

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.

4. Threats to the economic independence of the region	3.3. The increase in the volatility of the region	The production of electricity and water per capita, thousand RUB.
	3.4. The curtailment of building	Commissioning of buildings per capita, sq. m.
	3.5. Migration population decline	Migration increase, people.
	3.6. The growth of economic crime	The number of crimes in the sphere of the economy per 1,000 inhabitants
	4.1. Growth dependence on external financing (strengthening of subsidization of the region)	The share of gratuitous receipts in total sources budget, %
	4.2. The high dependence of GRP from GDP	The GRP change per 1% change of GDP, %
	4.3. The increasing demographic burden	Demographic load factor
	4.4. The reduction of the labor potential of the region	Share of labor force in total population, %
	4.5. Reduction srednedushevyh incomes	The ratio of per capita incomes with the subsistence level
	4.6. Growth of the population's debt on loans	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 e/energy, gas and water per capita, thousand RUB.	10
The PS 4 - the Commissioning of housing per capita, sq. m.	0.3

PS 5 - net Migration, persons	0
Yiwu 6 - the Number of crimes in the sphere of the economy per 1,000 inhabitants	0.5
Indicators of economic independence development of the region	
JOHN 1 - the Share of gratuitous receipts in the total sources budget %	30
IN 2 - GRP Change per 1% change of GDP, %	1.0
IN a 3 - age dependency Ratio	700
JOHN 4 - the proportion of the labour force in total population, %	50
JOHN 5 - the Ratio of per capita incomes with the subsistence level	2.0
JOHN 5 - the Ratio of per capita incomes with the subsistence level	70 000

Summary table of indicators of economic security system of the Federal districts (table 3).

Table 3. Summary table of the security metrics of the economic system of regions according to the Federal districts

Federal district		Indicators of security						The amount
		IS1	IS 2	IS 3	IS 4	IS 5	IS 6	
The threshold value		108.6	-10335	2200	8.9	2.7	42	
Central Federal district	The value	113.70	2486.94	8947.96	6.77	3.40	6.57	
	Rating	The norm	High	Low	The norm	High	Low	2.3
	Score	2	3	1	3	2	3	
The North-Western Federal district	The value	113.10	-1157.66	5124.52	7.94	4.50	30.99	
	Rating	The norm	High	Low	The norm	High	Low	2.45
	Score	2	3	2	3	2	3	
Southern Federal district	The value	112.60	-3196.34	4760.58	12.32	6.40	1.70	
	Rating	The norm	High	Low	The norm	High	Low	2.1
	Score	2	2	2	2	2	3	
The North Caucasian Federal district	The value	114.70	-2277.81	4501.49	13.17	10.60	0.19	
	Rating	The norm	High	Low	The norm	High	Low	2.05
	Score	2	3	2	2	1	3	
Volga Federal district	The value	111.60	-2839.67	3253.79	11.62	4.50	5.29	
	Rating	The norm	High	Low	The norm	High	Low	2.1
	Score	2	2	2	2	2	3	
Urals Federal district	The value	113.00	-552.12	5736.32	10.97	6.00	20.92	
	Rating	The norm	High	Low	The norm	High	Low	2.25
	Score	2	3	2	2	2	3	
Siberian Federal district	The value	111.60	-4065.19	4750.66	16.34	7.00	186.76	1.7

	Rating	The norm	High	Low	The norm	High	Low	
	Score	2	2	2	1	2	1	
	The value	112.00	-2303.48	6216.25	14.45	5.40	70.14	
The far Eastern Federal district	Rating	The norm	High	Low	The norm	High	Low	1.95
	Score	2	3	2	1	2	2	
	The value	126.40	-677.46	114.38	X	6.20	0.57	
Crimean Federal district	Rating	The norm	High	Low	The norm	High	Low	1.8
	Score	1	3	3	1	2	1	

The formula to calculate the totals:

$$IS = 0.2 IS 1 + 0.15 IS 2 + 0.15 IS 3 + 0.2 IS 4 + 0.2 IS 5 + 0.1 IS 6.$$

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						Σ
		IS1	IS 2	IS 3	IS 4	IS 5	IS 6	
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	
	Rating	The norm	High	Low	The norm	High	Low	1.64
	Score	2	2	1	2	2	1	
The North-Western Federal district	The value	102.44	40.60	49.60	31.00	11.0	96.00	
	Rating	The norm	High	Low	The norm	High	Low	1.78
	Score	2	2	1	2	3	1	
Southern Federal district	The value	103.47	40.00	35.60	29.60	5.50	109.50	
	Rating	The norm	High	Low	The norm	High	Low	2.14
	Score	2	2	2	2	3	2	
The North Caucasian Federal district	The value	103.06	47.30	39.00	29.50	7.50	102.30	
	Rating	The norm	High	Low	The norm	High	Low	2.14
	Score	2	2	2	2	3	2	
Volga Federal district	The value	103.45	53.30	59.10	28.90	4.60	96.40	
	Rating	The norm	High	Low	The norm	High	Low	1.78
	Score	2	2	1	2	3	1	

Urals Federal district	The value	100.83	60.40	60.40	32.90	2.70	98.20	1.34
	Rating	The norm	High	Low	The norm	High	Low	
	Score	1	1	1	2	2	1	
Siberian Federal district	The value	102.46	41.80	52.00	32.20	2.80	100.20	1.64
	Rating	The norm	The norm	Low	The norm	The norm	Low	
	Score	2	2	1	2	2	1	
The far Eastern Federal district	The value	104.12	35.00	41.90	34.60	5.60	101.00	1.94
	Rating	The norm	High	The norm	Low	High	Low	
	Score	2	3	2	1	3	1	
Crimean Federal district	The value	X	63.30	39.80	38.5	X	112.4	1.56
	Rating	Low	Low	The norm	Low	Low	High	
	Score	1	1	2	1	1	3	

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

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

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