

The Formation of Management Strategies of Economic Development Stability of a Region

Elena Igorevna Lukyanenko

National Academy Urban Economy, Kharkov, Ukraine

Abstract: The aim of the investigation is to elaborate the management strategy of economic development stability of a region allowing achieve positive stable economic development in all spheres of vital activities of a region. The methods of management strategies of economic development stability of a region have been proposed. This methodology the following steps have been isolated Determining the main probable characteristics of a region development; Forecasting the future state; Elaborating management strategies of economic development stability. Using modern mathematic apparatus of the theory of Markov's processes the matrixes of states and transitions have been calculated and the main strategies and trends for efficient management of economic development stability in Kharkiv region have been recommended such as three main management strategies of economic development stability of a region and its constituents - spheres of development, namely, the strategy of neutral development, the strategy of growth and the strategy of reducing the influence and to substantiate their economic content.

Key words: Region • Stability • Economic development stability • Markov's processes • Graph of state
• Matrixes of states and transitions.

INTRODUCTION

Transformation of an economic system resulted in considering a region not only as an object of government management but also as a separate system correlating with other systems and changing not only because of external influence but also due to self-regulation and self-development.

The Analysis of the Latest Investigations and Scientific Papers: Theoretic and methodological problems of investigating the stability in the wide sense and stability applied to economic development have been considered in the works of such scientists as: A. Lyapunov, A. Smith, R. Dorfman, N. Porter, P. Samuelson, R. Solow, N. Harrad, D. Hicks, V. Danilov-Daniljan, A. Granberg, M. Cicanov, G. Rozenberg, S. Chernikova, G. Krasnoschokov, J. Rolls, M. Mesarovich, L. Medows.

Close study of the concepts and approaches presented in the papers allowed to focus on the problems concerning economic development stability which have not been thoroughly investigated yet. In particular, the

problems of providing self-development stability of a region, which may be solved using efficient management of economic development stability, require additional investigation.

Statement of the Task: The aim of the investigation is to elaborate the management strategy of economic development stability of a region allowing achieve positive stable economic development in all spheres of vital activities of a region.

The Main Content of the Research Work: For solving the problem stated in the article the methods of elaborating management strategies of economic development stability of a region have been proposed and its algorithm is presented in Fig. 1.

Consider the Investigation Content by Stages:

Stage 1: Determining the main probability characteristics of the development. Studying and diagnosing the stability of economic development of a region one can come to the following conclusions:

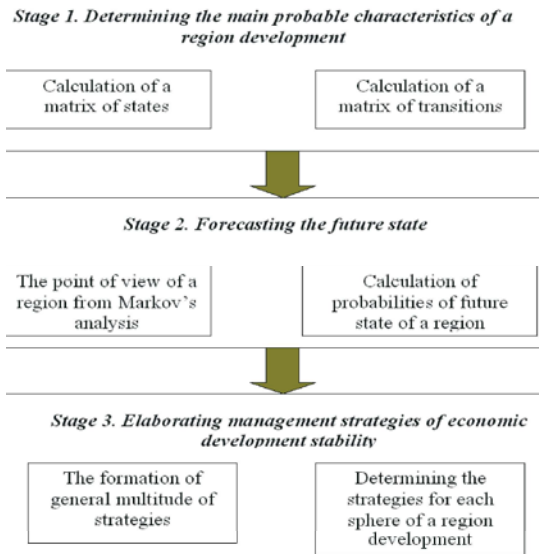


Fig. 1: Algorithm of methods of the formation of management strategies of economic development stability of a region

- Economic development stability of a region is the value depending only on its state in the previous moment of time;
- Stability state at each following moment can be one of six states, i.e. the process of stable economic development of a region is considered to be casual;
- This process may be managed, i.e. when carrying out certain strategies the change of transition probabilities from one state into another is quite possible.

These conclusions testify that the process of stable economic development of a region may be considered as a Markov's process with certain limits [1-3].

Stage 2: Forecasting the future state of economic development stability of a region. This stage of the methods is dedicated to determining initial states of each sphere of a region on the basis of which the future state of a region is determined using matrixes of transition probabilities.

Stage 3: Elaborating strategies of managing economic development stability of a region. Carried out investigation of stability states of economic development spheres of a region showed that a region can transit from one state into another in a certain period of time and the states can be either attractive or not from the point of

view of general economic development stability. In this connection it is appropriate to work out management strategies of economic development stability, i.e. a complex of measures aimed at increasing the probability of transition into more attractive state of economic development stability of a region.

