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## EVALUATION OF YOUTH EMPLOYMENT BASED ON FACTOR MODEL

**Chub O.V. Evaluation of youth employment based on factor model.** The problems of youth employment in the labour market of Ukraine are studied in the article. The system of factors of forming socio-economic and organizational efficiency of youth employment is proved. The most influential factors are highlighted. Based on the proposed classification of the given factors of youth employment, a model of evaluation of youth employment is proposed.

**Keywords:** youth, labour market, youth labour market, employment, effective employment.

**Чуб О.В. Оцінювання зайнятості молоді на основі факторної моделі.** У статті досліджуються проблеми зайнятості молоді на ринку праці України. Обґрунтовано систему соціально-економічних та організаційних факторів впливу на ефективну зайнятість молоді. Виділено найвпливовіші фактори. Запропоновано факторну модель оцінювання зайнятості молоді на основі класифікації наведених факторів.

**Ключові слова:** молодь, ринок праці, молодіжний ринок праці, зайнятість, ефективна зайнятість.

**Чуб О.В. Оценивание занятости молодежи на основе факторной модели.** В статье исследуются проблемы занятости молодежи на рынке труда Украины. Обоснована система социально-экономических и организационных факторов влияния на эффективную занятость молодежи. Выделены факторы наибольшего влияния. Предложено факторную модель оценки занятости молодежи на основе классификации указанных факторов.

**Ключевые слова:** молодежь, рынок труда, молодежный рынок труда, занятость, эффективная занятость.

**Introduction.** The global economy is in the midst of a series of demographic and economic shifts, leading to what many young people are being left behind. With some 75 million young people in the developing world unemployed and hundreds of millions more underemployed, youth employment is one of this century's most pressing problems. Yet global growth and poverty reduction over the next 15 years will be driven by today's youth. This has obvious economic and social consequences, and societies – and governments – are motivated to find new ways to create productive employment and promote economic growth. Youth employment is one of the modern pressing issues [1].

The problem of youth employment has increased in many parts of the world during the last two decades due to the weakening of the link between the increase in a number of jobs and creation of high-quality jobs in conditions of catastrophic ageing of the population. Political and economic crises that unfolded in Ukraine in 2008 became the main reason for the delay of development of systems of youth employment promotion. Such a situation prevents young people from fulfilling their aspirations for the effective employment and activates efforts in the directions of overcoming the unstable situation and finding ways to desirable future. Under such conditions, it is the effective youth employment that has the greatest potential for the provision of innovative

development of the country. The full use of this potential is possible only through the creation of conditions for attracting young people towards priority sectors of the economy, combining production and scientific activities, etc.

**Analysis of recent researches and publications.** Publications of Y. Bogoyavlenska, Y. Marshavin, D. Melnichuk, E. Libanova, L. Lisogor, O. Tsymbal, O. Yarosh and many other national and foreign authors are the grounds of the conceptual basis of the development of youth labour market in Ukraine. When researching scientific achievements, it should be noted that nowadays some aspects are not studied enough and require further research, including determination of factors that affect employment in general and the degree of their influence on the youth segment of the labour market in particular.

**Formulation of the problem.** The aim of this research is to determine the basic tendencies of youth employment and develop a factor model of assessment of macroeconomic factors that affect effective youth employment.

**Presentation of the main research material.** Ukrainian youth employment is formed in the context of deep structural changes in the national economy that are connected with the transformation of the sectoral structure of the economy from the dominance of industrial and production types of economic activities

to the services sector. In this sense, the demand and supply of youth in labour market significantly differs from the vocational and sectoral structure of previous generations' employment. The services sector has many opportunities for the provision of remunerable employment but the discipline and the culture of compliance with labour law are there much weaker than in industrial and manufacturing sectors of economic activities. Negative changes in actual labour relations primarily affect young workers who are more vulnerable to low wages, partial or complete deforming of employment relations, coverage by temporary contracts and limitation of legal protection [2, p. 2].

Despite the fact that the youth employment crisis is a global trend, in each country, it is different [3, p. 323]. This applies to both its scope and nature. The youth segment of Ukrainian labour market consists of the citizens aged 15 to 35 years, and the state of youth employment is characterized by statistical data presented in Tables 1 and 2.

In average, less than 75% of youth is employed in Ukraine according to the assessment of youth activity during the last ten years. There is also another negative tendency – a very low level of youth employment among people aged 25 to 29 during the last two years.

The analysis of statistical data on youth unemployment in Ukraine presented in Table 2 reveals high levels of youth unemployment among all age groups, just like in the rest of the world. That is, it can be stated that unemployment in Ukraine has a “young face”, just like in any other country.

Youth is the future of the state, which has the ability to elevate the status of the country and implement the processes of economic growth. The state has the leverage on the labour force and the promotion of employment of young people with a high qualification should be the main priority since the future of society depends on them. The decrease in unemployment and increase in youth employment will lead to positive consequences: correspondence of real and potential GDP, an increase of income, welfare and national production, economic growth, increase in the quality of labour force.

