Research Journal of Pharmaceutical, Biological and Chemical Sciences

Modeling sustainable balanced development the regions in the single economic space of the state.

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ABSTRACT

In the article, authors proposed and implemented a method of modeling sustainable balanced development regions in the single economic space of the state. It is have based on a systematic approach and methods of spatial econometrics, allowing to carry out poly-scenario forecasting sustainable balanced development the regions in the single economic space of the state in the medium term and to optimize strategic regional development programs. The aim of present study is to develop methodological approaches and prediction complex level to development spatial socio-economic macro systems based on eight-stage algorithm multivariate extrapolation of estimated figures. Using which makes it possible to identify forward-path integrated rating for poly-scenery types of changes (inertia, optimistic and pessimistic). In the course of study were used methods such as dialectic, monographic, analytical, systematic, economics and statistics, target-oriented and strategic management. Testing techniques performed on an example of Stavropol Territory economic development indicators.

Keywords: sustainable development, modeling, economic area, region.

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INTRODUCTION

The concept of sustainable development became widespread in modern economic science the last decades of the twentieth century. The concept of sustainable development regional systems should provide the opportunity to form a special mechanism, stabilizing and ensuring transparency in the process of determining the main indicators for development of the region. Is infrastructure, offering the possibility to reliable prediction its development in the sectoral and territorial breakdown, and the possibility for formation system of economic regulation as this regional system separately and in its interaction in the macroeconomic space.

Sustainable balanced development of the regional system is a complex synthetic category, which reflects the influence of all factors for development and provides optimum, from the standpoint of the elements of the system, the dynamics of the main parameters, smoothing their transformational vibrations. In heuristic terms, a sustainable development involves making scientific judgments about two things: the prospects of the market, which can been install at this time, alternative ways and terms of their implementation.

In the face of uncertainty and elevated risks, the sustainability balanced development regions requires the development of scientifically based techniques of modeling and forecasting using formal methods to identify the main patterns of development and basic trends, which allows to objectively consider the prevailing economic conditions and changes in the macroeconomic environment.

The increasing role of modeling in these systems is due the global transformations of the external conditions of their existence, adaptation of state regulation of regional structures, integration of these systems with a common macroeconomic space. In modern conditions, even more issue that is urgent is the improvement methodical bases of modeling sustainable development territories with the use predictive methods, the purpose of which is to increase the efficiency functioning of the common economic space the country. The need for such developments is relevant due to the fact that existing tools used for the simulations stability balanced development of the regions in the common economic space of the state do not correspond to modern conditions for the formation of a new economic system. Called as global transformations and internal factors, and therefore, there arises the objective necessity of optimization of existing and development of new methodological approaches on the issue. In this regard, the theme of this study is relevant and timely.

MATERIALS AND METHODS

In developing the concept of sustainable balanced development of regions in the common economic space of the state, from our point of view, the most efficient and expedient to use the method of scenario forecasting and modeling, which enable to predict the most likely course of events and assess possible consequences. The desired scenario sustainable balanced development of the region is a scenario's model future, which characterized the likely course of events with indicating degree of their implementation. Which identifies key factors that must be considered in the calculations, and indicate how these factors can affect the simulated events, and are formed of the variant scenarios of the strategy of development of regional systems in the process of interaction at the macro level.

Modern research has led to the conclusion that the method of scenario modeling allow us to more fully and clearly define prospects of the development of a specific territory, as when building intensity varying according to the degree of certainty of the factors influencing the pace of its socio-economic development and stagnation condition. The advantage of this method of modeling is that the constructed model will allow the perspectively show the possible risks posed by bad management or adverse effects of the development of regional or macroeconomic situation.

