption and savings.

Marginal propensity to savings (MPS or S_Y) is the relation of a gain of savings on unit of a gain of the located income:

$$S_Y = MPS = \frac{\Delta S}{\Delta Y}. \quad (11.10)$$

The sum of marginal propensity to consumption and marginal propensity to savings is equal 1:

$$C_Y + S_Y = \frac{\Delta C}{\Delta Y} + \frac{\Delta S}{\Delta Y} = \frac{\Delta C + \Delta S}{\Delta Y} = \frac{\Delta Y}{\Delta Y} = 1. \quad (11.11)$$

So, Keynesian function of consumption:

$$\boldsymbol{C = C_0 + C_Y \cdot Yd}, \quad (11.12)$$

where C_0 – the autonomous consumption which isn't depending on size of the located income.

Autonomous consumption is a minimum level of necessary consumer expenses of a household. In the absence of the income auto-

nomous consumption is carried out through loans, reduction of the sizes of property, transfer payments of the state (for example, doles, grants, etc.).

Keynesian function of consumption is presented on fig. 11.3.

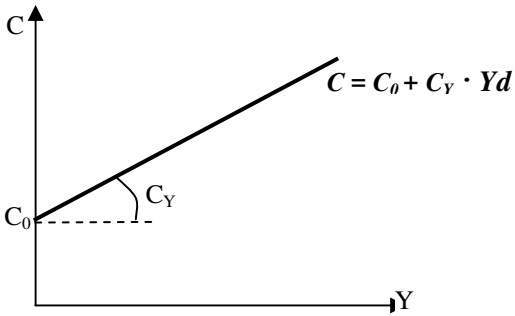

Fig. 11.3. Keynesian function of consumption

The tangent of angle of an inclination of function of consumption is equal to marginal propensity to consumption (MPC or Cy). If MPC there is more, then the inclination of function of consumption is more (a curve is more cool). Shift of a curve can be caused by change of size of autonomous consumption (C0), at increase the curve moves up.

The Keynesian function of savings is:

$$S = S_0 + S_Y \cdot Yd = -C_0 + S_Y \cdot Yd . \qquad (11.13)$$

In Keynesian model of savings (consumption) are function only the located current income and don't depend, for example, on a percent rate.

The schedule of Keynesian function of savings is presented on fig. 11.4. The tangent of angle of an inclination of function of savings is equal to marginal propensity to savings (MPS or S_y). If MPS there is more, then inclination of function of savings (a curve is more cool) there is more.

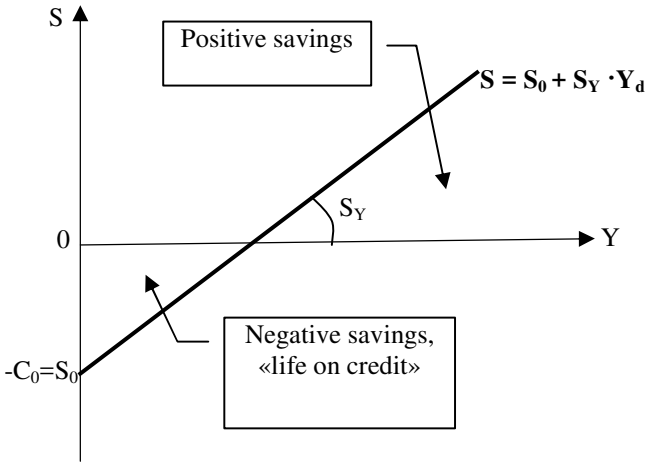

Fig. 11.4. The Keynesian function of savings

In Keynes's consumer function of MPS is the size constant, and APC falls in process of income growth. The analysis of empirical statistical data confirmed these dependences. Processing of the budgetary inspections of families showed that families with the big income consumed more and preserved the most part of the income, than a family with the smaller income. Research of short temporary ranks (2-5 years) also confirmed Keynes's hypothesis of constancy of MPC and APC decrease with income growth.

In 1946 the American scientist Simon Kuznets, having processed data on economic dynamics in the USA for 1869-1940, came to a conclusion that upon transition to longer time spans (10-30 years) APC remained stable, despite income growth. This opening received the name "Riddles of the Kuznets". In the present of time there are a number of the concepts explaining this phenomenon (the theory of life cycle of Franco Modigliani, the theory of the permanent income of Milton Friedman, the theory of the absolute income of Arthur Smith, the theory of the relative income of James Duesenberry, etc.).

