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Regional Labour Market Forecasting: a Modeling Concept

Прогнозування розвитку регіональних ринків праці: концепція моделювання

This article suggests a concept of modeling forecasting trends in the development of regional labor markets in Ukraine. It reveals the stages of analysis of the dynamics and development trends in labor resources in the regions. The article defined the algorithm of simulation of economic processes, methods and research tools.

Keywords: modeling, forecasting, employment, unemployment, professional competences, demand for occupation, expert survey.

Запропоновано концепцію моделювання процесу прогнозування тенденцій розвитку регіональних ринків праці України. Обґрунтовано етапи аналізу динаміки і напрямів розвитку у сфері трудових ресурсів регіонів. Визначено алгоритм моделювання економічних процесів, методи та інструменти дослідження.

Ключові слова: моделювання, прогнозування, зайнятість населення, рівень безробіття, професійні компетенції, попит на професії, експертне опитування.

Background. The most important prerequisite for regulation of economic processes is the development of forecasts. Forecasting is a system of science-based ideas about certain areas of a country's socio-economic development. In modern conditions of economic development, forecasting is the initial stage, the basis of the system of its governance. This is due to the fact that under market conditions areas for development are undergoing changes, options increase, and alternative socio-economic forecasts develop.

In a difficult and unstable economic situation, it is important to detect trends that determine the development and balancing of the labor market. The most complicated economic mechanism of coordination and balancing of the interests of employees and employers is the regional labor market. Therefore, an accurate and reliable forecast of the labor market is a valuable tool to regulate the disparities that may arise.

Analysis of recent studies. Both global and domestic economic researches have paid significant attention to labor market operation. This is due to the special significance of processes in the particular market for efficient

operation of the economy as a whole, as well as the presence of many specific features inherent only to the labor market that distinguish it from other types of markets.

The basis of modern conceptual vision in foreign and domestic scientists about the nature of the labor market was formed at different times by such thinkers of world significance as W. Petty, F. Quesnay, Th. Malthus, J. Sismondi, A. Smith, Ricardo F., and K. Marx.

The issues related to the labor market development were addressed by many modern foreign scientists, namely: V. Kulikov studies forecasting of supply on the regional labor market [1]; the works by B. Kuzyk, V. Kushlina, Yu. Yakovets are concerned with theoretical problems of forecasting of labor and employment; A. Korovkin takes care of macroeconomic analysis of the employment dynamics forecasting; E. Ponomarenko studies the regional aspect of the labor market forecasting.

Basic provisions of the new concept of employment, approaches to the analysis of the place, role and methods of government regulation of the labor market under transformation of the economy are revealed in the works by S. Bandur, D. Bohynia, V. Brych, V. Heiets', A. Kolot and other researchers. Modern Ukrainian scientists study the problem of the labor market forecasting in Ukraine: Yu. Marshavin reveals the nature, methods and techniques of forecast of the labor market [3]; L. Lisohor studies the European experience in forecasting the workforce demand, S. Kozhem'iakina takes care of forecasting productivity at the macro level [4].

These researchers developed in their studies a wide range of theoretical and practical aspects of modeling labor market processes. However, regional differences of the organized labor market modeling and forecast of the development trends have not been properly studied.

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Objective of this article is to design a modeling concept of forecasting the regional labor market development.

Results and discussion. The labor market as an object of economic and mathematical modeling is complex and diverse. This simulation can solve many problems associated with the use of labor potential, specify perspective parameters of socio-economic indicators, justification of the best options for the regulation of labor resources. The nature of mathematical tools that are applied to study the labor market, specificity of getting initial information, its processing and use, condition the differentiation of mathematical methods and development of the theory of their use. Economic-mathematical model includes three groups of elements [5, p. 35]:

- the environmental features;
- internal parameters of the economic process;
- characteristics of productive process.

The basis for mathematical methods of studying the development of regional labor markets is to model the related phenomenon or process. This simulation is a cyclic algorithm of consistent actions (Fig. 1). The process can be updated cyclically from the first stage until a satisfactory result is obtained.

