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METHODICAL APPROACHES TO THE ASSESSMENT OF ECONOMIC SECURITY OF REGIONS

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Abstract

In today's environment, assessing the level of economic security of the state and its regions is essential. The authors of this article have systematized a number of concepts of economic security of a territory and investigated methodological approaches to assessing its state. The objects of research were the regions of the Ural Federal District and the Russian Federation. The main five evaluation blocks were identified, according to which the indicators of assessment were grouped. These are: economic, agri-food, innovative, social and environmental. Using the normalization method, we calculated the integral indicator. The normalized values of the criteria allow us to identify the strengths and weaknesses of the economic development of the region. The obtained values of individual indicators are the basis for a comprehensive assessment of the security of the territory. Application of this technique can contribute to the objective formation of regional development targets and the ability to predict the level of economic security in various areas.

Keywords: Economic security, assessment techniques, region

1. Introduction

Regions are integral parts of the country. Negative impact on the country as a whole negatively affects the state of the economy of its territories as well. Understanding of the essence and application of indexes and indicators of economic security should be uniform or logically related at the federal and regional levels. The economic security of the region should not be interpreted as a state of absence of any dangers, since in reality such a state does not exist. On this basis, the economic security of the region is an integral characteristic of the state of the economy, taking into account the social and financial factors affecting it, and reflecting the level of protection of the regional economy from the threats to its socio-economic development.

Both foreign and domestic scientists have actively engaged in and are still continuing their studies of the essence and state of economic security of the country. In the most famous works of foreign scientists such as Jiang (2008), Kahler (2004) and Nesadurai (2005), they have considered it as the basis of national security of the country. Among the domestic scientists who conducted research in this area and engaged in the selection of indicators used to assess the level of economic security of the territory, we can single out Denezhkina and Suzdaleva (2011), Dolganova and Rudenko (2016), Glazyev (1997), Kuznetsov et al. (2018), Kazantsev and Karpov (2016), Novikova and Krasnikov (2010). Semin and Kurdymov (2018), Senchagov and Mitiakov (2016), Tatarkin et al. (1997) and others. However, the majority of them does not expand on why they are offering those particular indicators for assessing economic security of regions and what their number of levels of economic security is based on. Which is why, despite the extensive study of the regional aspect of this problem, it still requires further research.

2. Methodology of the research

The aim of the study lies in determining the basic principles of the formation of a system of indicators and in calculating their actual and threshold values when assessing the level of economic security of regions.

The methodology of the study is based on the principles of a systematic approach to studying the essence of economic security of regions and assessing their level, using a set of research methods and their techniques, such as economic-statistical, economic-mathematical, graphic, etc.

Theoretical analysis is based on the study of the works of domestic and foreign scientists assessing the economic security of the state and regions. The basis for the calculations was the official statistics of the Russian Federal State Statistics Service on the topic of the study.

The regional economy comprises a large number of activities and industries, and various sources mention security types that, to varying degrees, can be attributed to the economic security of the region (ESR). In this study, the ESR indicator system is based on the economic, agri-food, innovation, social and environmental directions of regional development. The proposed methodology for assessing economic security includes a comparative analysis of the values of individual ES indicators with their thresholds, as well as creation of an integral economic security index of the region as a whole, or of an industry (sphere) of the economy, which is a weighted average degree of indicators reaching their threshold values.

The method used by the authors to monitor and assess the state of economic security was tested using the regions of the Ural Federal District (UFD) as an example.

3. Results

With the continued sanctions policy of developed world powers against Russia, its national security remains a top priority and in order to solve this problem, Russia needs to achieve sustainable economic growth. Therefore, the study and analysis of the economic security of the country and its territories has attracted such close attention of scientists. The study of the essence of economic security of the region should begin with the study of the legislation governing the relations of subjects and the state as well as scientific works of domestic and foreign scientists on the subject. But at the same time, there is no unified approach to the concepts of economic security (ES) and economic security of the regions (ESR). A number of scientists do not consider them a scientific category. In their opinion, they do not reflect objective reality, but depend on the role of the country in the world economy.