11.4 Model of multiplication of autonomous expenses in the Keynesian concepts

The important consequence which has received the name of effect of the multiplication follows from the Keynesian concept of consumption. The theory of the multiplication arose in the period of a depression of 1929-1933.

The essence of multiplicative effect in the following: any increase in economy for any reason of autonomous expenses will lead to growth of aggregate demand and the national income at a size which is repeatedly exceeding initial growth of autonomous expenses.

Action of effect of the multiplicator locates according to the Keynesian theory, consumption is income function, unlike other planned costs which don't depend on level of the income and therefore are considered as autonomous.

The mechanism of action of effect of the multiplicator is described as follows. Any growth of autonomous expenses (A) on the size ΔA directly increases aggregate demand and the national income by the size $\Delta Y = \Delta A$. Consumption of households is direct function from the income therefore they will direct part of a gain of the income of $C_y \Delta Y$ on increase in consumption.

Consumption is a component of aggregate demand; it (aggregate demand) again will increase. It will cause the next growth of the national income therefore the part of a gain of the income again will be directed on increase in consumption, etc.

Consecutive record of all cycles of increase of aggregate demand, beginning from an initial gain of autonomous expenses:

$$\Delta Y = \Delta A + C_Y \Delta Y + C_Y^2 \Delta Y + C_Y^3 \Delta Y + \ldots + C_Y^n \Delta Y = \\ = \Delta A(1 + C_Y + C_Y^2 + C_Y^3 + \ldots + C_Y^n). \qquad (11.14)$$

and $C_Y < 1$, before us a decreasing geometrical progression, which at $n \to \infty$, it is reduced to:

$$\Delta Y = \frac{1}{1 - C_Y} \Delta A = m_A \cdot \Delta A, \qquad (11.15)$$

where m_A – multiplicator of autonomous expenses; ΔA – change of the public expenditures[49].

The multiplicator of autonomous expenses shows, at what size the national income will increase at increase of autonomous expenses on size ΔA. Thus value of the multiplicator of subjects is more, than house farms are inclined to consume the most part of a gain of the income, i.e. MPC is the more size, the multiplicator is more.

The effect of the multiplicator can be shown only in the conditions of economy of a part-time employment i.e. when there are not loaded capacities, unoccupied able-bodied population, etc. in economy of a full employment, i.e. reached level of potential release, the effect of the multiplicator pours out only in overall price level increase, i.e. inflation.

From the concept of the multiplicator follows one more interesting effect which Keynes called "paradox of thrift". As MPS = 1-MPC, increase in tendency to savings means not that other as reduction of tendency to consumption. The reduction of a consumer demand and growth of stocks of unrealized production conduct to reduction in production, growth of unemployment and falling of the national income. Virtue of thrift which was preached by classical school, turns not into growth of welfare of the nation, and its contrast is a nation impoverishment.

So, "the paradox of thrift" is characteristic only for conditions of a part-time employment in stagnating economy (a striking example the Great depression is). In the conditions of a full employment when the economy is inflationary "overheat", growth kindly disposed to savings (and, therefore reduction of tendency to consumption), promotes decrease in price level.

Questions for discussion:

1. What is the national consumption and saving and what factors influence on their level?
2. Explain why the amount of consumption isn't equal to income.
3. What are the motives inducing individuals to do saving?

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[49] Lusse A.V. Macroeconomics: short course. – Saint Petersburg: Piter, 2001. – 47 p.

4. What is the essence of neoclassical model of consumption and saving?

5. What is the essence of Keynesian model of consumption and saving?

6. What caused the criticism of Keynesian function of consumption?

7. What is the essence of "Kuznets's puzzle"? What theories of consumption arose in response to criticism of Keynesian theory of consumption?

8. What is the mechanism of multiplicative effect?

9. How is the autonomous expenditure multiplier calculated?

THEME 12. THE MODEL OF INVESTMENT DEMAND AS AN ELEMENT OF AGGREGATE DEMAND

12.1 The concept of investment demand and investment typology in microanalysis.

12.2 The accelerator-multiplier model of the investment process.

12.3 The basic neoclassical model of autonomous investments.

12.4 The basic Keynesian model of autonomous investments.

12.1 The concept of investment demand and investment typology in microanalysis

If consumer costs in developed countries account for more than half of the aggregate demand, the share of investment is 15 to 30% of aggregate costs.

