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MACROECONOMIC FORECAST AND DECISIONS

TUTORIAL

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МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РОССИЙСКОЙ ФЕДЕРАЦИИ

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МАКРОЭКОНОМИЧЕСКОЕ ПЛАНИРОВАНИЕ И ПРОГНОЗИРОВАНИЕ

Учебно-методическое пособие
по дисциплине «МАКРОЭКОНОМИЧЕСКОЕ ПЛАНИРОВАНИЕ И ПРОГНОЗИРОВАНИЕ»

Рекомендовано методической комиссией Института экономики и предпринимательства ННГУ для иностранных студентов, обучающихся по направлению подготовки 38.03.01 «Экономика» (бакалавриат) на английском языке

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В настоящем пособии изложены учебно-методические материалы по курсу «Макроэкономическое планирование и прогнозирование» для иностранных студентов, обучающихся в ННГУ по направлению подготовки 38.03.01 «Экономика» (бакалавриат).

Пособие дает возможность бакалаврам расширить основные знания о методах экономического анализа, которые объединяют экономическую теорию со статистическими и математическими методами анализа и прогнозирования, овладевать умением комплексно подходить к вопросам экономического развития, использовать различные источники информации; развивать экономическое мышление.

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INTRODUCTION

Cognitive and social human activity is called "planning" if it consists of making decisions about the future and providing targeted training to it. Planning is made by individuals, organizations, people and states. Planning is a science and some form of practical activity of people.

Planning as a science is a kind of social division of labor, consisting of the production of new knowledge relating to the foresight of things which may happen in the future, borders desirable to achieve and what resources will be needed.

Planning as a form of social practice is the specific activity consists of development of forecasts, projects, programs and plans, the ability to implement and verify the level of implementation.

Planning is the modern model of the planned work of the different actors in the market conditions, the preparation of management decisions that ensure their survival in the long term.

The subject of the discipline "Macroeconomic Forecast and Decisions" includes the study of mechanisms of action, the possibilities and ways to use in practice laws of development a society.

The science of planning is constantly evolving and improving as an important tool for improving the scientific validity and effectiveness of the decisions made by all subjects of management in a market economy.

The study of the theory and practice of planning has a special place in the training of economists, armed to form their understanding that the success of any activity is inseparable from the proper organization of the planned work at all levels of management.

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CHAPTER 1. MACROECONOMIC FORECASTING

1.1 Forecasting of Economic Development: the Concept and Essence

In General, forecasting refers to the process of scientific research qualitative and quantitative in nature. Such research is aimed to identify trends in the national economy or its republics, industries, regions, etc. and search for optimal ways to achieve the objectives of this development. The final result of the process of forecasting is forecasting system.

The forecast is a complex of reasoned assumptions, expressed in qualitative and quantitative forms regarding future economic parameters of the object. The prediction task is to provide objective, accurate idea of what will happen under certain conditions. It is developed search forecast to solve this problem, showing what can be the development of the economy (or some of its areas). The results will provide the answer to the question: "what will happen if" the government don`t take any other measures to regulate the economy. Thus, search forecast defines the spheres of the economy, requires urgent government intervention to overcome the negative processes.

Forecasting is not limited to a passive role of foresight of what may happen in the future, but also developed and target forecasts. They define a set of goals of the state economy and possible ways of their achievement. While forecastinf it is equally dangerous as ground targets, citing a lack of resources, as unrealistic goals, even if they are tempting. In addition, it is necessary to consider the existence of contradictions between long - and short-term goals. The pursuit of short-term benefits, usually complicates the movement in the strategic direction. There must be a certain balance between them.

Forecasting is applied at pre-planning stage of the development of major economic decisions and contributes to the development of the concept of economic development in the future.

Economic forecasting is performed in the following areas:

• forecasting growth of resources - natural, demographic, national wealth, development of scientific - technical progress;

• forecasting the rate and growth factors, structural shifts;

• forecasting needs - national industrial, personal, and other

• forecasts of the likely consequences of events in the country and abroad;

• forecasts of development of individual sectors, industries, specific types of

production areas;

- demographic projections;
- political forecasts;
- social forecasts;
- scientific and technical forecasts;
- foreign economic forecasts;
- environmental forecasts and other

Forecasts are linked closely to each other, although developing separately. On their basis shall be prepared summarizing the socio-economic development of the country in the future.

The development of any forecast are taken into account (in the conditions of market economy):

1. Forms of organization of the material flow. Due to the fact that the overwhelming part of all kinds of products are sold freely, to develop a reliable forecast of capacity in one way or another, it is possible only on the basis of detailed information about the situation on the commodity markets.

2. Methods of forming the cash flows. Financial resources does not belong to the sphere of direct government regulation in predominant part, therefore it is important to determine the volume and structure of private capital and its application.

3. Dynamics of prices and their impact on production and distribution. This circumstance applies to the original, because it is impossible to obtain any reliable forecast evaluation of production without knowing the price.

4. Internal convertibility of the currency - the purchase and sale of foreign currency in exchange for national domestically and Vice versa.

Forecasting is closely linked to planning that needs prerequisite routine calculations. One of the important tasks of forecasting is the prediction of the so-called thresholds (limits) of processes development, identification of possible timing of major changes, which marks a qualitative change of the studied processes. For example, in forecasting of energy development such thresholds may be the emergence and spread of new methods of energy production.

It is used the following two approaches in the process of forecasting. The essence of the first is to predict gradually penetrating from the existing basis of information to the future (from the moment of prediction). The essence of the second - to identify future goals and benchmarks, and they gradually move to the present. In the first case we have search (genetic) prediction, in the second - target prediction. Extension of the projection period, as a rule, leads to less assurance because current conditions are less affected in long-term.

The prediction is based on mathematical-statistical tools and the use of computer technology. The goal of prediction is to create a scientific backgrounds,

including scientific analysis of trends in the economy; variant anticipation of the upcoming development of social reproduction, taking into account current trends and goals; an assessment of probably consequences of decisions; substantiation of directions of social - economic and scientific-technical development for Executive decision making.

The forecasts are divided into (depends on the purpose of forecasting):

- cognitive - implying description possible or desirable prospects, future;
- management - involving the use of information about the future when making decisions.

