

Prediction of crisis condition and anti-crisis regulation of regional economy

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Abstract. The article considers approaches to forecasting crisis conditions in the regions of the national economy. The regions of the national economy act as business entities. A list of indicators has been developed to comprehensively identify the presence of crisis conditions in the region's economy. Grouping of Russian regions was carried out according to the degree of probability of a crisis. The directions of crisis management in the region are proposed.

Russian regions are affected by macroeconomic shocks. Macroeconomic crises cause the emergence of crisis phenomena in regional economic systems as subsystems of the national economy. Regions have a significant differentiation both in economic and geographical position, and in the state of the economy. Different initial situations cause different states of regional economies in response to macroeconomic shocks. In addition, the state of regional economies is affected by federal regional policies, redistribution of budget funds and regional management. To assess the development trend of the regional economy, it is necessary to improve the methodology for forecasting regional development. With an early identification of the crisis, it is possible to develop ways to counter the current situation and anti-crisis measures.

The influence of external shocks and the crisis conditions of regional economies is analyzed by N.N. Mikheeva [7], Shmaydyuk TS [8] focuses on the fact that it is advisable to evaluate the probability of a crisis occurring on the basis of an assessment of objective statistical data. Kalyuzhnova N. Ya. [4] believes that management in the regions should be aimed at identifying, creating and using the competitive advantages of the regions, through the use of which it is possible to counter crisis trends.

Early diagnosis of crisis conditions allows you to develop and implement anti-crisis measures to counter the development of the crisis in the region.

Due to the differentiation of regions according to the level of economic development, they have a different probability of a crisis. Analysis of a set of statistical indicators by region makes it possible to determine the proximity of a region to a crisis. Clustering the regions in terms of proximity to the crisis allows developing crisis management methods that are appropriate for each cluster.

Let us single out the concepts characterizing the different states of the regional economies in relation to the crisis: crisis state and crisis. We define the crisis state as a combination of quantitative and qualitative negative manifestations in various areas of economic life that are not systemic in nature and can be overcome in a short period of time. A crisis state can develop into a systemic crisis. The crisis is characterized by the inability of the regional socio-economic system to perform its

functions for reasons of internal or external origin. To prevent the transition from a crisis to a systemic crisis, a number of crisis management measures are required.

To predict the crisis conditions there are different approaches and methods in the region. All modern techniques can be divided according to two classification criteria, such as [2]: 1) data processing methods; 2) scorecard.

According to the data processing methods, two approaches can be distinguished - descriptive and rating. The essence of the rating is as follows: the regions are arranged (grouped) according to certain criteria or criteria. Signs or criteria or reflect certain aspects of the region's business or characterize the region as a whole. There are two methods of rating analysis - expert and analytical. Expert method is based on the experience and qualification of specialists and experts, using special economic information published in the press. Moreover, in the examination process, a system of indicators of a general nature is taken into account, which include: general characteristics of the financial and economic condition of the region; summary indicators according to statistical reporting; analytical financial indicators showing the state of the region in dynamics.

The analytical method is based on information of an economic and financial nature, as well as the application of various methods of economic and mathematical modeling. Rating method was the most popular among all the approaches to forecasting of crisis conditions in the region, thanks to its ease of use and the information needs of the different actors of socio-economic process.

To predict crisis conditions, Ye. Gorbatenko proposed a mathematical model that assesses the state of 12 factors determining the proximity of the region's economy to the crisis. The selection of factors is an extended version of the indicators used by Euromoney magazine. Each factor is evaluated by an appropriate indicators.

1. Production factor:
 - Industrial production growth, %
 - Volume of production per capita, rub. / human
 - The share of the region's production in the country's production, %
2. Macroeconomic factor:
 - GRP growth, %
 - Dynamics of inflation, %
3. Export factor:
 - Export growth, %
 - The share of the region's exports in the country's exports, %
 - The volume of exports per capita, dollars / person.
4. Resource and raw materials factor:
 - Land resources, thousand ha
 - The volume of water resources in the region, thousand hectares
 - Volume of forest resources, thousand ha
 - The growth of the region's mining industry, %
5. Investment factor:
 - Investment Growth, %
 - The share of investment in industry, %
6. Innovation factor:
 - The growth in the volume of scientific and scientific-technical work, %
7. Labor factor:
 - Average salary in the region, %
 - Unemployment rate, %
8. Social factor:
 - Standards of living
 - Significance of the region
9. Debt factor:
 - The share of debt in the total financial resources of the region, %

10. Consumer factor:

- Consumer demand growth, %

11. Environmental factor:

- The growth of registered cases of neoplasms, %

12. Infrastructure factor:

- Capital construction costs in terms of 1 resident, rubles / person
- The share of the region's revenues allocated for the development of infrastructure, %
- The number of infrastructure facilities put into operation during the reporting period, pcs.