Though the value of investment in total aggregate demand is much less than consumer demand, its role is extremely important and analysis of factors determining the investment demand is crucial.

First, investments increasing the supply of capital provide progressive development and economic growth.

Second, the investment demand is the most volatile and unstable component of the aggregate demand. In addition, the demand change for investment is based on the economic ups and downs.

Investments are long-term investment of economic resources in order to create and produce the net benefits in the future.

In the macroeconomics, the investment means investing in **real capital**, i.e. to recover the old and the creation of new production facilities and other capital assets.

There are 3 types of investments in real capital:

1) Investments in fixed capital (industrial buildings, structures, equipment, machines, etc.);

2) Investments in inventories (raw materials, work in process, finished goods);

3) Investments in housing

The investment demand is the demand of entrepreneurs for investment (capital) good for restoring worn and real capital growth.

Accordingly, there are **gross** and **net** investments.

Gross investments are the sum of:

1) **reducing investments (depreciation)** are investments for compensation of worn equipment

2) **net investments** are additional investments increasing the amount of capital of firms.

The main source of investment is savings. The problem is that savings are made, as a rule, by households, and investments – by firms, i.e. the concept of "saver" and "investor" is not the same. Of course, savings of firms serve as a source of investment, then the 'saver" and "investor" are the same. However, the role of household savings, which are not entrepreneurial firms, is considerable, and the difference in savings and investment processes as a result of these differences can lead the economy to a state deviating from equilibrium.

Thus, investments of firms are financed by entrepreneur's own funds (depreciation charges, retained earnings, etc.) and by borrowed funds (other people's savings). Investor resorted to borrowing if:

a) He does not have sufficient own funds to implement an investment project;

b) The implementation of the investment project will make a profit greater than the paid interest on loans.

Ceteris paribus, the demand for borrowed funds from investors will be the greater, the lower the loan interest. In other words, investment demand is a decreasing function of the interest rate (Figure 12.1):

$$I = I\left(\frac{1}{r}\right). \qquad (12.1)$$

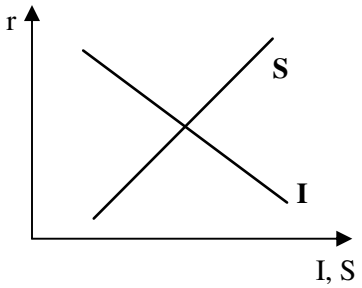

Figure 12.1. The curves of investment demand and savings

As for the supply of borrowed funds, ceteris paribus, the savings will be placed in the credit sector, if there is good profitability on deposits. Therefore savings are an increasing function of the interest rate (Figure 10.1):

$$S = S\,(r). \qquad (12.2)$$

In addition to the interest rate, investments are influenced by the increase in GNP, changes in the scope of taxation, technological changes and expectations of entrepreneurs. These factors lead to a change in investment demand. Any factor that causes the increase in the expected profitability of investment shifts the demand curve for investment to the right-up, and causes a reduction in the expected profitability shifts curve to the left-down.

There are induced and autonomous investments in macroeconomic analysis.

Induced (derivatives) investments are investments that are caused by sustained growth in aggregate demand (or national income).

Autonomous investments are investments in new capital formation, not related to the growth of aggregate demand (national income), but implemented by entrepreneurs to improve their position in the market.

Autonomous investments are presented mainly as investments made as a result of technological innovation, innovative technological solutions and the development of scientific discoveries. Such projects developed by innovators really cannot depend on the dynamics of the national income. In addition, autonomous investment is public investment

12.2 The accelerator-multiplier model of the investment process.

The impact of investment on aggregate demand (national income) is reflected in the multiplier-accelerator theory.

Static model of the investment multiplier was proposed in 1931 by R. Kahn, was developed in detail by J.M. Keynes. The essence of the investment multiplier effect is in the following: growth of autonomous investment leads to an increase in employment and an in-

crease in aggregate demand (national income), with an amount greater than the initial investment increase.

