COGNITIVE AND ECONOMETRIC MODELING OF REGIONAL SOCIO-ECONOMIC DEVELOPMENT

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Abstract. This article offers a theoretical and practical analysis of aspects of the methodology for evaluating the results of cognitive and econometric modeling of socio-economic development of regions on the example of the Republic of Uzbekistan.

Key words: area, assessment, GDP, formula, socio-economic development, mathematical-statistical methods.

The operation and socio-economic development of regions is an important and urgent task that requires serious analysis and attention for every country and region. Understanding the relevance of this topic becomes even more important in the modern world, where every area strives for prosperity. The operation of regions as an economic system includes a complex set of interrelated processes. In the conditions of globalization and competition, the need to develop effective strategies for the formation and development of economic regions is becoming more and more urgent. It is the socio-economic development of the regions that makes it possible to create a favorable business environment, raise the standard of living of the population and attract investments. One of the main factors of successful development is the infrastructure of the area. A developed transport network, energy base and logistics systems help to create a favorable economic environment and attractiveness for commercial activities. The level of development of education and science also has a great influence on the activity of regions.

The main direction of regional development is the evaluation of the results of cognitive and econometric modeling of socio-economic development of regions. The choice of a particular model is influenced by many factors, including the geographical location of the region, its resource base, infrastructure, level of development of human capital, etc.

In order to adapt the economic model to the needs and requirements of the population, it is also important to take into account the social and cultural characteristics of the area.

Some of the evaluation results of cognitive and econometric modeling of socio-economic development of regions based on mathematical and statistical modeling by researchers and authors in the field of economics and mathematics such as Xin Li, Haixia Zhao [2], Yaojia Dong [3], Fernando Isla-Castillo [4] and others we present models. We pay attention to the model of Tobias Eibinger, Beate Deichelberger, Hans Manner, which showed the levels of factors affecting economic stability. [1]

The authors' basic model development is based on IPAT identification. In the context of regression, this model is called the STEEPAT (Stochastic Effects of Regression on Population, Wealth and Technology) model proposed by Dietz and Rosa (1997). It starts with the IPAT identifier and transforms the variables into natural logarithms. The coefficients and error values are added to obtain the regression model:

$$log(I) = \alpha + \beta 1 * log(P) + \beta 2 * log(A) + \beta 3 * log(T) + u, \quad (1)$$

The model states that environmental impact (I) is determined by population (P), welfare (A) and technology (T). Environmental impact is measured by greenhouse gas emissions, wealth by real GDP per capita, and technology energy intensity. This model is usually estimated using panel data. The authors provide an overview of the specific econometric challenges faced in modeling the nonstationary panel data that often underlie such regression models, and provide recommendations for adequate testing and modeling approaches. The authors argue that the CCE model is a very flexible specification that is easy to implement and overcomes the econometric problems encountered when dealing with non-stationary macropanels. It takes into account cross-sectional dependence, non-stationarity and possible cointegration of the errors. As such, it is one of the most general static models in the literature and is well suited for further empirical analysis.

A CCE model regresses an endogenous variable on individual observed covariates and common observed and unobserved factors.

$$yit = \alpha' dt + \beta' xit + \lambda' ft + uit, i = 1, 2, \dots N, i = 1, 2, \dots T., \qquad (2)$$

This represents a linear heterogeneous panel data model, where $dt = (d' , d' , d')'$. d' is a vector of deterministic components, θ' is a vector of observed total effects assumed to have a unit root, and $1t$ $d'2t$ is a $3at$ vector$1ot$ r of stationary observed total effects. $2t$ is the vector of individual regressors, ft is the vector of unobserved effects co$3mt$ mon and the errors uit along i are assumed equal to xit.

Given that the left-hand side of the model is the same and the variables on the right-hand side are also the same, the left-hand sides are equated, which gives the following equation:

$$lndei = [\gamma' 0 + \gamma' 1 ln\beta i] + \gamma' 1 lnyi + \gamma' 2 lnp, \qquad (2)$$

According to the model developed by the authors Jeyhun I. Mikayilov, Ryan Alyamani, Abdulelah Darandari, Muhammad Javid, Fakhri J. Hasanov, the income and price elasticity of the obtained model will be the same as the original model. Thus, you can use the developed model without costs when estimating income and price elasticities. However, if a prediction is also needed, it must be corrected using the eclipse correction techniques that can be used in the prediction exercise in this study. Using the example of the Republic of Uzbekistan, the development of socio-economic development led to the development of cognitive and econometric modeling based on the results.