The process of forecasting is based on scientific methods of understanding of socio-economic phenomena and the use of a combination of methods, means of economic analyses.

The forecasts are divided into (depend on scale of forecast developments):

- forecasts of macroeconomic (economic), interregional and interindustry forecasts of the industrial complexes (fuel and energy, agriculture, investment, infrastructure, social and other);
- forecasts of the industry (industry, agriculture, construction, transport, education, health and other branches of material production, non-production)
- forecasts regional - national-state and administrative-territorial formations in the Russian Federation;
- forecasts of the primary parts of the economic system (enterprises and organizations);
- forecasts of individual plants and products.

On lead time forecasts are divided into:

- long (period of pre-emption over 20 years).
- long-term (the period of pre-emption from 5 to 15, 20 years)
- medium-term (the period of pre-emption from year to 5 years);
- short term (the anticipation period from one month to one year);
- operational (the anticipation period up to one month);

T*he anticipation period* means the time interval from the moment that you have the latest statistical data on the subject until the prediction applies.

The variety used in the practice of projections forms a system. Under the *system of socio-economic forecasting* should be understood a certain unity of methodology, organization and development of forecasts, ensuring their consistency and continuity.

There are the following types of forecasts depending on the nature of the objects studied: economic, natural resources, scientific and technological,

demographic and social development and other.

Economic forecasts are exploring the prospects of development of individual elements of the productive forces and relations of production: labour productivity; the use and reproduction of labor resources; the volume and structure of fixed assets; the amount and structure of investments and their effectiveness; economic growth: the development of industries and economic systems; dynamics, volume, composition and quality of manufactured products and other.

Forecasts of natural resources - explore the potential involvement of natural resources in the economic turnover: fuel and mineral resources of the oceans, all kinds of energies, flora and fauna, as well as environmental and other.

Scientific-technical forecasts are exploring the prospects of scientific and technical progress, have a significant effect on the location of production, and environmental factors. Distinguish the following types: forecasts for the development of science as one of the spheres of human activity, forecasts of fundamental and applied research; development forecasts and the use of scientific-technical progress in the national economy; determination of consequences of scientific and technological progress and other.

Demographic projections are exploring the prospects of the movement of population and the reproduction of labor resources, the size of population change (fertility, mortality, sex ratio and age structure, level of employment, qualification and professional staff and other).

Forecasts of social development explore the prospects for the consumption of food and non-food products, retail sales, development of non-material sectors: General and professional education, culture and art, health care, housing and communal services, consumer services and other Forecasting the development of the national economy covers all aspects and levels of its functioning and is based on the aggregate of all the above predictions, i.e. has a complex character.

Development of a forecast is to search for a possible realistic and economically sound development of the national economy. Any forecast is development options with a certain degree of probability and contains the materials necessary to develop and make informed management decisions.

Forecasting as a process based on the use of predictive methods. Forecasting allows us to predict the socio-economic processes, measurable and not amenable. You should not plan such processes as: part of demographic processes, the current demand for commodities, the level of development of private farming, family composition and age structure of the population and some others.

 The prediction is based on the following *principles*: consistency, scientific validity, adequacy, alternative, focus, etc.

The principle of consistency - is to look at the object in his relationships and

dependencies with other processes and phenomena, the study of quantitative and qualitative regularities, the construction of such a logical chain of research, according to which the process of the elaboration and justification of any decision based on the definition of the General objectives of the system and subordination to achieve the goal, the activities of all its constituent subsystems. This system is regarded as part of a larger system that also consists of a certain number of subsystems.

The principle of scientific validity is based on: the requirements of economic laws, the application of scientific tools, the study of the achievements of domestic and foreign experience, making predictions, using methods and models, as conditions of the scientific formation of projections of their validity, effectiveness and timeliness.

The principle of purposefulness - involves the purposeful nature of the prediction, i.e. the content of the forecast should not be reduced only to foresee, but to enable the goals that you want to achieve.

The principle of adequacy forecast: objective pattern characterizes not only the process of identifying trends, but also the assessment of the sustainability of trends and relationships, and develop analogically theoretical economic processes.

The implementation of the principle of adequacy implies taking into account the probabilistic nature of economic and social processes. This means evaluating both the mainstream and the existing deviations, identifying possible areas of their differences and the assessment of their likelihood in the future.

The principle of alternative assumes the development choices in different trajectories, with different relationships and structural relationships. The transition from imitation of existing processes and trends to predict their future development based on the construction of alternatives, i.e. formation of several possible, and often opposing, mutually exclusive ways of development.

The principle of historicity - involves consideration of the predicted phenomena and processes in relation to their historical forms. In other words, in the forecasting process should proceed from the fact that the state of the object is the natural result of previous development, and the future is a natural result of its development in the past and present.

The main tasks of forecasting are:

• the accumulation of scientific material for informed choice prognostic solutions;

• assessment of the object of forecasting;

• scientific analysis of the economic, social, scientific-technical processes tendency;

• research objective relationships of socio-economic phenomena of the

development of the national economy in a particular place and time;

     • identification of alternatives for economic and social development;

     • selection and justification of the alternative forecast.

Scientific analysis of the forecast is carried out in three stages: a retrospection, diagnosis, prospection.

The *retrospectio*n refers to the stage of prediction, which explores the history of the development of the object to get its systematic description. This stage is about collection and processing of information, optimization of the composition of the springs, adjustment and final formation of the structure and composition of characteristics of the prediction object.

Diagnosis - stage of prediction, which explores a systematic description of the object of forecasting in order to identify trends of its development and selection of models and forecasting methods. At the stage of diagnosis realizes the analysis of the object of prediction. The analysis ends with the selection and justification of the model, and the prediction method.

The *prospection* stage of forecasting, which according to diagnosis are developed forecasts of the future development of the object, and assess the credibility, accuracy, reasonableness of the forecast (verification). At the stage of prospective reveals missing information about the object forecasting, specified previously obtained, adjustments are made to model the projected object in accordance with the newly received information.

Study objective relations of socio-economic phenomena is the process of developing a framework for the utilization of economic laws, which is a reflection of the significant causal relationships of phenomena, expressing their frequency of occurrence in certain conditions. Forecasting must take into account the uncertainty due to the probabilistic action of economic laws, the incompleteness of knowledge, the existence of a subjective factor when making planning decisions, imperfect and insufficient reliability of the information.