The initial impetus that autonomous investment gives can be carried out by the private sector and the state. For example, Keynes assigned a special role of the investment activities of the state in stimulating aggregate demand. In his theory, investment projects had to be implemented in the form of public works financed from the state budget (construction of roads, dams, bridges, etc.) in the economic downturn.

Thus, the investment multiplier is the numerical factor showing the dependence of the change in income on changes in autonomous investment. If there is a growth in the volume of autonomous investment, the aggregate demand and revenue will increase by an amount which in M_I times greater than the initial investment increase, i.e.:

$$\Delta Y = M_I \times \Delta I , \qquad (12.3)$$

where ΔY is increment in revenue, M_I is investment multiplier, ΔI is increment in investment.

Therefore, the investment multiplier is equal to:

$$M_I = \frac{\Delta Y}{\Delta I} . \qquad (12.4)$$

Since the multiplier is in direct relationship to the marginal propensity to consume (MPC) and in inverse relationship to the marginal propensity to save (MPS), then:

$$M_I = \frac{1}{1 - MPC} = \frac{1}{MPS} . \qquad (12.5)$$

Accelerator model (induced investment) was proposed by J.Clarke in 1917 and is based on the existence of a certain relationship between the dynamics of investment costs and changes in the gross.

The essence of the accelerator effect is in the following. Growth of autonomous investment leads to a multiplicative increase in aggregate demand and income. In turn, the business recovery and employment growth lead to higher propensity of various entrepreneurs to invest. As a result, induced (derived from income) investments increases.

Thus, **the accelerator** is the ratio of induced investment growth to increase in income caused by it and expressed by the formula:

$$A_K = \frac{\Delta I_{ind}}{Y_{T+1} - Y_T} \ , \qquad (12.6)$$

where A_K is accelerator; ΔI_{ind} is increase in induced investment; $Y_{T+1} - Y_T$ are increase in income.

12.3 The basic neoclassical model of autonomous investments

Neoclassical theory of autonomous investment is based on microeconomic principles and is based on the concept of **"marginal productivity of capital".**

According to the neoclassical concept, entrepreneurs making decisions about investing, motivate these solutions by the desire to bring the current value of capital to the optimum level. Therefore, investment demand function can be represented as follows:

$$I_A = \beta (K^* - K_t) \ , \qquad (12.7)$$

where I_A is autonomous investment volume; K^* is optimal value of capital; K_t is the current value of capital; β is factor characterizing the measure of approximation of the current value of capital to the optimal, $0 < \beta < 1$.

The optimal amount of capital is a level of capital volume that provides entrepreneur with the maximum profit.

In turn, the profit is maximized when the marginal productivity of capital (MRC) is equal to marginal cost, which is the sum of the current values of the interest rate (i) and the depreciation rate (d). In other words, profit is maximized when MRC = i + d.

To determine the optimal amount of capital, we use a modification of the Cobb-Douglas production function:

$$Y = K^{\alpha} \times L^{1-\alpha} \ , \qquad (12.8)$$

where Y is output; K is capital; L is labor; α is parameter that determines the contribution of capital to output, $0 < \alpha < 1$.

Using the condition for profit maximization, the optimal amount of capital will be equal to:

$$K^* = \frac{\alpha Y}{d + i} \ . \qquad (12.9)$$

As shown in equation (11.9), if rental costs rise at a given technology, the values of the desired output and the optimal amount of capital will decrease. Conversely, if the rental costs will be reduced, the value of output and the optimal amount of capital increase.

Further, if at given value of the marginal cost, technology of production changes as a consequence - the marginal productivity of capital, the value of the optimal amount of capital will also change. Because the marginal productivity of capital growth due to technical progress will increase the value of the optimal amount of capital.

Thus, in the neoclassical concept of **demand for autonomous investment (investment demand) is an increasing function of the marginal productivity of capital and a decreasing function of the interest rate** (at a given value of depreciation). [50]

It should be noted that the neoclassical concept of autonomous investment postulates dependence of investment demand on objective parameters of economic conditions (interest rates, production technology) and emphasizes the strong inverse of dependence of investment demand on the interest rate (i.e., high elasticity of investment by the interest rate).