The founder of research in the field of economic security Glazyev (1997) defines ES from the point of view of sustainable socio-economic development of the country and the competitiveness of the national economy. However, Senchagov and Mitiakov (2016) notes that ES, through governmental institutions, is designed to create mechanisms protecting the interests of domestic economy, its development and stability. As ES of the country and its individual regions are interconnected, the indexes and indicators that serve to assess their levels must be uniform. By summarizing the views of a number of scientists, we can highlight the main areas that characterize the essence of the economic security of the territory:

1) minimizing adverse conditions or negative factors, including threats, damage, etc. (Kazantsev & Karpov, 2016; Senchagov & Mitiakov, 2016)

2) sustainable economic development, independence, self-reliance, competitiveness (Glazyev, 2007; Kuznetsov et al., 2018; Semin & Kurdymov, 2018);

3) the state of the economy's security, lack of danger (Kazantsev & Karpov, 2016).

Achieving the necessary level of economic security should be accompanied by the realization of the main objectives (On the Economic Security Strategy…, 2017).

improvement of the quality of life of the population;

meeting state (regional), social and personal needs;

sustainable and stable economic development;

independence of the economy from external threats;

competitiveness of the region in domestic and foreign markets;

effective usage of the potential of the region and its resources to improve the well-being of its population.

Assessment of the level of economic security of the territory should be carried out according to certain criteria. The adopted Concept of Long-Term Social and Economic Development of the Russian Federation until 2020 identifies the parameters that are the basis for the formation of the ESR indicator system. At the same time, we should not forget that the full independence of the regional economy in the current conditions is impossible. Therefore, it is important to reduce its dependence on external and internal threats of deterioration of major economic indicators.

An assessment of the region's economic security should begin with the selection of stages and assessment methods. There are quite a few scientific approaches to this process. For example, Y.A. Dolganova and Rudenko (2016) in their work offer the following list: macroeconomic; expert rating; dynamic econometric; economic and mathematical; integrated approach. Based on the chosen approach, or their combinations, a methodology for assessing the level of ESR is being developed.

Tatarkin et al. (1997) Ural scientists have studied this issue even more in-depth and further identified destabilization factors that negatively affect the level of economic security.

On May 13, 2017, the Economic Security Strategy of the Russian Federation was adopted until 2030. It contains not only the main areas for strengthening it, but also separate challenges and threats, however, there is no distinction between them. Moreover, there is no link between these indicators and threats to economic security.

Most scientific papers note that it is through the indicator system that the level of economic security of the region is assessed. Scientists of the Omsk Research Center of the Siberian Branch of the Russian Academy of Sciences investigated the methods of calculating the integral index and evaluation of ESR, developed and tested mathematical models of forecasting and evaluation of certain areas of ESR (Mityakov & Kornilov, 2011).

We partially support the works of these scientists. By summarizing the methodical and analytical material, based on our own research and development, we propose the basic principles of the formation of a system of indicators of the level of ESR, determining their actual and threshold values:

1) ESR level indicators should reflect the most important areas of regional development;

2) ESR indicators include indicators of the economic, agri-food, innovative, social and environmental blocks;

3) the actual values of ESR indicators should correspond to one time period and be considered in a certain dynamic (5-7 years at least);

4) the sources of information on the actual values of ESR indicators should be restricted to only official statistics published periodically at a federal level;

The method of monitoring and assessing the state of economic security was tested using the regions of the Ural Federal District as an example. To compare the values of indicators with their thresholds, the authors used the normalization given in the work of Senchagov and Mitiakov (2011, 2016):

for a "not less than a threshold value":

$$y = \begin{cases} 2^{\left(1-\frac{a}{x}\right)/\ln\frac{10}{3}} & ,if\ \frac{x}{a} > 1 \\ 2^{-\log_{10/3}\frac{a}{x}} & ,if\ \frac{x}{a} \le 1 \end{cases}, \qquad (1)$$

- for a "not more than a threshold value":

$$y = \begin{cases} 2^{\left(1-\frac{x}{a}\right)/\ln\frac{10}{3}} & ,if\ \frac{x}{a} < 1 \\ 2^{-\log_{10/3}\frac{x}{a}} & ,if\ \frac{x}{a} \ge 1 \end{cases}, \qquad (2)$$

where x is the actual value of the indicator; a is its threshold; y is its normalized value.