Transformational processes in the economy of Ukraine made it necessary to study the economic essence of employment in the new economic conditions. Theoretical analysis and systematization of the views of scientists proved the existence of two basic approaches: understanding employment as a process of using the labour force and as labour relations. It is established that achieving effective employment, that is, a division of labour that would ensure the most consistent employment in the labour market under the conditions of an acceptable level of natural unemployment under current social and economic conditions is a priority for a market-oriented economy. Determination of balanced market conditions is a criterion of effective employment and allows providing a complete use of labour and production potential of the country.

In such conditions, youth acts as an indicator of the assessment of labour potential's recovery. Youth employment is one of the areas, in which the complex of contradictions of the transitional stage is most

Table 1

**The level of youth employment in Ukraine, 2006–2015**

Indicator	Employment level, %									
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
People aged 15 to 24 years	35,1	36,6	37,3	34,5	33,5	33,9	33,7	32,5	29,5	28,2
People aged 25 to 29 years	75,4	76,5	76,4	72,2	72,0	72,4	73,8	73,8	71,6	71,8
People aged 30 to 34 years	–	–	–	–	–	–	–	79,8	74,9	74,3

Source: Compiled by the author according to the data of the State Statistics Service of Ukraine [Electronic source]. – Access mode: <https://ukrstat.org/uk>

Table 2

**The level of youth unemployment in Ukraine, 2006–2015**

Indicator	Unemployment level, %									
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
People aged 15 to 24 years	14,1	12,5	13,3	17,8	17,4	18,6	17,3	17,4	23,1	22,4
People aged 25 to 29 years	7,3	6,9	7,0	10,4	9,9	9,2	9,5	8,7	11,1	11,2
People aged 30 to 34 years	–	–	–	–	–	–	–	6,6	9,3	9,7

Source: Compiled by the author according to the data of the State Statistics Service of Ukraine [Electronic source]. – Access mode: <https://ukrstat.org/uk>

acutely reflected. But the analysis of scientific literature indicates that there is no single approach to the assessment of the condition of youth labour market because the actual processes that take place in the labour market are much more complex – demand and supply are permanently changing under the influence of many factors. The search for and development of a mathematical model of youth employment assessment based on relationships between different indicators that have the most impact on effective youth employment should be the basis for further scientific researches and formation of institutional constraints regarding the levels of unemployment.

The efficiency of such researches depends largely on the methods and tools that scientists use when carrying out these researches. Every science reaches perfection only when using modern research methods, including such general scientific methods as modelling, formalization, systematic approach, etc.

The key to implementing the method of formalization in modern science, including economics, is the application of mathematical methods and models. This also applies to the organization of labour market management. In order to make such a management effective, it is necessary to get reliable information on the state labour market and directions of its transformation, situation around employment and criticalness of unemployment, relationships between the features that characterize this market, accurate information about the extent, to which a self-regulating market mechanism is formed in the country, what is the degree of interdependence of labour macroeconomic factors, how tightly are the volume indicators of labour market connected with its financial and cost characteristics, how flexibly do demand and supply of labour force react to inconsistencies that emerge between performance and remuneration, etc. It is quite problematic to solve these tasks without the use of mathematical methods and models. Therefore, in order to research the state and dynamics of the labour market or its components, it is advisable to use known statistical and econometric methods and models, including methods of correlation, regression, factor, component analysis, and other [4, p. 7].

In order to analyse the level of youth employment, it is necessary to use the method of factor analysis – namely, correlation and regression analysis. The main goal of correlation analysis is the establishment of causal relationships between phenomena, which are caused by a complex mix of reasons that differ by nature and essence. The use of correlation analysis makes it possible to measure the closeness of the connection between variable characteristics, assess the factors that have the greatest impact on the resultant attribute and determine how does the average value of resultant attribute change when factor attribute changes [5, p. 194].

Practical use of regression analysis of employment and unemployment makes it possible to determine whether the obtained relationship between factor attrib-

utes expressed by regression equation is reliable or accidental and whether it is possible to use it for future forecasting and strategic plans.

Correlation and regression analysis is conducted by constructing a statistical model in the form of regression equation (correlation relationship equation) [6].

Before the construction of a multifactor econometric model, it is advisable to determine the list of factors that influence the dynamics of employment of the youth segment of labour market [7, p. 142]. Nowadays, there is no common point of view on the classification of these factors among Ukrainian scientists. The following factors can be distinguished: economic, social, personal, political, geographic, demographic, financial, legal, institutional, organizational, managerial, environmental, and socio-psychological [8; 9].

In previous studies, the author determined that political, demographic, economic, social and organizational factors have the greatest influence on the youth segment of the labour market. They are heterogeneous and have impacts of different strength and direction.