Evaluation of prediction object is based on a combination of probabilistic and deterministic approaches.

The essence of the *probabilistic approach* is based on the recognition of the impossibility systems to get completely accurate information about all socio-economic processes that are currently taking place and to predict the future even more detailed.

The *deterministic approach* is based on the recognition of the socio-economic system as not probabilistic but deterministic. It means that each decision causes a well-defined result. Random (not foreseen in advance) effects is neglected. This approach implies a simplification of reality, which bears actually probabilistic in nature. At the absolute determinism eliminates the possibility of

alternative choices. With an absolute uncertainty of a particular view of the future is impossible, and in these cases the prediction is meaningless.

Identifying the objective of the alternatives analyzed process and trends of its development for the future requires a choice between mutually exclusive possibilities. Selection and justification of the alternative forecast is based on genetic research (search) and normative (target) approach.

When *genetic approach* identifies the possible states of the object of forecasting in perspective, including the preservation of existing trends in the development of this object. It does not take into consideration conditions that can change these trends.

The normative approach defines the possible states of the object based on the recommendations of the desired behavior of the object. For example, in supply and demand forecasting the development of norms of consumption, as well as measures to encourage the application of such rules (the taste of consumers, and others).

Both approaches are interrelated, mutually complement each other and, as a rule, are used in combination, providing a comprehensive study of the predicted phenomenon or process.

1.2. Forecasting Methods

Prediction methods is a set of techniques and ways of thinking, based on the analysis of historical data, external and internal relations of the object of forecasting, leading to judgment, with some degree of certainty about the future development of the object.

When we use models in economic calculations, all values are characterized by the simulated objects and could be divided into:

• exogenous (or input) is known, i.e. calculated outside the model;

• endogenous, or a weekend - unknown, i.e. it is determined in the process of resized and received within the simulated system.

Endogenous factors are interconnected by direct and inverse relationships, exogenous does not have the reverse impact (in the model). For economic-mathematical modeling division of variables into endogenous and exogenous largely arbitrary and is determined by the nature of the problem being solved.

All forecasting methods are grouped according to the following criteria:

- the method of obtaining and processing information: statistical methods, methods of analogy, advancing methods;

-according to the degree of formalization: formal and intuitive;

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Promising extrapolation assumes a continuation of the levels on the future on the basis of the revealed regularities of changes of levels in the studied period of time. Retrospective extrapolation is characterized by the continuation of the levels of a number of speakers in the past.

There is a *formal and predictive* extrapolation. Formal extrapolation is based on the assumption that conservation in the future past and present trends of the object. *Predictive extrapolation* links the actual state of the object with the hypothesis about the dynamics of its development. It implies the necessity of taking into account the perspective of alternative changes of the object itself due to its essence.

Developing predictions using extrapolation we come from statistically emerging trends in those or other quantitative characteristics of the object. We extrapolate estimates, functional, systemic and structural characteristics, for example, the quantitative characteristics of the economic, scientific and manufacturing potential. The degree of reality of such forecasts is largely determined by the validity of the choice of the limits of extrapolation and the chosen "measures" the essence of the phenomenon under consideration. Procedure is as follows in the statistical analysis of trends and extrapolation:

1. The formulation of the problem, hypotheses about the possible development of the projected object, a discussion of the factors that stimulate or hinder the development of the property, the definition of extrapolation and its valid range.

2. The choice of system parameters, the unification of the various units assigned to each parameter separately.

3. Collection and systematization of data, checking data consistency and comparability.

4. Identifying trends of the studied variables of statistical analysis and direct extrapolation of data.

Predicting specific values of the studied object or parameter is not the main result in extrapolation forecasts. More important is the timely identification of objectively upcoming shifts, the natural tendencies of development of a phenomenon or process. Under the *trend of development* understand some General direction, long-term evolution. Usually the trend is the attempt to present in a more or less smooth trajectory.

Improvement of the accuracy of extrapolating the adjusted trend of the phenomenon is based on the experience of functioning of object, similar research or object ahead in its development of the projected object. Depending on what principles and what source data we use as the basis of the forecast, there are the following methods of extrapolation: the average absolute growth, medium growth

rate and extrapolation based on the alignment of rows for any analytical formula.

The prediction in the average of the absolute gains could be made in the case, if you are sure to consider a General linear trend, i.e. the method is based on the assumption of a uniform level change (under the uniformity refers to the stability of absolute increases).

To find analytical expressions of trends on any date it is needed to determine the average absolute increase and sequentially add to the last level so many times, how many periods are extrapolated range.

An analytical expression of this method is as follows:

$$Y_{i+t} = Y_i + \Delta t$$

Y_t is the final level of the number of speakers;

Y_{i+t} - extrapolated level (i+t) - the number of the level (year);

i - the number of the last level (year) of the study period, for which the calculated Δ ;

t - term forecast period (pre-emption);

Δ is the average absolute increase.

Forecasting average growth rate can be realized in the case when there is a reason to believe that the General trend of the series is characterized by exponential curve. For finding trends in this case it is necessary to determine an average growth rate raised to the power corresponding to the period of extrapolation, i.e. according to the formula:

$$Y_{i+t} = Y_i * K_p^t$$

Y_i is the final level of the number of speakers;

t - term forecast;

K_p^t - average growth rate.

If the same row of the dynamics inherent in different pattern, the data will differ from the data obtained by other methods of extrapolation.

Methods of trend extrapolation, being simple at the same time are also the most trusted. Therefore, the most common method of forecasting is the analytical expression of the trend.

The extrapolated trend of the phenomenon is a long-term trendof economic indicators, i.e. the change that determines the overall direction of development, the main trend of the time series. The trend characterizes the basic laws of motion in time with some extent free from accidental impacts. When developing models for forecasting the trend appears to be a major component of the predicted time series,

which is influenced by other components.

The result in this case is associated exclusively with the passage of time. It is assumed that over time it is possible to express the impact of all main factors.

Development of prediction is determining the type extrapolating function based on original empirical data and settings. The first step is the selection of the optimal form of the function that gives the best description of the trend. The next step is the calculation of the parameters of the selected extrapolation function.