The proposed model is described in more detail in [3]

On the basis of selected indicators, and the data of the Federal State Statistics Service of the statistical reporting of indicators calculated by region. As a standard adopted by the average figures for the Russian Federation, which compares the calculated parameters.

The next step in the implementation of crisis forecasting is to determine the integral index of the possibility of a crisis, using the calculated indicators, according to formula 1:

$$I_{CS} = \sum_{i=1}^h \frac{I_i}{I_{eti}} \times b_i \quad (1)$$

I_{CS} – is an integral indicator of a crisis state;

I_i – is the i -th indicator of the crisis state;

I_{eti} – is the i -th benchmark indicator of a crisis state;

b_i – is the weight of the i -th index.

The result of the integral index of the crisis state requires interpretation and determination of the probability of a crisis on the basis of the obtained value. Regions with a low probability of crisis development are in the range of $0.67 \leq I_{CS} \leq 1$; with an average likelihood of a crisis: $0.34 \leq I_{CS} \leq 0.66$; with a high probability of development of the crisis: $0 \leq I_{CS} \leq 0.33$. According to the proposed algorithm and formula 1, the integrated index I_{CS} was calculated. According to the index value, groups of regions of the Russian Federation were formed according to the degree of probability of development of crisis conditions. The calculation was made for 2013-2018.

The first group consists of regions with low indicators of current development, these include: the Chechen Republic, the Republic of Ingushetia, the Republic of North Ossetia-Alania, the Republic of Dagestan, the Republic of Kalmykia, the city of Sevastopol, the Republic of Crimea, the Republic of Altai, the Kabardino-Balkarian Republic, Karachay-Cherkessia Republic, Kurgan Region, Republic of Adygea. These regions can be characterized as prone to crisis, they do not have significant production or outstanding natural resources. The performance indicators of economic mechanisms in these regions are below average. In such regions, it is possible to develop tourism and recreational areas as a factor in countering the crisis, creating new industries, and developing the social sphere.

The second group consists of regions with high rates of current development: Kemerovo Region, Perm Territory, Khanty-Mansi Autonomous district-Yugra, Tyumen Region, Orenburg Region, Vologda Region, Moscow, St. Petersburg, Arkhangelsk Region, Tyumen Region without Autonomous District, Yamalo-Nenets Autonomous District, Lipetsk Region, Magadan Region, Kursk Region and Belgorod Region. These are regions with the highest GDP and the highest growth rates of real wages in the region. A significant part of production is concentrated in the regions. The probability of development of crisis conditions is insignificant.

The third group consists of regions with an average probability of development of crisis conditions. It includes regions that are not included in the first and second groups. The regions of the group are characterized by average values of development effectiveness indicators, low profitability indicators, and high unemployment. However, the regions of the third group have the opportunity to develop the economy through production, which is concentrated here, subject to the renewal of fixed assets. The

probability of the development of crisis and crisis in these regions in the near future can be estimated as average. The possibility of developing areas through the production, which is concentrated here, is being traced, while increasing the degree of capacity utilization and updating of fixed assets.

The assessment shows the state of the regions adjacent to the crisis. These results can be used to design activities. Crisis management of a region should be understood as the saturation of its economic facilities and relations, increasing economic activity. The general concept of anti-crisis development of the region should take into account the factors of development of crisis conditions in the region and be aimed at identifying the competitive advantages of the region that can give impetus to the development of the region.

The main anti-crisis measures for most regions are as follows:

1. Increasing the volume of investments in the main areas of the regional economy that determine the strategic priorities for their development:

- The provision of subventions to ensure the development of infrastructure.
- Providing conditions for the creation of new enterprises.
- Formation of state and regional infrastructure.
- Support for investment projects.

2. Increasing the purchasing power of the region's population:

- An increase in budget expenditures for the maintenance of the social sphere of the regions.
- Stimulating the development of self-employment
- Stimulating the development of industries focused on export or inter-regional demand to

increase the income of workers in these industries

3. Support for small and medium enterprises:

- Simplification of the procedure for creating business entities.
- Development of the financial services market.
- Formation of a network of regional entrepreneurship support funds.
- The creation of a favorable climate for small and medium-sized enterprises by management

bodies.

- Stimulating the innovative orientation of development:

4. Creation of a mechanism to prevent the growth of unemployment; introduction of a mechanism for legalizing the employment of self-employed, expanding the list of employment services, training specialists in accordance with the needs of the region

The integrated implementation of each of these areas will increase the living standards of the population and create new jobs, which, in turn, will reduce the likelihood of a crisis developing already at the state level.

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