Both foreign and Ukrainian economists have repeatedly proposed models for forecasting elements of the labor market. A group of IMF staff under the direction of R. Chama developed a model for analyzing and forecasting labor market indicators however, subjective factors of the country's development were not considered. Members of Academy of Sciences of Ukraine under the leadership of S. Dorohuntsov offered a forecast scheme of the development and placement of productive forces in Poltava Oblast that differs by a large number of indicators and the difficulty of making forecast.

Adequate representation of the pattern of regional labor markets cannot be achieved in the context of a single model. This requires a transition to a system modeling – simulation and mapping in the context of economic and mathe-

tical models, parameters, characteristics, status and behavior in the environment of interlinked economic processes with a complex organizational structure for focused managing.

The concept of process modeling involves three levels of forecasting regional labor markets (Fig. 2).

1. Assessment of the current demographic situation in the region and prospects for its change.
2. The analysis of the dynamics of macroeconomic indicators in the region.
3. Rationale for the strategy of the regional labor market development.

At the first level, the demographic situation of individual Ukrainian regions is studied in terms of a complex quantitative characteristic and also a qualitative assessment of demographic processes in a particular area (fertility, mortality, migration) is carried out. Specifically, it is true of trends and results over a period of consequences. The tools of this simulation are systemic and structural analysis, and statistical methods.

It is envisaged to provide statistical evaluation of the region's population, by age, sex and place of residence. For preparing adequate demographic characteristics, the choice of time period for such analysis is of importance. A period should be long enough to detect the main trends (in case of a small period of time, they may be distorted by random annual fluctuations). In addition, it is necessary to take into account periods of sharp fluctuations in demographic processes caused by socio-economic changes in society and this country. In fact, taking as a starting point the period of sharp ups and downs of indicators, one can receive a distorted view of the trends.

For objectification of a qualitative assessment of the situation, it is necessary to make a comparative analysis of basic demographic parameters by regions according to a certain standard. The situation in a country may be such a standard. It is also possible to compare the situation with

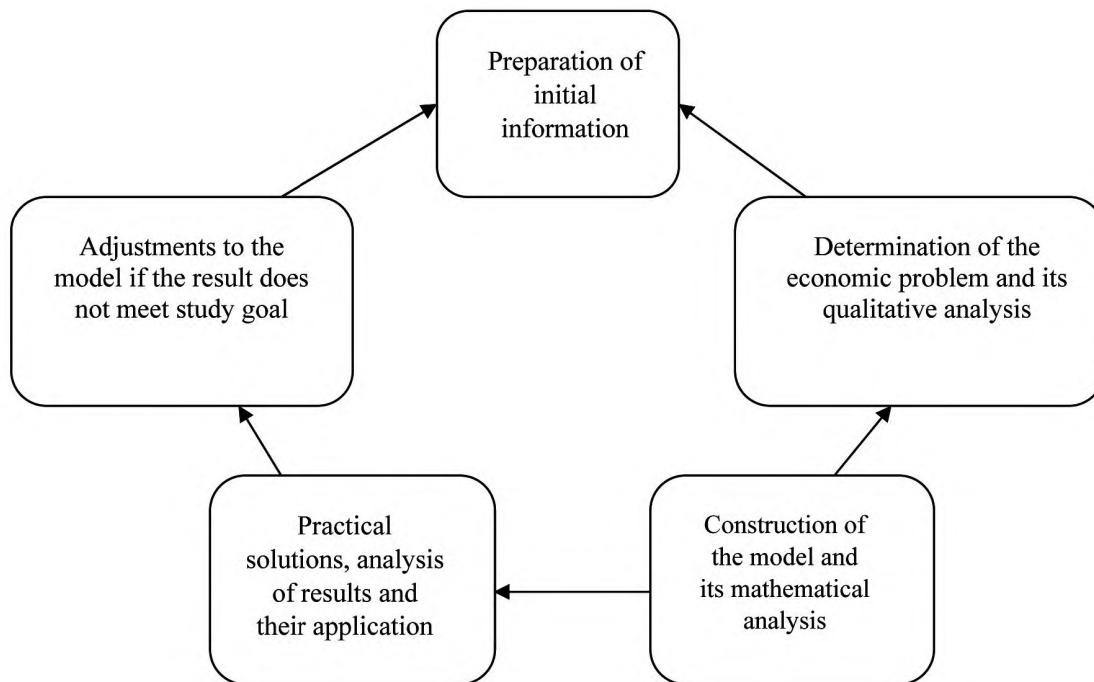


Fig. 1. The scheme of modeling economic processes

Developed by the author on the basis of [6].

