Indicators of economic security of the region: a risk-based approach to assessing and rating

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Abstract. The article presents the results of research of theoretical and methodical problems of strategy development for economic security of a particular region, justified by the composition of risk factors. The analysis of those risk factors is performed. The threshold values of indicators of economic security of regions were determined using the methods of socio-economic statistics. The authors concluded that in modern Russian conditions it is necessary to pay great attention to the analysis of the composition and level of indicators of economic security of the region and, based on the materials of this analysis, to formulate more accurate decisions concerning the strategy of socio-economic development.

1. Introduction

Currently, the problem of economic security of a state, region, a separate business entity is more and more actively included in the scope of scientific, governmental and managerial activities, being a by-product of globalization and a significant increase in economic and other types of threats. New crisis stage of development of the Russian economy (2014 – 2015) found the failure of many of the mechanisms and means of protection, showing vulnerabilities in the economic security of the state in General and the economic strength of individual regions in particular. Particularly painful negative geopolitical and economic factors have hit on subsidized Russian regions, including Kirov region.

It is obvious that the effectiveness of the system of economic security of the region, including the effectiveness of the implementation of the concept of regional economic security are directly dependent on the adequacy of the assessment of the current level of protection, and the level of deviations of the values of individual indicators to their threshold values. Today in Russian Federation there is no uniform method of estimating the level of regional economic security, implemented only a few attempts to create such methods on the level of separate subjects of the Russian Federation (for example, the method of V. K. Senchagov, Nizhny Novgorod region).

Therefore, the determination of the list of safety criteria and the calculation of their thresholds is a key step in the creation of indicators or guidelines for the development of the region. The presence of such indicators should be an effective tool to ensure sustainable development of the region, to highlight innovative approaches for managing and, eventually, to attract the attention of potential investors, as is logical, the desire to invest in the region, aware of the need for protection from external threats.
2. Methods
Under the economic security should be understood as "that condition of the region in order to ensure its security and sustainable development in conditions of constant exposure to internal and external threats, ensuring their financial, material, energy and population independence, and the level of competitiveness" [1].

Note that currently the dominant approach to the assessment of threats to economic security of the region as a particular case is the security of the state. In our opinion, this is because it is difficult to simulate the situation of "isolation" of a given region and to separate the threats, the probability of which is maximum. It should be understood that the regions differ considerably among themselves, but because the set of threats is different [2-3].

The foregoing can be illustrated by the example of the new Russian region – Crimea Peninsula. The separation of the region from Ukraine has resulted in the implementation of economic insecurity on three components: financial, commodity and energy independence. The region was cut first from Central funding, which primarily hit the most vulnerable layers of the population – pensioners, the disabled and other categories in need of regular financial assistance from the then water and power. Thus, the level of development of the region is not an indicator of its security. GDP per capita, economic growth and other indicators by themselves do not guarantee safety, as their level and dynamics are often caused by external to the region factors. It follows that the key components of the economic security of the region are its independence and sustainability, i.e. the ability of the region to support the level and pace of its development in conditions of isolation from the centre.

3. Results
The system of criteria or indicators to assess the level of economic security can be defined as follows (table 1).

Table 1. System of criteria (indicators) to assess the level of economic security of the region (author's development)

| Group threats | Threats | Criteria (indicators) |
|---------------|---------|-----------------------|
| 1. Threats to the security of the economic system of the region | 1.1. Inflation | Inflation (CPI), % |
|               | 1.2. Failure to fulfill financial obligations (rising budget deficit) | Surplus (deficit) of consolidated budget per capita, RUB. |
|               | 1.3. The increase in debt on taxes and duties | Arrears of taxes per capita, RUB. |
|               | 1.4. The growth of poverty | The level of poverty, % |
|               | 1.5. The increase in the unemployment rate | Unemployment rate, % |
|               | 1.6. The deterioration of the ecological situation | Education of production wastes and consumption per capita, tons |
| 2. Threats to regional competitiveness | 2.1. The decrease in labor productivity | The index of labor productivity, % |
|               | 2.2. An increase in the degree of depreciation of fixed assets | The level of depreciation of fixed assets, % |
|               | 2.3. The lack of own investment | Share of private investment, % |
|               | 2.4. The failure of companies in the region | The share of unprofitable enterprises, % |
|               | 2.5. The predominance of extensive way of economic development | Gains in the number of high-performance workplaces |
|               | 2.6. The decline in industrial production | The index of industrial production (IIP), % |
| 3. Threats of sustainable development of the region | 3.1. The increased dependence on imported food | The volume of food imports per capita, USD |
|               | 3.2. The reduction in agricultural production | The volume of agricultural production per capita, RUB. |
3.3. The increase in the volatility of the region
3.4. The curtailment of building
3.5. Migration population decline
3.6. The growth of economic crime