Factors that influence the effective youth employment:

- political (stability of the political situation in the country, the effectiveness of the legal system, the quality of state regulation of social and economic processes);
- demographic (gender and age structure of the population, fertility, mortality, and migration);
- economic (development of productive forces, sectoral structure of the national economy, economic stimulation, investment policy, the social standard of living, etc.);
- social (the level of development of service sector and a network of preschool institutions, educational level of the population, national traditions, the level of health care development);
- organizational (the level of organization of labour, production and management, an organization of labour exchange and employment service functioning) [10, p. 322].

The determining factors are the following ones:

- economic;
- demographic;
- political;
- social;
- organizational;
- psychological.

Psychological or mental factors of impact reveal themselves through the features of behaviour associated with the level of consciousness of employable young people, their economic activity, and the need of realization of personal potential in profession and career [11, p. 146]. This factor has the same degree of impact on employment level as economic or political factors. However, the research of mental component of social and labour potential is seldom given enough attention.

Based on the fact that many factors affect youth employment, at the same time, it is advisable to use the

multifactor model of correlation and regression analysis. In this case, the multiple regression equation connects resultant attribute ( $Y$ ) with two or more factor attributes ( $X_1, X_2, X_3, \dots, X_m$ ). That is, changing one of the variables changes the average value of the other. Conditional expectation is considered because mathematical expectation characterizes the mean expected value of a random variable and is called function of regression  $Y$  by  $X$ , where  $Y$  is a dependent factor, an explanatory variable or a regressand, and  $X$  is an independent explanatory factor or a regressor. Thus, the linear regression model would look like this:

$$Y = f(X_1; X_2; \dots X_m)$$

Not only quantitative but also qualitative variables are often used as explanatory variables in regression models. Quantitative variables are indicators, which can be expressed quantitatively. For example, population aged 14 to 35 years, the average level of remuneration of labour can be used as a quantitative indicator for the analysis of youth employment. The impact of psychological and political factors that cannot be represented in numerical form can be examples of quality indicators.

Usually, the influence qualitative factor is expressed in models as an artificial variable that displays two opposite states of the qualitative factor. For instance, "factor acts" – "factor does not act". In this case, artificial variable  $D$  can be expressed in the binary form:

$$D = \begin{cases} 0, & \text{factor acts} \\ 1, & \text{factor does not acts} \end{cases}$$

Therefore, in addition to models that contain only quantitative explanatory variables (marked  $X_j$ ), models that contain only qualitative variables (marked  $D_j$ ) are also used in regression analysis.

Then the relationship between youth employment and the impact of quantitative and qualitative factors can be expressed by the model of paired regression:

$$Y = \beta_0 + \gamma D + u.$$

Theoretically, multiple linear regression equation is written in expanded form as follows:

$$Y = a_0 + a_1 X_1 + a_2 X_2 + \dots + a_m X_m + u.$$

The number of observations  $n$  should be  $n \geq m + 1$ , and the number  $r = n - (m + 1)$  is called the number of degrees of freedom.

In this equation, each coefficient  $a_j (j \neq 0)$  – is the partial regression coefficient that characterizes the sensitivity of  $Y$  value to the change of  $X_j$  factor – the impact of the increase in the value of the variable  $X_j$  (per one unit) on the change of conditional expectation  $Y$  (in certain units of measurement), when all other variable factors are considered constant.

Also, it is necessary to calculate partial coefficients of elasticity for the reliability of the model –  $E_{Y/X_j} = \frac{\hat{a}_j \cdot \bar{X}_j}{\bar{Y}}$ , that characterize the impact of separate factors – by how many % will regress and  $Y$  change, if the value of one of the factors  $X_j$  increases by 1% under the condition that other factors remain constant. It means that it is possible to determine the most and the least influential explanatory factors. Dependent factor  $Y$  is more sensitive or more stable, inertial towards their change.

Correlation and regression analysis was chosen as a basic mathematical method because this type of analysis allows determining the impact of each independent factor on the studied dependent attribute by building a specific mathematical model. It is possible to quantitatively calculate the degree of the impact of each factor and make predictions for the near future, which will be done in future studies.

**Conclusions.** The current recession of youth employment has affected the whole Europe and many other countries but the effect on the labour market has been different from one country to another, due to the level of economic development, labour market stability, and policies adopted.

Labour market policies and programs that mediate between labour supply and demand can improve the labour market integration of youth, especially if they are well targeted and sequenced.

Thus, economic and mathematical methods of evaluation of youth employment should become the basis for further scientific studies with the purpose of proper management, regulation, forecasting, and assessing its level.

Information about the state of youth employment and application of economic and mathematical methods is absolutely necessary for the main social partners of labour market – employers, vocational and higher education institutions, government authorities. The state should become the guarantor of effective youth employment facilitation.

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