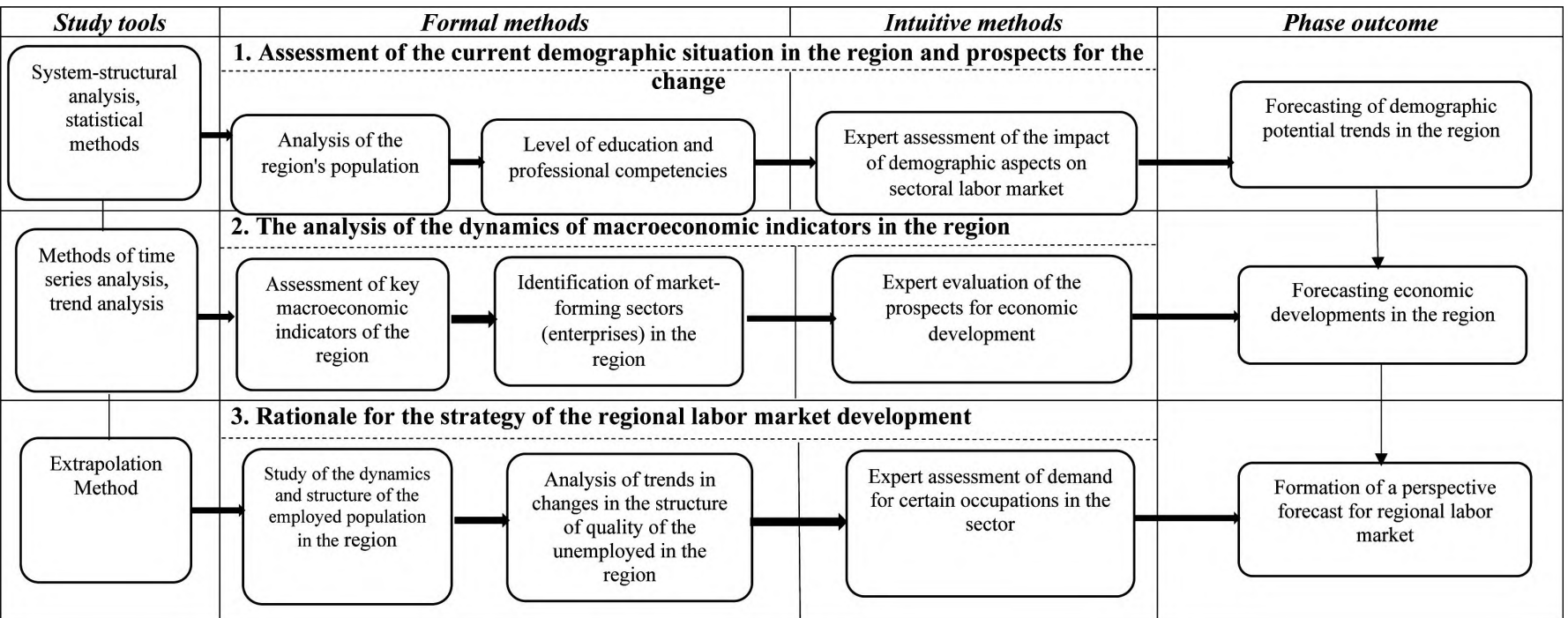


Fig. 2. The concept of modeling the process of forecasting regional labor markets

Developed by the author.

neighboring regions or those which are characterized by the proximity of demographic processes. This approach allows us to identify common and specific features of demographic processes, assess their uniqueness in specific regions, and identify problems to be solved. Thus, since the early 1990s, decline in the number of population has been observed in most regions, which is based on natural decline. However, the depth of depopulation, its pace and components (ratio of natural and migration growth, reduction), and other factors may differ significantly [2, p. 24–27].

The outcome of the first level of study is the formed forecast of trends of the demographic potential development of the region.