The positive aspects of the methods of modelling and prediction may also include a high level of representativeness of the presented model of sustainable balanced development of the regional system, and factors influencing the formation of a common development strategy. The use of regional forecasting at various levels is an important instrument of state planning of socio-economic development of the country as a

whole and its regions. Using the prediction is have provided identification of priorities and scenarios of development of regional economy aimed at the smoothing of regional contradictions and the welfare of the population. Based on the identified patterns, as well as on the features most used in the prediction methods, we developed and tested a multidimensional forecasting technique of a complex estimation of stability of a spatially-dynamic development of territories, comprising eight stages, the sequence and the content of which is schematically presented in figure 1.
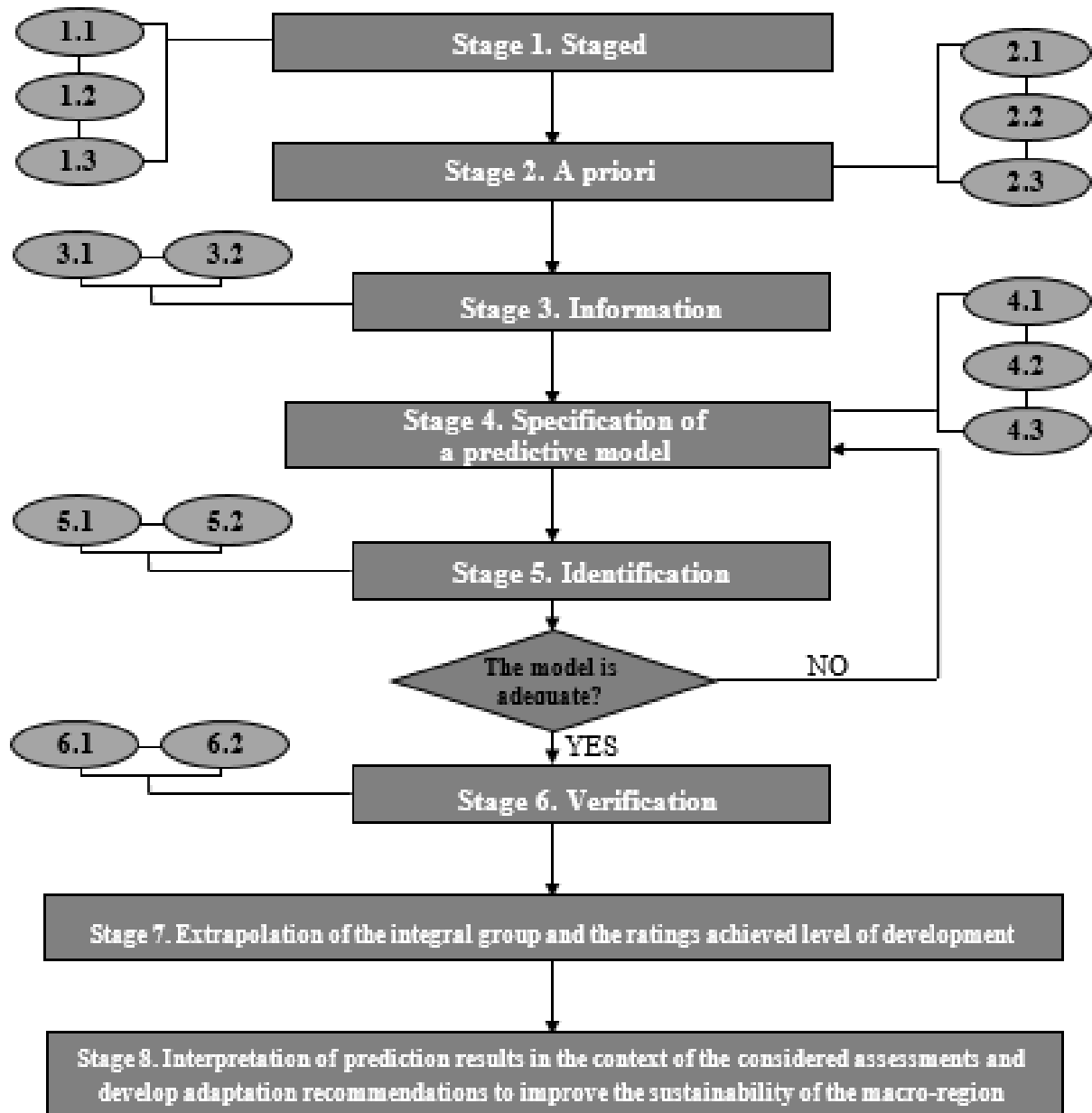

Figure 1: The algorithm of modeling and forecasting integrated assessment of the sustainability of balanced development of territories.

The algorithm is a sequence of specific procedures within each of them.

1.1 Purpose of predictive research.
1.2 Specification of the applied problems of prediction of the generalized estimates of a spatial-dynamic development.
1.3 Justification of the study subject.