When assessing dependencies there are the most common method - least squares, the method of exponential smoothing of time series, moving average method, and others.

The least-squares method is widely used in forecasting due to its simplicity and the possibility of implementing on the computer. The disadvantage of this method is that the model trend is firmly fixed, and this makes possible its use only for small periods of pre-emption, i.e. for short-term forecasting.

The method of *exponential smoothing* time series - this method is a modification of the method of least squares for the analysis of time series, in which more recent observations are given more weight, i.e. the weight of the number of points decreases exponentially as the distance into the past. This method allows to estimate the model parameters describing the trend that emerged at the end of the reference period and not simply extrapolates existing dependencies in the future, and adapt to time-varying conditions. The method of exponential smoothing is applied in the short and medium-term forecasting. Its advantages are that it does not require extensive information base.

Models describing the dynamics of the metric are fairly simple mathematical formulation and adaptive evolution of the parameters to reflect the heterogeneity and fluidity properties of the time series.

The *moving average method* is that the calculated average of a certain number first in order of levels of the row, then the average level of the same number of levels, starting with the second, then from the third, etc. Therefore, if the calculations of the average as would "slip" on a range of dynamics from beginning to end, each time discarding one level at the beginning and adding the next one.

Each link of the moving average is the average level during the corresponding period, which belongs to the middle of the selected period, if the number of levels number of speakers is odd.

The disadvantage of the simple moving average is that the smoothed number of speakers is declining due to the impossibility to obtain a smoothed levels for the beginning and end of the row. This disadvantage is eliminated by the use of the method of analytic alignment for the analysis of the main trends.

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Analytical smoothing method involves the representation levels in the range of dynamics in the form of a time function y=f(t).

To display the main trends of development of events in time there are different functions: polynomial degree, exponential, logistic curves and other species.

The extrapolation methods are based on the extension of the trends of the past and present to a future period and can be used in forecasting only in the anticipation period is five to seven years. The most important condition for the application is available stably expressed trends in socio-economic phenomenon or process. Over the long term prognosis these methods do not produce accurate results.

The method of *mathematical modeling* based on the possibility to establishing a certain correspondence between the knowledge about the object of cognition and the object itself.

Human knowledge about the object is more or less equivalent to its display, and a materialized form of knowledge is the object model. Thus, the method of modeling is the method of study, which examines not the objects themselves, and their models and the results of this research are transferred from the model to the object.

Application of mathematical methods provides a high degree of validity, effectiveness and timeliness of forecasts. In the prognostics use different types of models: optimization, static, dynamic, factor, structural, composite, etc. depending on the level of aggregation. The same type of models can be applied to different economic objects, i.e. macro-economic, intersectoral, inter-regional, regional and other models.

Modeling is one of the most important and most effective means of forecasting of socio-economic phenomena, tools of scientific knowledge of the process under investigation. Therefore, the question about the adequacy of the model object (i.e. image quality) you need to decide based on the particular purpose of the forecast.

Content modeling process are: design the model on the basis of a preliminary examination of an object or process, highlighting its essential characteristics; theoretical and experimental analysis of the model; comparison of simulation results with the actual data about the object or process; updating and refining the model.

Such connections, relations or properties of model elements that do not correspond to any one relationship, a relationship or a property of the object elements may be set in the process of experimentation. In this case, either built model is not adequate in the essence of the phenomenon, or built a model adequate

to the essence of the phenomenon, however, the properties and relations of elements of the predicted phenomena are not described fully.

In the forecasting of socio-economic processes by means of studying the regularities of the development of socio-economic processes is economic-mathematical model (EMM), i.e. formalized system that describes the basic relationships of its elements.

The model can be formulated in three ways: as a result of direct observation and study of some phenomena (phenomenological method), a distillation of the more General model (deductive method), generalization of more specific models (inductive method). The same object can be described by different models depending on the research or practical needs, capabilities, mathematical apparatus, etc. So it is always necessary to estimate the model and the region in which the conclusions from the study can be reliable.

The model, which describes the instant state of the economy, is called static, and models describing the development of object modeling are called dynamic. Models can be built in the form of formulas and analytical representation of the model; in the form of numerical examples and numerical representation; in the form of tables and matrix representation; in the form of a graph and a network representation of the model. Accordingly, there are models numerical, analytical, matrix, network.

In economic science, they are used for the analysis of economic processes, forecasting and planning at all levels and at all levels of the economy, as well as planning the development of the national economy as a whole. They are commonly divided into two large groups: models, reflecting mainly the production aspect of the plan; and models, reflecting the social aspects of the plan mainly. These divisions are largely arbitrary, since in each of the models in varying degrees, combined production and social aspects. Models of the first group can be called: the long-term model forecast summary indicators of economic development; inter-sector model of economic planning; sectoral models of optimal planning and production, as well as models optimized the structure of production in the industries.

Models of the second group (the most developed models) are associated with forecasting and planning of income and consumption of the population, demographic processes.

Forecasting also apply EMM econometric type. In the econometric model are synthesized achieve the theoretical analysis with the achievements of mathematics and statistics, mathematical statistics. Econometric methods are used to describe the economy by building econometric systems models, including as constituent elements of the production function, investment function, and the

equations describing the motion of employment, income, prices and interest rates and other blocks. Among the most well-known econometric systems of this kind, on which the calculations are being done on computers, so - called Brookings model (USA), Dutch model, Wharton model (USA) and other.

The General scheme of development of the system of forecasting models consists of three steps. At the first stage of developing local forecasting techniques, are being developed separate models and subsystems forecasting models. Then the model are interrelated in a single system, which allows to make individual interaction models according to the requirements stated in the program of research of the whole issue.

The second stage involves the creation of a system of interacting predictive models on the basis of the development of local methods of forecasting. There are specified and agreed subsystem models, they have been checked for their interaction, are determined by the sequence of individual models, and techniques assessment and validation methods receive comprehensive forecasts. There are programmes for problem solving on the computer.

The third phase involves the specification and development of individual local systems and techniques of the creation of predictive models and their practical usage.