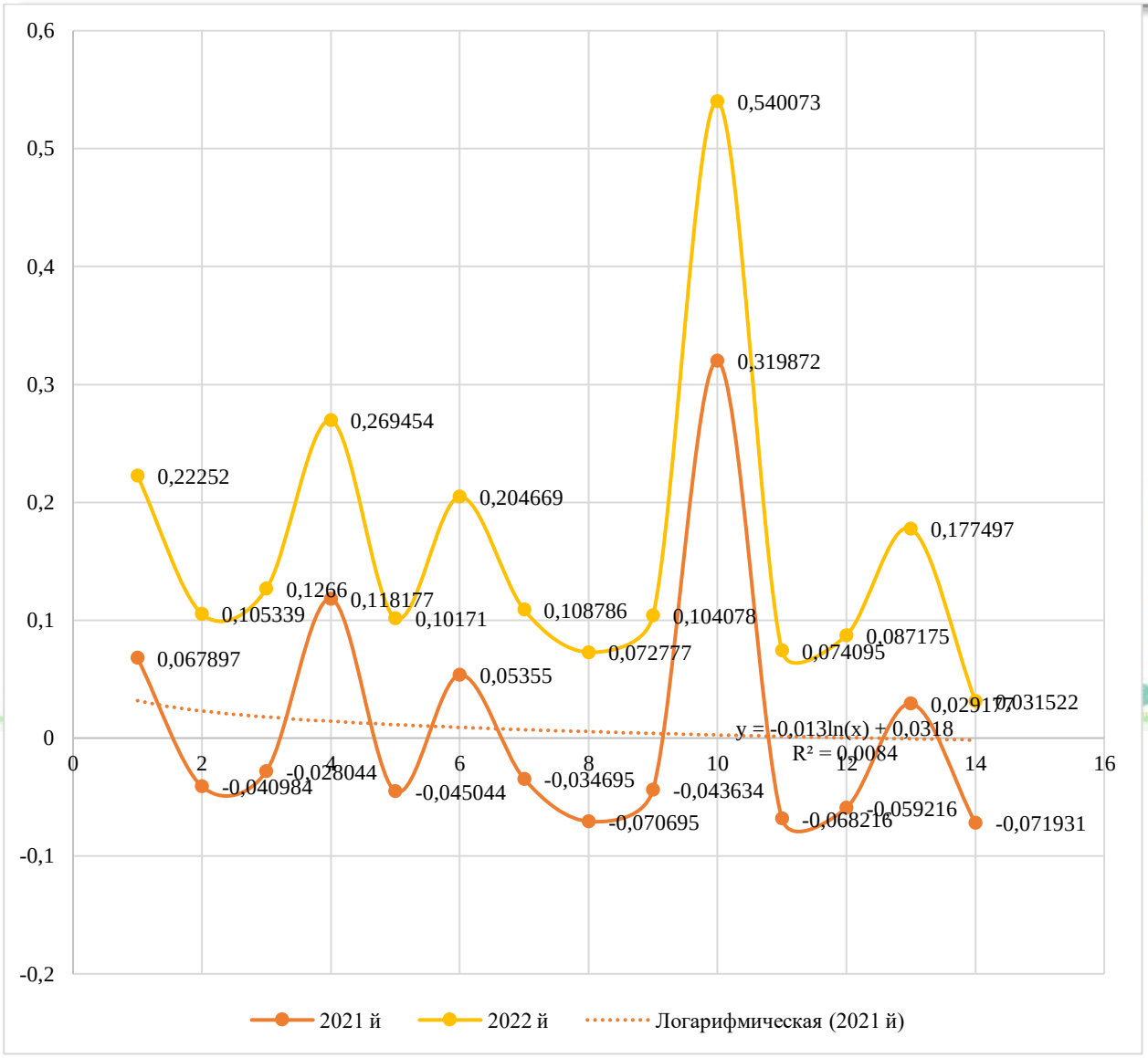

Fig.1. Uzbekistan on the example of the Republic of Uzbekistan in 2021-2022 as a result of the development of socio-economic cognitive and econometric modeling of territories

By comparing the assessment models, we concluded that the modeling model of socio-economic development of regions correctly shows the level of socio-economic development of regions, because it takes into account the risks affecting socio-economic development, at the same time, the modeling model of socio-economic development of regions accurately shows. the results of econometric modeling of socio-economic development of regions do not take into account risks and the influence of factor components on the resulting indicator (effect) is calculated, therefore it was

concluded that the cognitive modeling model is more effective than the econometric modeling model of socio-economic development of regions.

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