12.4 The basic Keynesian model of autonomous investments

Keynesian theory of autonomous investment is based on the concept of **"marginal efficiency of capital".**

Investor deciding whether to invest in a project compares the expected stream of net income from the investment project with invested capital (i.e. investment costs). Since the major cost of investment projects are carried out mainly in the early years, and revenues from the project are allocated to subsequent years, an adequate assessment of future income in today's scale of values is necessary. This is done by using **the discount method**, which is an estimate of the current value of future net revenues.

Current (today's) value of future (in t years) income can be calculated by dividing this amount by $(1 + R)^n$, where R is the discount

[50] Vechkanov G.S., Vechkanova G.R. Macroeconomics, 2nd ed. - SPb.: Piter, 2004. - p. 114.

rate, i.e. preference measure of present value of the future . Any investment project will be economically viable if:

$$K_0 \langle \frac{D_1}{(1+R)} + \frac{D_2}{(1+R)^2} + ... + \frac{D_n}{(1+R)^n} \quad , \qquad (12.10)$$

where K_0 is required (starting) capital investment in the investment project ; D1, D2, ..., D_n are streams of net income from the project ; R is discount rate .

In formula (10), required capital investments in the project (K_0) and the expected net revenues (all D) are known estimate values for the investor. The investor's task is to find an unknown R, i.e. discount rate.

The value of the discount rate that makes the inequality (10) in the equation is called the marginal efficiency of capital (R *). In other words, the marginal efficiency of capital (R *) is the discount rate at which a stream of expected net income for the entire period of the investment project is equal to starting capital investment in the project.

Investor selecting investment projects by the profitability criteria stops at those which R * is the highest. Further, the investor compares the R *with market nominal rate of interest **i** to ensure the profitability of the investment project.

If R*> i, the investment project is profitable and it is necessary to carry out autonomous investment.

If R* <i, the investment project is unprofitable and investment will not take place. In this case, the entrepreneur can place his funds or in securities or bank deposits at the current nominal interest rate i.

If R* = i, it is the marginal condition of investment when the entrepreneur is indifferent to invest in a project or invest in securities or deposits. It is necessary to make autonomous investment.

Thus, the investment market size will be the greater, the less the current nominal interest rate i. Therefore, investment demand can be represented as a decreasing function of the interest rate.

$$I_A = I_i (R^* - i) , \qquad (12.11)$$

where I_A is autonomous investment value ; I_i is the marginal propensity to invest, showing by how many units, investment will be increased in the case of reducing the interest rate by one point.

Among foreign economists there is no consensus on the issue of sensitivity of investment to changes in interest rates. In contrast to the neoclassical theory (meaning about strong dependence of investment demand on the current interest rates), Keynes and his followers believed that the investment volume depends largely on the R*, than on the interest rate.[51] In general, the Keynesian concept of investment demand is based on the fact that investors in making investment decisions are guided not so much by objective economic indicators (market interest rates), as by subjective factors - internal feelings, pessimistic or optimistic estimates of the investment climate that Keynes called "animal instinct" of investments.

Questions for discussion:

1. Explain the typology of investments in macroeconomic analysis.
2. What is the difference between autonomous and induced investments, between net and gross investments?
3. What is the action mechanism of investments multiplier and accelerator?
4. What is the difference between Keynesians and neoclassical approach to the explanation of investment demand?
5. How is the concept of autonomous investment defined in neoclassical model?
6. What is the meaning of Keynesian model of autonomous investment?
7. What is discounting and why is it necessary?

[51] Vechkanov G.S., Vechkanova G.R. Macroeconomics, 2nd ed. - SPb.: Piter, 2004. - p. 113

THEME 13. ECONOMIC ACTIVITY OF A STATE AS A COMPONENT OF AGGREGATE DEMAND

13.1 Public expenditure as a component of the aggregate demand and the state budget.

13.2 The fiscal policy of the state and its impact on aggregate demand.

13.1 Public expenditure as a component of the aggregate demand and the state budget

In developed countries economy, the share of public expenditure in the structure of aggregate demand is on average 20% of GDP.

From a macroeconomic point of view, all public expenditures can be grouped as follows:

1) government procurement of goods and services (the cost for maintaining public institutions and organizations providing security, law enforcement , political governance, economic regulation and public expenditure for social and economic infrastructure and salaries of public sector workers, etc.), their value is included in GDP);

2) transfers (unrequited payments from the state budget for certain categories of citizens (pensions, benefits , scholarships, grants, subsidies , etc.), their value is not included in GDP, but is included in the LP) ;

3) interest payments by government bonds (public debt service).