The system of forecasting models and modeling procedures are documented in the form of modeling techniques, which must meet the following requirements:

• to give a coherent description of a sequence of rules, allowing to predict when a sufficiently broad assumptions about the nature and values of the initial information;

• to justify the choice of methods and technical means to perform calculations in a timely manner and repeatedly;

• to identify the essential connection predictable phenomena and processes. For this purpose it is necessary to identify the most important and stable patterns and trends as on the source material, and in the process of analysis of the results obtained by this method;

• to ensure the coordination of the individual forecasts in a consistent system, and also allows mutual adjustment of forecasts.

Intuitive forecasting methods are methods of solving complex problems through informal receipt of the estimates of the state of development of the object in the future, regardless of information provision method of expert estimations.

The essence of the method of *expert assessments* is conducted by the experts intuitive-logical analysis of problems with the quantification of judgment and formal processing of the results. This generalized opinion of experts is accepted as the solution to the problem. Using intuition, logical thinking and quantitative

assessments with the formal treatment allows to obtain an effective solution to the problem. Features of a method of expert estimations are, first, science-based organization of all stages of the examination, providing the greatest efficiency at each stage; secondly, the use of quantitative methods as in the organization of examination and evaluation of expert judgment and formal group processing results. Most often these methods are used when considering socio-economic problems, where it is impossible to develop formal predictive model.

The following tasks are solved using the method of expert assessments: complete lists of possible events for a certain period of time on the problem under consideration; determine the most probable intervals, making the set of events; define goals and objectives with ordering them in order of importance; develop alternative solutions to problems with the assessment of their preferences; develop alternatives resource allocation by ranking them in order of priority; develop alternative ways of decision making in a particular situation with an assessment of their preference; and other.

Organization of expert assessment procedure involves several areas:

• formation of the expert group;

• preparation and examination; statistical processing of the obtained results.

Depending on the organization of the expert evaluation and the survey form there are methods of individual and collective expert judgments.

Methods *individual expert assessments* include: a method of questioning and interviewing, analytical method, script writing and other

Method of the survey is to produce experts questionnaires - questionnaires, to which they must respond in writing. Interviewing is an oral question expert member of the management group by the interviewer.

All questions can be classified according to content and form. Content questions are divided into three groups:

• objective data about the expert;

• key issues in fact analyze problems;

• additional questions, identifying sources of information and reasoning expert, self-evaluation of competence of the expert.

The basic questions are divided into open, or free, closed and with multiple choice, as well as direct and indirect. Closed question is given in a form involving only three possible answers - "Yes", "no", "don't know". The issue of " multiple choice answers provides expert possibility to select one of the offered answers, for example, the period of implementation of specific scientific and technical ideas from a number of the listed terms. This form includes job on the ranking of the specified objects, estimate their weights, importance scores to estimate the probability of some event.

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In addition to the three forms of the questions, you can enter another form, intermediate between open questions and multiple choice questions of answers. This question is the task to conduct morphological analysis, to build a tree of goals, alternatives.

When you set a question in this form, the expert may be entitled to give two or three evaluations of the same object - minimum, average, maximum (or optimistic, average and pessimistic).

When setting questions, the expert should be informed that he has the right to raise new questions and to answer them as well as experts are not included in the number of respondents who are able to give answers to the questions or the questions put forward to them. In addition, the expert must present their comments and advice on the form and content of the questionnaires.

Obtaining estimates by the method of interview is carried out through conversation, during which the interviewer asks the questions to the expert in advance in varying degrees, developed the program. At the same time can be made a survey of several experts, but in this case there is a danger to lose independence of experts.

From face-to-face questionnaire this method is differ by the fact that during the interview, the expert provides answers verbally to oral questions, the exact content of which before the survey, as a rule, was not known, although the themes of the interview could be notified in advance.

The advantage of interviews is a continuous live contact of the interviewer and interviewee, which allows you to get quickly a large amount of information and comprehensive, albeit superficially, and illuminates the object under examination.

The disadvantages of interviews are an opportunity to the strong influence of the interviewer on the answers of the expert, no time for deep thinking through the answers, and also the high requirements of polling and great time spent on the survey of the total composition experts.

Obtaining estimates by analytical method is performed by a logical analysis of some predictable situations. It is intended for independent expert's work on trend analysis, assessment and development forecast of the object.

Method of *writing a script* based on the determination of logic process or phenomenon with time under various conditions. The main purpose of the script is the definition of the General development of the object of forecasting, identifying the main factors of background and formulating criteria for assessment of the upper levels of the tree of purposes. The value of the script is the degree of uncertainty, i.e. the greater degree of consistency of expert opinions on the feasibility of events in the development process, etc.

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The main advantage of the above methods are maximum use of individual abilities of experts and the insignificance of psychological pressure on individual employees.

Methods of *collective expert assessments* - group collaborative expert judgments based on the fact that collective thinking, first, is characterize by a higher level of accuracy of the result and, secondly, when processing individual independent assessments made by the experts, new ideas can be produced. There are the following types of methods of collective expert assessments: method "commissions", "Delphi method", method of the collective generation of ideas (brainstorming), the method of morphological analysis and other.

The method of "*commissions*" involves the creation of a working group, which includes: the appointment of experts, surveys, processing of materials, analysis of the results of collective expert evaluation. During the work they clarify the main directions of development of the object, and compose matrix, reflecting the General objective, sub-objectives and means to achieve them, i.e. directions of scientific research and development, the results of which can be used to achieve the goal. Then develop questions for the experts. This can be a list or table, but the content of the questions must be determined by the specifics of the object projection. This is followed by a survey of experts and statistical processing of materials that characterize a generalized opinion and the degree of consistency of individual experts. They serve as the starting point for the synthesis of predictive hypotheses and options for the development of the studied phenomenon or process. The methodology is a set of estimates of the relative importance assigned by the experts of each of the evaluated areas of research and development, expressed in points and takes values from 0 to 1, from 0 to 10, from 0 to 100 and so on.

These estimates on a particular issue should be consolidated in a table whose rows correspond to the areas of research, and the columns of ordinal experts.