With this normalization, $y = 1$ corresponds to the case where the indicator is equal to its threshold value, $y < 1$ indicates a threat to economic security, and $y > 1$ corresponds to the indicator having achieved its threshold value.

Application of this normalization can significantly improve the effectiveness of research. Based on the data obtained, the following risk areas can be identified, see Table 1:

Table 1. Risk Areas and Their Boundaries

Risk zone	Risk range	Difference between the value of the indicator and the threshold
Catastrophic risk	Inside the sector: 0.25	More than 10 times
Critical risk	Inside the sector: 0.25 to 0.5	3 to 10 times
Significant risk	Inside the sector: 0.5 to 0.75	From 1.6 to 3 times
Moderate risk	Inside the sector: 0.75 to 1.0	Not more than 1.6 times
Stability	Outside the sector: 1.0; 1.0 to 1.25; 1.25 to 1.5; 1.5 to 1.75.	Complete match; Exceeds by 1.0 to 1.6 times; Exceeds by 1.6 to 3. 3 times; Exceeds by more than 3.3 times.

The authors have grouped indicators into five blocks: economic, agri-food, innovative, social and environmental. With the help of petal charts of normalized values of the criteria we have found the strengths and weaknesses of the economic development of the regions. In the Kurgan region, the positive factors include the optimal volume of foreign trade turnover relative to GRP, and the problematic ones are the average monthly nominal wage (the lowest in the UFD), as well as the gross regional product being two times lower than the threshold (average for Russia) value, the volume of retail trade and the provision of services per capita being lower than the Russian value, and the share of unprofitable organizations, on the contrary, being higher.

Food security (independence) is one of the main components of the economic security of the region and the country. Analyzing the normalized values of agri-food indicators of the regions of UFD and Russia for 2015–2017, we have revealed that the leading regions in this direction are the Kurgan and Chelyabinsk region. The level of self-sufficiency of the population in basic foodstuffs exceeds the thresholds for potatoes and eggs in almost all regions. For other types of products, the security is not sufficient. Consumption of basic food products of all types in the regions is below the standard recommended by the Russian Ministry of Health.

The normalized values of innovative development of regions reflect the most unfavorable situation in terms of the distance of indicators from the threshold values. However, the highest positions belong to the Sverdlovsk and Chelyabinsk regions.

When assessing the normalized values of social indicators of the regions of the UFD and the Russian Federation during the study period, a similar, for almost everyone, situation in the social sphere draws

attention: in all the regions the share of population with incomes below the value of the subsistence level is rather high and generally the income level of the majority of the population is fairly low; the unemployment rate is high, and the level of financial security of citizens is low. The Kurgan region is a clear outsider here, and the leader is the Tyumen region. Positive factors include a significantly low crime rate in all the regions.

When analyzing the normalized values of the environmental indicators of the regions of UFD and Russia for 2015–2017, two environmental indicators are a cause for some concern. Emissions of pollutants into the atmosphere in all the regions are above normal. Particularly catastrophic values surface in the Sverdlovsk and Chelyabinsk regions, this is due to the fact that these regions are industrial. The Kurgan region is the clear leader in the favorable situation in environmental safety, the figures exceed the thresholds.