2.1 formalization of the system of performance indicators to be extrapolated to calculate the rating.

2.2 justification of the optimum method for obtaining a predictive evaluation.

2.3 the Choice of the period of pre-emption.

3.1 Definition of the object of study.

3.2 the Formation of the source base of the study.

4.1 the Choice of optimal mathematical models form.

4.2 restrictions.

4.3 Estimation of parameters of econometric models.

5.1 quality Assessment parameters.

5.2 evaluation of the quality of the whole model.

6.1. Point forecast estimates on the model (corresponding to the inertial variant of the forecast).

6.2 the Construction of confidence interval estimates (upper bound corresponds at optimistic variant of the forecast, the lower bound is pessimistic).

The main goal of the proposed methodology is the possibility of obtaining generalized and group ratings with the aim of monitoring, control and scheduling parameters of a spatial-dynamic systems development at various levels (from municipalities to federal districts).

RESULTS AND DISCUSSION

In terms of practical implementation of the methodology of forecasting and modeling for integrated assessment of sustainability of balanced development of territories by the authors on the example of separate regions of Russia (Stavropol region) was carried out the prediction of how complex rating evaluation and in the context of individual development areas (economic, social, institutional and technological). To do this, as a baseline we have taken the initial values of the performance indicators over 10 years. In accordance with generally accepted principles of forecasting, in our case the extrapolation of the initial indicators can be have carried out not more than three years. In the next step, based on the application of econometric modeling we conducted a specialization of the built models to predict the performance indicators of economic development in the study region. In accordance with the presented methodology considers three variants of projections (inertial, pessimistic, optimistic). The results of the multivariate extrapolation carried out with the help of specialized software for the determinants in accordance with the method of multidimensional comparative level of economic development of Stavropol region are have presented in table 1.

Table 1: Results of extrapolation of the estimates of economic development of Stavropol region

Index	Scenarios	2005	2014	FORECAST		
				2015	2016	2017
Investments in fixed capital per capita, rubles.	Inertial	53414,6	118821,5	133434,2	144174,4	154914,6
	Pessimistic			121155,7	131301,4	141381,1
	Optimistic			145712,7	157047,3	168448,1
The cost of fixed assets per employee, ths. rubles.	Inertial	418,2	792,9	917,5	1029,4	1154,9
	Pessimistic			834,0	931,4	1039,7
	Optimistic			1009,4	1137,7	1283,0
GRP per capita, thous. rubles.	Inertial	60378,1	169318,1	180685,5	197895,1	215104,7
	Pessimistic			149515,3	165215,8	180748,5
	Optimistic			211855,6	230574,3	249460,8
Profit economy per employee, ths. rubles.	Inertial	14,7	34,1	30,8	32,9	35,0
	Pessimistic			19,6	20,9	22,1
	Optimistic			48,2	51,8	55,4

The results show that the presented model shows a very high correlation of the proximity of grade changes according to identified trends. Trend equations are statistically significant, as demonstrated by the

findings variance and correlation analysis. Model can have very efficiently be used for the prediction of relevant performance indicators. Similarly, we can carry out a multivariate forecast steady balanced development of the region for any of the study areas and paths.

CONCLUSION

Presented a method of multivariate prediction which generalized rating estimation of level of development of regions for five of the investigated area, has certain distinctive features: has a universal orientation, can have be used at different levels (or objects) from separate business entities (or groups) of States. It is easy with the appropriate software product will be used by entities with a minimum level of training. The results of prognostic estimations allows to give a clear assessment of the most probable scenarios of development in the future, which greatly facilitates the process of overcoming the negative and stimulate the positive scenarios by applying the appropriate set of corrective actions. The structure of estimated indicators and a number of research directions, if necessary, may be revised (increase or decrease) depending on the objectives and expected results of the application of the proposed method. The presented models predict a systematic refinement and improvement as new information and structural changes in the economy. In order to improve the stability of balanced development of regional systems in the context of cooperation with the single economic space based on the conducted research, it is possible to define the following areas. Implement the proposed technique for modeling of sustainable balanced development of regions in the common economic space of the state at the macro level. Integrate this methodology into the practice of activity of bodies of state management to ensure improvement of the strategic regional development programs.

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