"*Delphi method*" is one of the most common methods of expert estimations. Its main features are: the anonymity of the experts, a complete rejection of personal contacts of experts and group discussions; multistep procedure of a survey of experts by means of a survey; providing expert information, including the exchange between experts, after each round of the survey while maintaining the anonymity of the estimates of argumentation and criticism; the justification of the answers of experts on request the organizers.

The method of "*collective generation of ideas*" includes two elements: identification of probabilistic variants of development of the object of forecasting and evaluation. When "brainstorming" first activates the creativity of experts, as reflected in the generation of a specific idea. Then follows the process of destruction, criticism of this idea and formulation is contrite. This allows to

involve actively all experts in the creative process of achievement productive results for a short time by.

Method of *morphological analysis* is used for predicting the complex processes by the expert method and systematic review of all possible combinations of the development of individual components of the system. This method is built on the full and strict classifications of objects, phenomena, properties, and parameters of the system, allowing to build and evaluate possible scenarios of its development in General.

The reception systematic coverage of the information and studding its method "morphological box" are used in this purposes. The latter is constructed in the form of a tree or matrix, in its cells are contained the relevant characteristics of the object. Serial connection of one of the parameters of the first level with only one subsequent second level represents one of the possible States of an object or solutions to the problem. The result is a new information about the target object and generation of evaluation of all possible alternatives of his condition.

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CHAPTER 2 . MACROECONOMIC DECISIONS

2.1. The Concept and Content of Macroeconomic Planning

Planning is a purposeful activity which involves the development and practical implementation of plans that define the future state of the economic object and ways, means to achieve it. Planning is one of the economic methods of management.

For over the last thirty years, many economists broke a lance in the debate on the problem of combination of plan and market. When market relations become reality, understanding that the plan and the market is not antipodes, but complementary elements of the economic system have come. The management of socio-economic development on the basis of monetary, tax and customs policy without balanced national plans is not justified.

Planning takes place at various levels of management hierarchy. At the level of the national economy - macroeconomic planning; at the regional level - regional (territorial) planning; enterprise-level - microeconomic planning.

Macroeconomic planning is the scientific foreknowledge of the level of development and performance of social production, it is based on identifying patterns and trends of social and scientific-technical progress, experience and business practices objective dependencies and causal relationships in the economy. Scientific basis for macroeconomic planning is economic theory.

Macroeconomic theory is the science that studies the economy as a whole, as well as its most important sectors (household, business, public sector etc. or any other classification of industry, agriculture, financial and insurance market, consumer market, and so on) and using the aggregated macroeconomic indicators and their relationships.

Part of macroeconomic theory is the theory of planning, investigating the principles of the national planning and the system of decision-making about the upcoming socio - economic development. The theory of planning has three components: methodological, social, economic and organizational.

Methodology of planning - a system of principles, indicators, methods and techniques for the development and justification of the planned solutions. The methodology is based on economic theory that studies the laws and regularities of development of society, trends in reproductive processes and other components of the methodology are planning principles, methods, methodology, logic planning.

Socio-economic direction provides study and knowledge of the economic

and social laws expanded reproduction with the aim of implementing them in the economic policy of the state.

Organizational direction is researching and developing a technology plan, the structure plan authorities etc.

The planning principles are the starting points of the theory of macroeconomic planning. As the main principles are the following planning principles: scientific validity, social orientation and priority of social needs, improving the efficiency of social production, proportionality, priority approval of short-term and long-term goals and objectives.

The principle of *scientific validity* planning decisions - requires consideration of laws and procedures of development of nature and society, of the laws of thought, the application of methods of mathematical modeling in the process of plans development.

The principle of *social orientation* and priority public needs suggests that planning should primarily consider the interests of the individual and society. The needs of society must be the original position of the national plans - economy should not and cannot develop outside interests, personal and public consumption.

The principle of *increasing the efficiency of social production* involves the implementation of the goals and objectives of the planning at the lowest cost, i.e. with a maximum savings of labor and materials.

The principle *of proportionality and balance* - involves the formation of proportions, in the interests of the whole society, on the basis of a balanced structure of social production. The proportions of social production on the one hand shape the market mechanism, on the other, through planning creates its rational structure based on the interests of the company. Proportionality and balance of social production is achieved through:

• the establishment of equivalent exchange operational activities in all spheres of social production;

• the achievement of equilibrium of aggregate demand and aggregate supply across the economic turnover of resources;

• the rational balance between the reasonable needs and available resources;

• the parity of interests of various forms of ownership in the use of material, labor and financial resources of the company and other.

The implementation of this principle in planning allows you to maintain material and cost proportion in the whole national economy, as well as crosssectoral, sectoral, territorial and other proportions.

The principle of *the priority* requires selection of priority areas dealing with major national economic problems caused by the limitations of available resources.

Principle *approval of short-term and long-term goals and objectives* helps to

ensure the consistent achievement of current goals and objectives of socio - economic development with the achievement of strategic goals. It is implemented through a system of long-term, medium-term and current planning documents.

Planning methods - a set of methods and techniques by which ensured the development and justification of various plans. The main methods of planning include: balance sheet, regulatory, various mathematical methods, and program-target method.

Methodology of planning is reflected in the regulations, controlling, guidelines of plans, forms, targets and methods of their study.

An integral part of the methodology of planning is a planning methodology that represents a set of specific methods, techniques, calculations required for the development of certain types, sections and plan parameters, their coordination and linkages.

The most important element of planning methodology is logic and technology planning.

The logic of planning is a system of ideas about the stages of scheduled calculations; an ordered sequence of actions associated with the development of plans. She elaborates on the methodology of economic planning and serves as a basis for the development of technology planning.

The technology planning is defined as a set of procedures for the collection of planning and economic information, processing, layout of plans, indicators structure, development and of other means of supporting the process of drawing up plans and monitoring their implementation.

Plan, organize, implement plans, adjust, and monitor their implementation involves the selection and justification purposes, the definition of the means and ways of achieving them through the comparative evaluation of alternative options and making the most acceptable of them.

2.2. The Indicators Used in the Planning

As mentioned in the previous section, an integral part of the methodology of planning is a system of targets. *Planning indicators* - quantitative and qualitative characteristics, expressing jobs plan, determining resource used in terms of processes of production and consumption in the planning period. The indicators form the structure and adequacy of the planned solutions, and are implemented through the preparation and substantiation of administrative decisions, as well as the fit between the objectives of the plan with the resources and effectiveness of their use, national interests with the interests of individual entities and other.