The resulting values of individual indicators are the basis for a comprehensive assessment of the security of the region. In this case, we can define the integral index (formula 3):

$$I = \sum_{i=1}^{n} w_i y_i, \qquad (3)$$

where n is the number of indicators in the ESR system; y_i is the normalized according to the formulas (1) and (2) value of the ith indicator; w_i is the weight factor that reflects the importance of the ith indicator within the direction under consideration, $i = 1, ..., n.$ $\sum_{i=1}^{n} w_i = 1$

Weight coefficients w_i can be calculated using various expert methods (ranking methods, pairwise comparison, etc.) or using the main component method [5]. The value of the integral index of less than one indicates a crisis state in the studied direction. When calculating the integral indexes, all the indicators within the framework of the economic, agri-food, innovative, social and environmental components of economic security for all the regions and the Russian Federation were considered equivalent, i.e. weighting factors were assumed to be equal to:

$$w_i = \frac{1}{n}, \ i = 1, ...,n. \qquad (4)$$

We need to note that two approaches may be used in calculating the integral ESR index, which includes economic, agri-food, innovative, social, and environmental components. The first approach is that the integral index is calculated as the arithmetic average of the integral indexes of the economic, agri-food, innovative, social and environmental components of economic security, the results of the calculations are reflected in Table 2.

During the second approach, the integral index is calculated as an arithmetic average of normalized indicators in all five directions. Table 3 provides a calculation of the integral index of economic security of the regions of UFD and Russia for 2011–2017 using this approach.

Table 2. Integral Economic Security Index of the Regions of UFD and Russia (version 1)

Region	2011	2012	2013	2014	2015	2016	2017
Russian Federation	0.8226	0.8373	0.8312	0.8274	0.8279	0.8088	0.8394
Kurgan region	0.7471	0.7418	0.7474	0.7218	0.7060	0.7130	0.7400
Sverdlovsk region	0.7938	0.7725	0.7858	0.7814	0.7771	0.7586	0.8159
Tyumen region	0.7161	0.7038	0.7167	0.7191	0.7094	0.6934	0.7287
Chelyabinsk region	0.7603	0.7842	0.7793	0.7454	0.7005	0.7204	0.7388

As we can see, in the second version of calculation the integral index of economic security of the regions is slightly higher, some of the areas move from the zone of significant risk to the zone of moderate risk. This is demonstrated by the Tyumen and Chelyabinsk regions. The Sverdlovsk region is stable in the moderate risk zone. The Kurgan region, although close in value of the overall integral indicator of economic security to the zone of moderate risk, is still throughout the study period in the zone of significant risk.

Table 3. Integral Economic Security Index of the Regions of UFD and Russia (version 2)

Region	2011	2012	2013	2014	2015	2016	2017
				Index value			
Russian Federation	0.8397	0.8580	0.8473	0.8427	0.8424	0.8364	0.8572
Kurgan region	0.7460	0.7359	0.7554	0.7317	0.7081	0.7147	0.7413
Sverdlovsk region	0.7919	0.7728	0.7824	0.7824	0.7718	0.7667	0.8080
Tyumen region	0.7759	0.7701	0.7773	0.7808	0.7716	0.7480	0.7745
Chelyabinsk region	0. 7813	0.7988	0.8006	0.7759	0.7412	0.7466	0.7600

4.   Conclusions

Thus, the authors have investigated methods of assessing the economic security of the regions; identified their strengths and weaknesses; made the selection of indicators and thresholds of the criteria for the most significant blocks: economic, agri-food, innovative, social and environmental areas of regional development; calculated normalized values of integral indexes; made comprehensive assessment of the safety of the regions of the Ural Federal District and Russia.

The results of the work will enable regional authorities to effectively monitor the current state of regional development and economic security in the region, highlight the most significant indicators that require special attention, and predict economic security in various areas in the medium term. This will enable planning activities aimed at improving competitiveness and enhancing socio-economic situation in the region as a whole. This method of assessment of the level of economic security can serve as a starting point for the formation and justification of the Regional Development Strategy targets or the expected results of regional programmes, as well as in the development of scenarios for the socio-economic development of the region.

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