The structure of public expenditures and public revenues approved by law is called the state budget.

Sources of income of the state budget are tax revenues (including social security contributions), profits of state enterprises, as well as involving government loans. At the same time the main source of state revenue are taxes, i.e. compulsory levies imposed by the government from individuals and legal entities.

For the purposes of macroeconomic analysis, it is important to distinguish direct and indirect taxes as well as only indirect taxes are considered in System of National Account.

Indirect taxes are taxes paid by consumers in the product price, also called consumption taxes (such as value added tax, excise taxes,

import duties, etc.). Since indirect taxes are reflected in the product price, they thereby increase nominal GDP (the higher indirect taxes, the higher prices and therefore more nominal GDP).

Direct taxes are the taxes on income and property of individuals and legal entities. Direct taxes are not reflected in the price, and therefore do not increase GDP.

If public expenditures are equal to state income (G = T), then there is a **balance of the state budget**.

The excess of government expenses over its revenues (G> T) forms **a budget deficit**.

In macroeconomic theory, there are three types of state budget deficits: the actual, structural and cyclical.

Actual deficit is the negative difference between the actual public expenditure and public revenue.

Structural deficit is the difference between the current public expenditure and public revenue that could go to the budget at full employment under the current tax system.

Cyclical deficit is the difference between the actual and structural budget deficit.[52]

Excess of public revenues over its expenditures **(T> G)** forms a **budget surplus**.

The state budget is deficit at the vast majority of countries, including with the developed market economies. Financing of the budget deficit is accomplished by:

1) issue of new money – this inflation method is also called the monetization of state budget deficits;

2) public borrowing within the country (domestic public debt) and abroad (external public debt), i.e. debt method.

Cover of budget deficit by issuing money (monetizing the deficit) leads to the danger of untwisting inflationary spiral. Besides monetizing government budget deficits allows the state to receive **seigniorage** - i.e. income derived as a result of issue of additional money, which is equal to the difference between the amount of newly issued money and the cost of their production. Seigniorage is a kind of infla-

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[52] Tarasevich L.S., Grebennikov P.I., Leussky A.I. Macroeconomics: Workbook. - 6th ed., rev. and add. - M.: Vyshee obrazovanie, 2006. -P.397.

tion tax, which is paid by the owners of funds that bear the losses caused by inflation.

When the state finance budget deficit by the issuance and placement of public debt (government securities) among banks and the public, there is an increase in market interest rates (as the demand for borrowed funds from private investors is added with the demand for credit from the state) that cause a decrease in private investment spending (since investment is inverse relation to the interest rate). This effect is called **the effect of crowding out private investment**. It weakens the incentive effect of fiscal policy.[53]

An amount of saved budget deficits over a certain period of net of budget surpluses form the government debt. There are two types of government debt: internal and external.

Internal debt is a debt of the state to citizens and organizations of the country, i.e. debt to the residents.

External debt is a debt of the state to citizens and organizations in other countries, i.e. debt to nonresidents.

In analyzing the dynamics of public debt, the budget deficit is divided into the common (current) deficit and the primary deficit. Primary deficit is a common (current) deficit net of interest payments on the national debt.

There are three basic concepts of balancing the state budget: the annual budget balancing, cyclic balancing and concept of functional finance.

The concept of the annual balance, also called Ricardian concept is in the idea that regardless of cyclical fluctuations of economy, annual public expenditure must be equal to government revenues. Inadequacy of this concept is obvious. So during the recession (crisis) when budget revenues (tax receipts) are minimal, state, according to the concept of the annual balance must reduce government spending, which will inevitably lead to a reduction in aggregate demand and the deepening slump in production. And in the period of economic growth, when government revenues (tax receipts) are maximal, according to the concept of annual balancing, the state should in-

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[53] Agapov T.A., Seregina S.F. Macroeconomics: Textbook/ under the general editorship of A.V. Sidorovich. 6th ed. Stereotype .. - Moscow: Publishing House of the "Delo I service", 2004. - P.129.

crease public expenditure that will spur the growth of aggregate demand and will cause overheating of the economy and even higher inflation. Thus, the theoretical inadequacy of this approach to the management of the budget is fairly obvious.