Let's consider realization of each stage of the methods of the formation of management strategies of economic development stability (fig.1).

Stage 1: Determining the main probability characteristics of the development.

Consider realization of this stage for Kharkiv region. Calculation of states matrix is given in Table 1.

The analysis of the table allows come to the following conclusions:

- In most cases state 6 is more probable, i.e. stable positive development of the first type and it corresponds to economic prerequisites of stable development of a region;
- For two spheres - general economic and financial and investment - state 5 is the most probable, i.e. stable negative development of the first type. In this case it is connected with the fact, that the prerequisites of financial crises have existed in the world for a long time and it showed its evidence in Ukraine in summer 2008 influencing the development of these spheres greatly;
- State 2 -unstable positive development is the least probable for seven out of eight constituents of economic development of a region.

The results of calculating transition probabilities for the general economic sphere of economic development of a region are presented in Table 2.

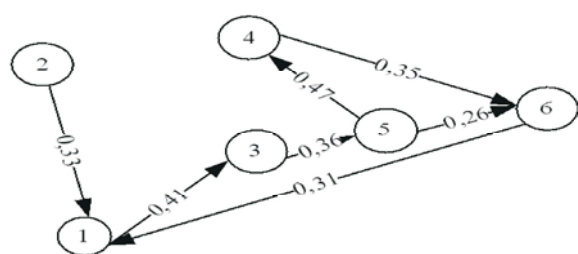
On the basis of this table it is possible to construct a graph of the most probable transitions of economic development of a region from one state into another (Fig 2). The analysis of the data given in Table 2 and Fig.2 allow come to the conclusion that transition to the best state (state 6) is most probable from state 4 (probability - 0,35) and state 5 (probability - 0,26). However, it should be taken into account that it is the second value probability, i.e. for realization of such transition it is appropriate to carry out some efficient intermediate management measures. In this graph a cycle expressed by the following states chain can be observed - 1-3-5-4-6-1 [3,4].

Table 1: Calculations of states matrix elements

States of economic development of a region	Spheres of regional economy							
	General Economy	Production	Finance and Investment	Consumption	Communication	Innovation	Foreign Economic	General Integral
1	0,16	0,06	0,15	0,03	0,12	0,06	0,11	0,17
2	0,06	0,07	0,04	0,00	0,12	0,07	0,03	0,02
3	0,20	0,24	0,21	0,00	0,06	0,25	0,22	0,19
4	0,16	0,19	0,14	0,03	0,28	0,30	0,21	0,19
5	0,21	0,11	0,23	0,03	0,08	0,20	0,17	0,08
6	0,21	0,32	0,23	0,92	0,33	0,11	0,26	0,36

Table 2: General economic sphere

Transition from state	Transition into state					
	1	2	3	4	5	6
1	0,00	0,35	0,41	0,18	0,06	0,00
2	0,33	0,00	0,17	0,17	0,17	0,17
3	0,00	0,23	0,05	0,23	0,36	0,14
4	0,29	0,00	0,18	0,12	0,06	0,35
5	0,00	0,00	0,13	0,30	0,30	0,26
6	0,30	0,00	0,26	0,04	0,22	0,17



Stage 2: Forecasting the future state of economic development stability of a region.

As a result of carried out investigation the following initials of state have been obtained [6,7]

$$\begin{aligned}
 P_1(0) &= \begin{pmatrix} 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \end{pmatrix} & P_2(0) &= \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \end{pmatrix} & P_3(0) &= \begin{pmatrix} 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{pmatrix} & P_4(0) &= \begin{pmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} \\
 P_5(0) &= \begin{pmatrix} 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{pmatrix} & P_6(0) &= \begin{pmatrix} 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \end{pmatrix} & P_7(0) &= \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \end{pmatrix} & P_8(0) &= \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \end{pmatrix}
 \end{aligned}$$

The analysis of these vectors testifies that the most destabilizing influence on the general integral index was made by consumption sphere, which was in state 1 in

2011 - the state of regressive unstable economic development as well as by finance and investment and communication spheres corresponding to state 3 - the state of regressive economic development with medium stability.

Let us calculate probabilities of transition of economic development spheres into corresponding states for 2012-2013 (Table 3).