4. Threats to the economic independence of the region
4.1. Growth dependence on external financing (strengthening of subsidization of the region)
4.2. The high dependence of GRP from GDP
4.3. The increasing demographic burden
4.4. The reduction of the labor potential of the region
4.5. Reduction srednedushevyh incomes
4.6. Growth of the population’s debt on loans

The production of electricity and water per capita, thousand RUB.
Commissioning of buildings per capita, sq. m.
Migration increase, people.
The number of crimes in the sphere of the economy per 1,000 inhabitants
The share of gratuitous receipts in total sources budget, %
The GRP change per 1% change of GDP, %
Demographic load factor
Share of labor force in total population,%
The ratio of per capita incomes with the subsistence level
Growth of debts on loans

Analysis of risk factors was the basis for the calculation of threshold values of indicators. The analysis was conducted in all regions of the Russian Federation in the context of districts. As sources of information was the official data of the Federal state statistics service, Federal customs service, as well as data of the Unified information portal "Exporters of Russia". Values of the indicators for the regions were ranked, were made discrete series of the distribution, determined by the frequency. Next, for each indicator were calculated the average value, variance, and standard deviation. On the basis of the obtained values was calculated thresholds, subject to the confirmation of the hypothesis about normal distribution of values was used the method of three Sigma, otherwise the threshold was calculated by adjusting the average value for the standard deviation.

The results of the calculations are presented in table 2.

Table 2. Threshold values of economic security indicators in the region

| The name of the indicator | Threshold the value |
|--------------------------|---------------------|
| Indicators of security of the economic system | |
| 1 - inflation (CPI), % | 108.6 |
| IZ2 - Surplus (deficit) of the consolidated budget per capita, RUB. | 10 335 |
| 2 Surplus (deficit) of consolidated budget per capita, RUB. | 2 200 |
| 4 - the Level of poverty, % | 8.9 |
| 5 - unemployment rate, % | 2.7 |
| 6 - Formation of production wastes and consumption per capita, tons | 42.0 |
| Indicators of regional competitiveness | |
| IR 1 Index of productivity | 102 |
| IK 2 Level of depreciation of fixed assets, % | 37 |
| IR 3 Share of own investment, % | 28 |
| IR 4 Share of unprofitable enterprises, % | 25 |
| IR 5 Gains in the number of high-performance workplaces, % | 2 |
| IR 6 Industrial production Index, % | 102 |
| Indicators of sustainable development of the region | |
| Yiwu 1 the Volume of food imports per capita, USD | 120 |
| PS 2 - the Volume of agricultural production per capita, thousand RUB. | 15 |
| Yiwu 3. Production of energy, gas and water per capita, thousand RUB. | 10 |
| The PS 4 - the Commissioning of housing per capita, sq. m. | 0.3 |
Summary table of indicators of economic security system of the Federal districts (table 3).

| Federal district                  | Indicators of security | The amount |
|-----------------------------------|------------------------|------------|
|                                   | IS1            | IS2          | IS3          | IS4          | IS5          | IS6          |
| The threshold value               | 108.6          | -10335       | 2200         | 8.9          | 2.7          | 42           |
| Central Federal district          | 113.70         | 2486.94      | 8947.96      | 6.77         | 3.40         | 6.57         | 2.3          |
| The North-Western Federal district| 113.10         | -1157.66     | 5124.52      | 7.94         | 4.50         | 30.99        | 2.45         |
| Southern Federal district         | 112.60         | -3196.34     | 4760.58      | 12.32        | 6.40         | 1.70         | 2.1          |
| The North-Caucasian Federal district | 114.70     | -2277.81     | 4501.49      | 13.17        | 10.60        | 0.19         | 2.05         |
| Volga Federal district            | 111.60         | -2839.67     | 3253.79      | 11.62        | 4.50         | 5.29         | 2.1          |
| Urals Federal district            | 113.00         | -552.12      | 5736.32      | 10.97        | 6.00         | 20.92        | 2.25         |
| Siberian Federal district         | 111.60         | -4065.19     | 4750.66      | 16.34        | 7.00         | 186.76       | 1.7          |
The formula to calculate the totals:
\[ IS = 0.2 \times IS_1 + 0.15 \times IS_2 + 0.15 \times IS_3 + 0.2 \times IS_4 + 0.2 \times IS_5 + 0.1 \times IS_6. \]