All targets in its purpose, content and form are divided into absolute and

relative, quantitative and qualitative, natural, labor and cost, claim and settlement, indicative, reporting, current, planned, technical, economic, technical, economic, organizational, social, aggregated, disaggregated, and other.

Depending on the methods of calculation targets can be: absolute, relative and average.

Absolute performance value is aneconomic value that reflects the volume or size of the phenomenon within certain limits of time and place. Absolute figures describe the sum of the values of the primary characteristics of the object, i.e. reflect the total number of units total property size (absolute) phenomena, their signs in units measures length, area, mass (weight) and the like, in units of time, in monetary units or in the form of a number of elements (items) that make up this phenomenon. For example, the amount of funds allocated to consumption in a given month or year, etc. They are expressed named quantities in physical units: tones, units, hours, and so on; in conventional units: conditional fuel, labor shifts, etc.; monetary unit: rubles, dollars, marks, etc.

The absolute figures are needed for planning and analysis activities of the economic object, analysis of factors influencing the achieved level of production, profit, cost, performance, and other

Relative indicators is values for performance measurement and correlation of different absolute values, their measurement in time, their relationship between themselves and other. Relative value obtained by dividing one value by another, which serves as a base of mapping. They are used for a comparative assessment of the phenomenon and study its structure, the degree of development and are divided into relative values: plan, implement the plan, dynamics, patterns, contrast, intensity, etc.

For the characteristics of the essence of special phenomena and processes targets are divided into: quantitative and qualitative.

Quantitative indicators - values that reflect those of the economic phenomena and processes, which can be directly measured and recorded. They express the dimensions, levels, phenomena and processes in absolute terms. These include: sales volume, the volume of commodity gross output, number of employees, number of employees, payroll, cost of various inputs and other. Quantitative indicators are divided into volumes and flows.

Volumes (torque indicators) - values that measure the size, level of economic phenomena on a certain date. For example, supply of products, the value of assets, number of employees on a specific date.

Flows (interval indicators) - values that measure the size, levels of economic processes taking into account the duration of the periods of time for which the calculation is performed. For example, the annual volume of production, the daily

output capacity of the power plant. The dimension of the thread: "volume divided by time".

Qualitative indicators - values measuring the levels of those economic phenomena and processes that cannot be directly measured and recorded. Size of quality indicators are determined by weighing and comparison of quantitative indicators in relation to each other - the level of productivity, production costs, profitability, capital productivity, and other

The type of meter indicators are divided into natural, cost, labor and other.

Natural – value allowed planning the material and substantial proportions of production, consumer properties of products, the process parameters, etc. They are used to reflect the real content of the plan, to align with demand. Calculation of physical indicators is carried out in units corresponding to the physical properties of the phenomena (in units of mass, length, volume etc).

Employment indicators, allowing planning the expenditure of time and labor. On the basis of their planned production volumes in employment measures the number of employees, labor productivity, wages and other

Cost indicators- general indicators using to plan production volumes, production, wages, production costs, income and other, previously expressed in natural and industrial gauges. Cost indicators are used to plan budget, costing, production jobs, and other.

Natural indicators, depending on which units are divided into:

- actually natural, reflecting the quantitative assessment of a specific product (pieces, tons, meters, etc);
- semi-natural (shown) is used to determine the total volume of production of different, but related in any respect of the products (products).

The essence of the method of semi-natural measures is that any one of the related products is a conditional one, and all the other depending on the values adopted for the measurement of the parameter and are translated in these conventional units. The conversion is done on the coefficients that characterize the relationship of the parameters of each product parameter of product taken as a unit of measurement. For example: building materials - standard brick size HH mm; slate, in conventional tile size 40*40*0.4 cm, etc.

Depending on their role in managing impacts on economic object indicators are divided into:

Assert (policy) indicators are values that establishe the achievement of performing the required tasks, defining the main results of economic activity of the object during the planning period. The structure and composition of the subsystems of these indicators are determined by the composition of the goals and objectives of the economic object.

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Calculated values - values that reflect the levels of those economic phenomena and processes, which are secondary to performance of the economic object. They are intended to substantiate quantities approved (directive) cost object.

Benchmarks - values that reflect the evolution of the familiar (predictable, planned) development of economic object.

In the point of time the indicators are divided into reporting, current, planned.

Reporting indicators - economic values characterizing the results of economic and financial activity during the reporting period (annual, quarterly, monthly, and so on);

Current indicators of economic value characterize the results of the economic and financial activities in the current period (annual, quarterly, monthly, and so on).

Targets indicator - economic value, establishes on the basis of the target proportions quantitative parameters of functioning and development of the economic object for the planning period.

The signs that reveal the nature the measured object bring new classification and the indicators are divided into:

technical - which characterize technical phenomena and processes of production - dimensions, precision, performance, durability, quality, durability, novelty and other;

economic - which characterize the economic phenomena and processes of production - the cost of labour, material and other resources, the degree of efficiency of all types of resources, production, etc.;

technical and economic indicators characterize technical phenomena and processes in their relation to the economic side production processes or separate elements - the level of use of different types of equipment, the degree of mechanization and automation, progressive technological processes, product quality, production efficiency, organization of production and labor, and others;

organizational indicators describes the level of organization of production - factors of specialization of jobs, mechanization and automation of production, use of production capacity, and other.

social indicators describes the level of social development of the collective organization skills, educational level, housing conditions and household maintenance and other.

According to the degree of generalization of processes and phenomena indicators are divided into:

aggregated indicators, that are enlarged on any basis by adding together,

represent a group of indicators through their medium, by using different weighing factors (e.g., production volume, average productivity, average annual value of fixed assets and others). The aggregates is necessary because no single model are able to accommodate the diversity existing in the economy, products, resources, links. In the process of control during the transition from the lowest to the highest stage, indicators are aggregated, and the number of them decreases. In this part of information is lost and you have to calculate approximately, on the basis of statistical regularities;

disaggregated indicators, that are reverse aggregated (e.g., production plant, the average productivity of workers and others).