The analysis of the table allows come to the following conclusions:

- Transition from state 5 - the state of stable economic decay into state 6 - the state of stable economic growth is expected to be the most probable for general integral index in 2012; in 2013 the region is also expected to be in state 6 and probability increases.
- Probability of transition into undesirable states (states 1, 2, 3) is the highest in 2012 for three spheres: consumption, innovation and foreign economic and in 2013 - only for two spheres: general economic and finance and investment. State 3 is expected to be the most probable for these spheres in 2012.
- In general 2013 is more optimistic for economic development of Kharkv region as the second value probabilities (underlined in table 3) are observed for states 4 and 5 in six cases out of eight.

Carry out detailed analysis of each sphere using matrixes of determining stability (Fig. 3) [8,9].

The matrix given in fig.3 allows estimate evolutionary stability of a separate sphere of economic development of the region which does not presuppose management influence and reflects genetic development of the process on the basis of existing probabilities of each sphere development [10].

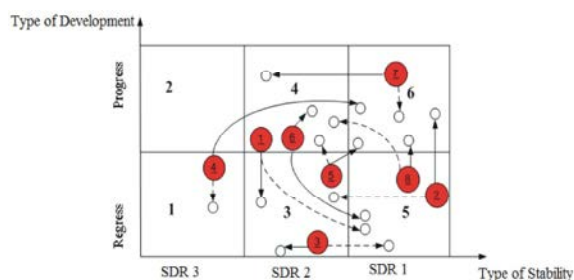
Stage 3: Elaborating strategies of managing economic development stability of a region

Table 3: Probabilities of transition into states

States	Sphere							
	General Economy	Production	Finance and Investment	Consumption	Communication	Innovation	Foreign Economic	General Integral
2012								
1	0,29	0,00	0,00	0,00	0,00	0,03	0,07	0,00
2	0,00	0,00	0,08	0,00	0,14	0,00	0,00	0,00
3	0,18	0,08	0,33	0,67	0,00	0,38	0,36	0,11
4	0,12	0,33	0,04	0,33	0,43	0,19	0,11	0,22
5	0,06	0,25	0,46	0,00	0,14	0,09	0,18	0,33
6	0,35	0,33	0,08	0,00	0,29	0,31	0,29	0,33
2013								
1	0,14	0,13	0,10	0,19	0,19	0,01	0,06	0,18
2	0,14	0,02	0,03	0,08	0,08	0,06	0,07	0,01
3	0,25	0,22	0,28	0,08	0,10	0,25	0,15	0,12
4	0,14	0,13	0,17	0,08	0,25	0,27	0,27	0,19
5	0,18	0,17	0,27	0,08	0,06	0,27	0,20	0,15
6	0,14	0,32	0,15	0,31	0,33	0,14	0,25	0,34

Table 4: The strategies of economic development of Kharkov region

Sphere	State 2012	State 2013	Strategy
General Economy	4	3	Strategy of growth (transition into state 6)
Production	5	6	Neutral strategy (state 6)
Finance and Investment	3	3	Strategy of growth (transition into state 5)
Consumption	1	6	Strategy of reducing negative influence (transition into state 3 or 4)
Communication	3	6	Strategy of growth (transition into state 6)
Innovation	4	5	Neutral strategy of growth (transition into state 4)
Foreign Economic	6	4	Neutral strategy (return into state 6)
General Integral	5	6	Strategy of growth (transition into state 6)



Notes: red circle - initial state; solid line - the most probable transition; dotted line - the second probable transition

Fig. 3: Matrix of probable transitions for the spheres of economic development of the region in 2013

Carried out analysis of states and probable transitions allowed elaborate three main strategies of managing development stability [10]:

- Neutral strategy;
- Strategy of growth;
- Strategy of reducing negative influence.

Concluding strategies are given in Table 4.

The conclusions on the carried out investigation

Carried out investigation allowed obtain the following results:

- To determine current states of the spheres of vital activity of the economy of the region and probable transitions in case of lack of management influence on the basis of Markov's processes apparatus;
- To forecast stability of economic development spheres in Kharkiv region for 2012-2013 and it allowed consider 2013 to be more optimistic for economic development of Kharkov region as the second value probabilities are observed for states 4 and 5 in six cases out of eight;
- To elaborate three main management strategies of economic development stability of a region and its constituents - spheres of development, namely, the strategy of neutral development, the strategy of growth and the strategy of reducing the influence and to substantiate their economic content.

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