Thus, the highest rating score across the security level of the economic system received the North-Western Federal district, the second place is the Central district; the least protected is recognized as the economic system of the Siberian Federal district.

Summary table of indicators of competitiveness according to the Federal districts is presented in table 4.

**Table 4** – Summary table of indicators of competitiveness according to the Federal districts

| Federal district                | Indicators of security | IS1 | IS 2 | IS 3 | IS 4 | IS 5 | IS 6 | Σ   |
|--------------------------------|------------------------|-----|------|------|------|------|------|-----|
| The threshold value            |                        | 102 | 37   | 28   | 25   | 2    | 102  |     |
| Central Federal district       | The value              | 102.75 | 41.10 | 47.60 | 28.70 | 2.80 | 97.20 | 1.64 |
|                               | The norm               |     | High | Low | The norm | High | Low |     |
|                               | Score                  | 2   | 2    | 1   | 2    | 2    | 1    |     |
| The North-Western Federal     | The value              | 102.44 | 40.60 | 49.60 | 31.00 | 11.0 | 96.00 | 1.78 |
|                               | The norm               |     | High | Low | The norm | High | Low |     |
|                               | Score                  | 2   | 2    | 1   | 2    | 3    | 1    |     |
| Southern Federal district      | The value              | 103.47 | 40.00 | 35.60 | 29.60 | 5.50 | 109.50 | 2.14 |
|                               | The norm               |     | High | Low | The norm | High | Low |     |
|                               | Score                  | 2   | 2    | 2   | 2    | 3    | 2    |     |
| The North Caucasian Federal   | The value              | 103.06 | 47.30 | 39.00 | 29.50 | 7.50 | 102.30 | 2.14 |
|                               | The norm               |     | High | Low | The norm | High | Low |     |
|                               | Score                  | 2   | 2    | 2   | 3    | 2    |     |     |
| Volga Federal district         | The value              | 103.45 | 53.30 | 59.10 | 28.90 | 4.60 | 96.40 | 1.78 |
|                               | The norm               |     | High | Low | The norm | High | Low |     |
|                               | Score                  | 2   | 2    | 1   | 2    | 3    | 1    |     |
The presented results can be considered as a methodology, characterized by considerable complexity, as part of the indicators is calculated in nature and is not an indicator of state statistics. Threshold values are not final and characterize the level of economic security of the region relative to other regions of the Russian Federation without regard to the General condition of the economic system of the state. Despite this, the proposed method, as well as threshold values of indicators can be successfully used in the assessment of regional security of the concrete subject of the Russian Federation and acceptance of administrative decisions at the level as at the level of the entity, and Federal level.

4. Discussion
The level of sustainability is the leader of the Ural Federal district. The region has energy resources of its own, able to provide food for themselves.

The rating on the level of stability of the Central and Siberian Federal districts. In the first case, the main reason is high dependence on imports and high levels of crime; negative in the second migration gain, lack of energy.

In General, the level of sustainable development of regions should be assessed as normal, the average rating number above 2.0.

The level of independence of the development of the highest credit rating score assigned to the Volga Federal district. Crimea was assigned a score of 1.0, however, to assess the independence of the newly created region based on results of the first year, is not quite correct. Therefore, the lowest ranking score will be considered has the Siberian Federal district, which, according to our estimates, the most affected from the center.

Were also calculated the total point rating for each Federal district, by aggregating the obtained assessments for the four examined groups of indicators. The results of the rating of Federal districts according to the level of economic security.

5. Conclusions
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