METHODICAL APPROACHES TO THE ESTIMATION OF THE LIVING STANDARD OF POPULATION IN MEZOSYSTEM

© 2009 L.P. Bakumenko, T.V. Sarycheva*

Keywords: a standard of living of population, econometric models, the systems of the simultaneous equations and structural forms of the model, identifiability of model, ranging factorial attributes.

The research deals with the methodology of creating econometric models that characterize living standard using the systems of structural equations that allow the profound analysis of the reasons caused by the changes in major social-economic characteristics

The factors determining the dynamics and problems of the standard of living are of great importance nowadays. Specification and rates of further transformations as well as the economic stability in the society depends on the ways these problems are solved. Being complex and multivariate, social life of the society is the system consisting of different properties, levels and quality. Being the system, these attributes are interconnected and mutually presupposed. Their unity is shown in various forms: in interaction, co-subordination, and discrepancy. This implies that the choice of the direction while researching within the framework of social statistics is no more than a conditional method that facilitates cognition.

To estimate the major characteristics of the standard of living of the population in the Republic of Mari El the following parameters have been used as the measuring instruments: y_1 - the number of economically active population (one thousand people); y_2 - the number of unemployed citizens (one thousand people), y_3 - average real wages (in % by the previous month), y_4 - monetary income of the population per capita (rubles), y_5 - consumer charges per capita (rubles), y_6 - life expectancy (number of years).

The wide range of explanatory parameters submitted in monthly statistical data was taken into account for analysis. Among them are: x_1 - the number of the unemployed on the unemployment benefit (one thousand people), x_2 - average nominal wages (rubles), x_3 - the average monthly pension (rubles), x_4 - consumer price index (in % by the previous month), x_5 - the cost of the minimal food set (rubles), x_6 - monetary expenses of the population (rubles), x_7 - the number of the pre-school establishments (item), x_8 - the number of higher institutions and colleges (items), x_9 - the number of sick lists (per 1,000 people); x_{10} - birth rate (per 1,000 people).

Using separate regressive equations means that the factors used for the construction of the equations can be changed independently from each other. However, this assumption is very rough: change of one variable cannot be totally non-related to the others. The equation of plural regress taken separately cannot characterize the real influences of separate attributes on the variation of the resulting variable.

The structural form of the equations has been constructed on the basis of the correlative-regressive analysis that has been carried out. Absence of this or that factor in the equations of the system is the consequence of its insignificant influence on the productive attribute.

$$\begin{cases} \widehat{y}_1 = b_{1,4}y_4 + b_{1,6}y_6 + a_{1,3}x_3 + \\ \quad + a_{1,4}x_4 + a_{1,6}x_6 + a_{1,7}x_7 + a_{1,9}x_9 \\ \widehat{y}_2 = b_{2,6}y_6 + a_{2,1}x_1 + a_{2,3}x_3 + \\ \quad + a_{2,5}x_5 + a_{1,6}x_6 + a_{2,9}x_9 \\ \widehat{y}_3 = b_{3,6}y_6 + a_{3,3}x_3 + a_{3,5}x_5 + \\ \quad + a_{1,8}x_8 + a_{3,9}x_9 \\ \widehat{y}_4 = b_{4,1}y_1 + b_{4,6}y_6 + a_{4,1}x_1 + \\ \quad + a_{4,6}x_6 + a_{4,8}x_8 + a_{4,9}x_9 \\ \widehat{y}_5 = b_{5,4}y_4 + b_{5,6}y_6 + a_{5,1}x_1 + \\ \quad + a_{5,5}x_5 + a_{5,6}x_6 + a_{5,7}x_7 + \\ \quad + a_{5,9}x_9 + a_{5,10}x_{10} \\ \widehat{y}_6 = b_{6,1}y_1 + b_{6,3}y_3 + b_{6,4}y_4 + \\ \quad + b_{6,5}y_5 + a_{6,2}x_2 + a_{6,3}x_3 + \\ \quad + a_{6,5}x_5 + a_{6,7}x_7 + a_{6,8}x_8 + a_{6,9}x_9 \end{cases} .$$

* Luidmila P. Bakumenko, PhD in Economics, Professor of Mari State Technical University, Tatyana V. Sarycheva, PhD in Economics, associate Professor of Mari State Technical University. E-mail: Lpbakum@mail.ru.

The estimation of significance for the factors in the equation and its reliability submitted in table proves that all factors of the structural form are significant, and as long as all $t_{imperical} > t_{tabl}$, the equations are also significant as a whole ($F_{imperical} > F_{tabl}$).

fluence was rendered by the number of sick lists (x_9). Practically all the parameters describing the standard of living of the population in the Republic of Mari El influence each other, that is the change of one variable cannot occur be totally non-related to the others. Such change

Criteria of estimations for the reliability of the structural form

Ranging factorial attributes according to the degree of their influence on productive attributes was achieved by the comparison of the values of standardized factors. Its analysis made it possible to draw a conclusion, that the majority of parameters are strongly influenced by the parameter x_6 that describes monetary expenses of the population. It especially strongly concerns y_1 - the number of economically active population, y_4 - monetary income of the population per capita, and y_5 - consumer charges per capita. The number of the unemployed citizens (y_2), are strongly influenced by the factor x_3 - the average monthly pension. As for the amount of average real wages the most significant influence was rendered by an attribute describing the cost of the minimal set of food stuffs. As for life expectancy (y_6) the most significant in-

will cause changes in the whole system of the interconnected attributes. Construction of structural equations system makes it possible to thoroughly investigate the reasons that make the basis for the variation of resulting variables. Thus it is possible to single out and estimate both direct and indirect influences of the attributes. Such models allow making the estimations concerning the standard of living of the population taking into consideration the mutual influence of the predicted values on each other.

Velikanova T., Kolmakov I., Frolova E. Improving the methods and models of population distributiondue to the average income //Statistic issues. 2001. № 5.

Eliseeva I.I. Econometrics. M., 2002.

Sarycheva T.V., Bakumenko L.P. Statistical analysis and forecasting the modern state of labour market. Ioshkar Ola, 2007.