The concept of cyclical balance is based on the assumption that to have a balanced budget each year is optional, but the budget must be balanced in the course of the economic cycle. In order to resist the downturn of the economy, it is necessary to stimulate aggregate demand by reducing deposits and increasing government expenditures. Budget surplus which appears during the economic boom (boom, peak in business activity) should be used to finance the budget deficit occurring during the crisis (downturn), when government revenues (tax receipts) are sharply reduced. The disadvantage of the cyclic balancing concept is existence of differences in the depth and duration of recovery and crisis that causes a mismatch in the amount of budget surplus (accumulated during the recovery) and budget deficit (accumulated during the downturn).

The concept of functional finance is based on the idea that the stabilization and maintenance of high employment is of priority before the balance of the state budget. According to this concept, first put forward in the framework of the Keynesian theory, public expenditures and taxes should be used as counter-cyclical economic regulators. In a crisis (downturn), state can exercise deficit financing of the economy in order to stimulate aggregate demand and economic activity that is to increase public expenditures and to reduce taxes. In the recovery and overheating of the economy, the state should restrain the growth of aggregate demand and economic activity by reducing the budgetary costs and tax increases. And, state of the state budget does not matter, on the contrary argues that the growth of public debt in a well-functioning financial system and the high confidence of the population in the state will not lead to the bankruptcy of the country (default). However, it should be noted that the active use of Keynesian ideas of deficit financing of the economy by most developed countries in the 50 - 60 years had led to the mid 70s to the problem of chronic budget deficit, which in future will be one of the main causes of inflation overgrowth.

Following the concept of functional finance, that public expenditures and taxes are important instruments of economic policy, cally fiscal policy.

13.2 The fiscal policy of the state and its impact on aggregate demand

Fiscal policy is the impact of the state on the economy by changing the position of the costs and revenues of the state budget.

The main instruments of fiscal policy are public expenditures (public procurement and transfers) and taxes.

Fiscal policy of the state is aimed primarily at regulating aggregate demand by affecting the position of total expenditures. However, some instruments of fiscal policy (for example, corporate taxes or subsidies to producers) can be used to impact on aggregate supply.

There are two types of fiscal policy: discretionary and automatic (nondiscretionary).

Discretionary fiscal policy is a conscious manipulation of the position of public expenditures and taxes to stabilize the economy. In this case, as a rule, there is a change in the current tax and budget legislation, adopting new laws on public expenditures, tax rates, the introduction of new taxes, etc.

Discretionary fiscal policy is of two types:

1) stimulative (expansionist, active) fiscal policy is aimed at encouraging (increase) aggregate demand and reducing unemployment by increasing public expenditures and/or tax cuts. Negative consequence of stimulative fiscal policy is inflation.

2) restrictive is aimed at reducing aggregate demand and reducing inflation by raising taxes and/or reducing public expenditures. Negative consequence of restrictive fiscal policy is the decline in production and an increase in unemployment.

Automatic (nondiscretionary) fiscal policy requires no special changes in the current financial legislation of the government, as it is based on the action of automatic stabilizers that provide a natural adaptation of the economy to the cycle phases.

The automatic stabilizers are institutional factors and instruments whose value does not change, but their presence (i.e. their embeddedness in the economic system) automatically stabilizes the

economy by stimulating business activity and aggregate demand at downturn and strangling them in recovery.

The main automatic stabilizers include:

1) progressive tax scale - thanks to it: a) during recovery of disposable household income and retained earnings of entrepreneurs are growing more slowly than the volume of output and national income, with the result that it automatically keeps down the aggregate demand and prevent overheating of the economy, and b) during the crisis, reduction in aggregate demand is slower than the decline in production, which ultimately reduces the scale of some downturn in the economy);

2) the system of social benefits to the unemployed and the poor (benefits on unemployment, poverty, etc.) - during crisis, government transfers for this purpose increases (which stimulates aggregate demand), and during recovery - decreases (it constrains the aggregate demand) with no special changes in the current legislation.