The structure of the indicators has another classification in the same criterion in accordance with which the leading indicators of the system are divided in terms of population): private (individual, group, and generalizing.

- *private (individual)* - indicators of individual phenomena and processes (number of personnel, the turnover of the trading companies, and others);

- *group* - indicators of phenomena and processes of individual groups for similar phenomena and processes.

- *summarizing* - indicators of phenomena and processes together of groups of similar phenomena and processes.

The difference between shared by group and private indicators lies in their different information capacity. If private figures describe a separate process, phenomenon, the efficiency of individual production factors, the group characterize the overall study process or phenomenon, its effectiveness as a whole.

System of performance depends on the complexity of the goals and objectives that are addressed in the development plan. The problem of adequacy of the performance characteristics of individual stages of reforming the economic system is one of the most difficult methodological problems.

4.4. The main forms of macroeconomic plans

Planning is the type of management activities aimed at the justification of the measures ensuring the achievement of goals, and is a function of the owner or its authorized representative. The need to plan for the needs of integration, deepening the division of labor and does not depend on the form of ownership or management. Every purposeful process of development of the productive forces and relations of production requires planning and foresight of the consequences.

In the conditions of market economy the government has to plan the following areas:

• the use of natural resources;

• the revenues from the property of legal and physical persons;

• tax rates and tax revenues to the budget from the production and circulation

of goods;

- budgetary costs of the apparatus;
- procurement of goods for state needs;
- financial support to industries, regions, individual categories of citizens of foreign States;
- attract, repayment and servicing of government loans;
- the purchase, sale, use of state property;
- the activities of state-owned enterprises and other

As practice shows, developed countries allocate up to half and even more than GDP. It is clear that such planning in the public sector is itself a macro-planning in abbreviated form. In form and content to distinguish between Directive and indicative planning.

2.3. Policy Planning

Policy planning - is the process of developing the plans, having the force of law and measures to ensure their implementation.

Policy plans are targeted mandatory for all performers, and officials responsible for the failure to meet targets.

The *essence* of the policy planning consists of: business entities form a single routine group and the centre of planning form the work plans and approved rates, that is attached providers and regulated sales. Implementation of plans is strictly controlled. Objective basis for national policy planning is functioning in the economy only one owner - the state. An important condition for the application of *directive planning* is to use methods of coercion and payment plans.

In the most complete form of policy planning was used in the former USSR for direct exposure to the Central government on all levels of the national economy, to achieve the goals specified in the General directions of development. The plan prepared by the state planning Commission, was mainly technical and production - macroeconomic indicators were formed by natural indicators, which in turn resulted from the industrial, technological and other plans and performed their investigation.

Accordingly to the production plan was it was built plan of distribution, which served as the basis of economic ties. Each provider were tied to their consumers, knowing how many should put it on their products and Vice versa, the consumer knew who it supplies raw materials, semi-finished products, components.

Plans had targeted, and are characterized by excessive detail. Due to these

characteristics they were difficult to implement across the country and gradually exhausted itself.

2.4. Indicative Planning

Indicative planning is a mechanism for the coordination of the interests and activities of state and non-state actors of economic management, combining its regulation with market and non-market regulation, based on the development of a system of indicators of socio-economic development and inclusive definition of its national priorities, goal setting, forecasting, budgeting, programming, Contracting and other procedures for the approval of decisions on macro- and micro-level, tax and other measures of state support of business entities involved in the implementation of the plan (under non-native economic governance refers to the institutions of local self-government, administrative bodies, corporations, financial - industrial groups and other business units, self-regulating organization of markets, and so on).

In a market economy indicative planning is a method of implementation of socio-economic policy of the state and an instrument of influence on the process of its functioning. Indicative planning is the primary method of influencing the functioning of a market economy. It is intended to provide a solution to many issues of socio-economic development, the implementation of which only by market methods it is impossible or difficult. This formsistem of interaction of all elements of the system of the Federal government, both among themselves and with regional bodies.

Indicative plans organically interconnected and combined into a single document, the concepts of socio-economic development; the forecasts of the economy; state programs; economic regulators.

Indicative planning is a continuation and development of forecasting. Being the most common worldwide form of state planning macroeconomic development, indicative planning is a set of processes of formation of system parameters (indicators) that characterize the state and its economy, the appropriate state socio-economic policy and the development of the system of measures of state intervention in social and economic processes in order to achieve a prescribed level indicators.

The main function of the indicative plan - coordination equitable economic entities. Information, orientation, promotion of economic entities is the basis for policy planning too.

The main content of indicative planning is the rationale for the goals, objectives, priorities, and methods of implementation of the state socio-economic policy and is an effective form of organization of interaction of all elements of the

system of the Federal government, both among themselves and with regional authorities. Indicative plans allow you to combine in a single document the concepts of socio-economic policy, forecasts the economy, the state program, the system of economic regulators, delivery for state needs, the state capital investments and other.

Indicative plan contains a limited number of mandatory tasks, it is largely guide. Being advisory in nature, it is capable to solve many problems of socio-economic development, the implementation of which purely market-based methods without measures of state influence is difficult, and sometimes impossible. It is so because indicators of socio-economic development are indicators of the dynamics, structure and efficiency of the economy; the state of the financial system and monetary circulation; the state of the market of goods and securities, foreign exchange market; the price movement; employment, living standards of the population of foreign economic relations, etc.

Interconnected and balanced scorecard is complemented by measures of state influence, including the use of budget funds, depreciation, interest for the loan, taxes, duties, licenses and quotas, government orders and other.

In the system of indicative planning fits operation of enterprises, as indicative plans have been drawn up to help various entities to focus on when developing their own plans, based on indicators of the state of the indicative plan.

Thus, the direct involvement in the planning process of all business entities on the basis of equitable cooperation of state authorities and all businesses distinguishes indicative planning from the directive. Indicative planning is both a tool of state regulation of the economy, and the means of itself-correcting as the defects of the market mechanism and the flaws of direct government intervention in the reproductive processes.

In his development of indicative planning passed through the forms corresponding to different stages of state regulation of economy.

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МАКРОЭКОНОМИЧЕСКОЕ ПЛАНИРОВАНИЕ И ПРОГНОЗИРОВАНИЕ

Учебно-методическое пособие