The development of the labor market is directly related to economic development in general. This is why the object of study at the second level is the concept of the dynamics of macroeconomic indicators in the region. Assessment of key macroeconomic indicators of the region's development involves the study of such indicators as gross added value, production and sales of products (in sectoral aspect), labor productivity, investment, average monthly salary. Research tools of the proposed indicators are methods of analysis of time series and trend analysis.

An important step in this study is to determine types of economic activities in the region that form the market, and also individual companies that greatly influence on the formation of the labor market. Monitoring of these companies makes it possible to predict the general trends of the labor market in the region and to respond to the challenges and risks that arise.

The outcome of the second level study is the forecast of economic development and probability of crisis in the region.

The third phase of the concept is the justification of the development strategy of regional labor markets. This phase involves the study of the dynamics and structure of the employed population. A separate study is dedicated to structural changes in the economically active population, particularly, the employed residents, their gender composition, dynamics of employment in Ukraine and the regions. Particular attention should be given to education and professional competencies of the workforce and identifying interdependence of the mentioned indicators and employment rate.

The analysis of trends of changes in the structure and quality of the unemployed residents in the region envisages the study of not only the volume and rate of the unemployment, but also the quality of the unemployed population, the reasons for unemployment. On the basis of research, the forecasting of trends in demand for certain sec-

toral occupations is formed. The tool for it is the extrapolation techniques.

Forecasting of the regional labor markets provides for the use of formal and intuitive methods of study. Formal forecasting methods are based on mathematical theory that enhances the reliability and accuracy of forecasts, significantly reduces the time needed for their performance, facilitates the processing of information and assessment of the results [3, p. 6–7]. Formal methods allow for quantitative indicators. When making such forecasts, it is assumed that the system is inert, that is, the future system is believed to develop in accordance with patterns with features of the past and the present. The disadvantage of formal methods is limited depth of prediction that is within the evolutionary cycle of the system, its reliability falls when beyond the limits. Formal methods include the method of extrapolation and modeling methods, factor analysis and others.

Along with formal methods, intuitive or expert forecasting methods have a significant place in the concept. They include not only the use of the full scope of relevant statistical information but also the assessment of decisions made at different levels of management, analysis of their possible impact on economic activity of the population and the volume of material and financial resources of regions [3, p. 27–32].

Intuitive forecasting methods are used for solving complex informal problems through forecast estimates of the development of the object in the future, regardless of the information supported by the method of expert assessments.

The principle of the method of expert assessments rests on the experts' intuitive and logical analysis of the problem with quantitative assessment of opinions and formally processed results. This summary expert opinion is taken as the solution. Use of intuition, logical thinking and quantitative assessments of formal treatment provides a viable solution. The features of the method of expert assessments are, firstly, scientifically based organization of all phases of the examination that ensures the highest efficiency at every stage; secondly, the use of quantitative methods both for the organization of the examination and assessment of the experts' views and formal processing of results in the group. Most often, these methods are used in the considera-

tion of socio-economic problems, when a prognostic formalized model cannot be developed. The disadvantage of intuitive methods is the impossibility to completely eliminate elements of subjectivity in expert assessments and difficulty in securing the competence of experts.

Expert survey on the impact of demographic aspects on sectoral labor market, as well as the prospects for economic development of the regions and demand for certain jobs adjust and complement the results of forecast estimates of regional labor markets that were received with formal methods.

The concept of modeling allows for a perspective forecast of regional labor markets in Ukraine that makes it possible to perform a number of tasks:

- drawing up a list of possible events over time that are related to the problem under study;
- determining the most probable time intervals of occurrence of events;
- development of alternative solutions to problems with the assessment of their advantages;
- development of alternative options for allocation of resources to priority rankings.

Labor Market Forecasting is the basis for determining the amount of funds required for the implementation of the employment service programs. It also makes it possible to determine the priorities of the regional employment policy for the forecast period and to develop measures to prevent mass unemployment and ensuring social guarantees.

Conclusions. System forecasting of the labor market is a prerequisite for making an information base to make agreed managerial decisions by various authorities. It links demographic, educational, economic development, labor migration models.

To date, the system forecasting of the labor market in Ukraine is in the initial stage and it needs to be developed through the use of mathematical modeling and accumulating the required amount of statistical data.

The concept of modeling that is described in this article is the first step towards building up a system of forecasting enabling authorities to make decision on regional labor markets.

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