Fiscal policy of the state in the short term (when full employment is not reached) are accompanied by the multiplier effect of public expenditures, taxes and a balanced budget. It should be noted that the change in public expenditures has a direct effect on aggregate demand, and tax changes have an indirect effect on aggregate demand through the change in the position of disposable income applied to consumption.

Increase (decrease) of public expenditures ΔG causes immediate increase (decrease) in aggregate demand (as public expenditures are a component of aggregate demand) and national income to the value ΔY, equal to the product of change in public expenditures (ΔG) to the value of the public expenditure multiplier of (m_G), which is equal to the autonomous spending multiplier ($m_A = \frac{1}{1 - C_y}$):

$$\Delta Y = m_G \cdot \Delta G = \frac{1}{1 - C_y} \Delta G \quad . \qquad (13.1)$$

From the formula (1), public expenditure multiplier (m_G) is the ratio of change in national income to change in public expenditures and by its significance it coincides with the public expenditure multiplier:

$$m_G = \frac{\Delta Y}{\Delta G} = \frac{1}{1 - C_y} \quad . \tag{13.2}$$

Tax changes lead to a change in aggregate demand not directly (as public expenditures), but indirectly through changes in disposable income (Y_d = Y- T) and consumption (C). So, in tax cuts of households, the part of its increased disposable income (ΔY_d) are directed for increasing savings, and the other part is for increasing consumption, so the initial increase in consumption will be less than the amount of tax cuts and will have minimal impact on the growth of aggregate demand.

Thus, an increase (decrease) in taxes to the value ΔT will cause a corresponding decrease (increase) in national income by the amount ΔY, equal to the product of the change in the tax (AT) to the value of the tax multiplier (m_T):

$$\Delta Y = m_T \cdot \Delta T = -C_y \cdot m_A \cdot \Delta T \quad . \tag{13.3}$$

In other words, the tax multiplier is the ratio of change in national income to change in taxes or the product of the marginal propensity to consumption and the autonomous expenditure multiplier:

$$m_T = -\frac{\Delta Y}{\Delta T} = -C_y \cdot m_A = -\frac{C_y}{1 - C_y} \quad . \tag{13.4}$$

It is important to note that the multiplier value of public expenditures is always larger than the tax multiplier value as tax cut leads to consumption increase not for the full value of growth of disposable income, but only for its part (the other part of released disposable income goes to savings). In other words, the increase in public expenditures will have a greater impact on the multiplicative impact on increase in the national income than the tax cut on the same value.

The same sizes of change in public expenditure and taxes have different effects not only on aggregate demand and national income, but also on the size of the budget deficit.

Increase in public expenditures will increase the budget deficit to size less than the increase in public expenditures (ΔG). This is because the increase in aggregate demand caused by increase in public expenditure will lead to an increase in revenue of market agents which in turn will increase tax collection which partly compensates the initial increase in public expenditure.

Increasing the income tax rate (ΔT) reduces the budget deficit by less value than ΔT as a tax increase reduces consumer demand and national income which is the basis for taxation. Decrease in taxes will lead to an increase in the budget deficit by a larger amount than ΔT.

Thus, in choosing between the two instruments of fiscal policy such as public expenditures and taxes it is necessary to consider that the same amount of change in public expenditures and taxes will cause different effects by the scale:

1) The national income will increase to a greater extent with the growth of public expenditures than with tax cuts;

2) an increase in the budget deficit will be smaller with the growth of public expenditures than tax cuts.

In other words, the change in the public expenditure is more effective instrument of fiscal policy.

Another important consequence of the multiplier model of public expenditure and tax is Haavelmo theorem (named after Nobel laureate Trygve Haavelmo first formulated it).

The essence of Haavelmo theorem: if the growth of public expenditures is financed by a corresponding tax increase (ΔG = ΔT), the multiplier of public expenditures will be equal to 1 and an increase in national income will equal to initial growth of public expenditures: $\Delta Y = \Delta G = \Delta T$.

Questions for discussion:

1. What is the role of state expenditure in the model of aggregate demand?
2. What is state budget, budget deficit and public debt? What kinds of budget deficit are there and what are the financing methods of it?
3. What is meant by discretionary fiscal policy and automatic stabilizers policy?
4. Define the mechanism of fiscal policy on production equilibrium quantity
5. Why is tax multiplier less than public expenditure multiplier?
6. What practical conclusion follows from Haavelmo's theory?

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