Methods of assessing the impact of the parameters of the consumer market development on the economic security of the region

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Abstract. The article presents a methodology for assessing the influence of parameters of development of the consumer market on the level of economic security in the region. A list of indicators by risk groups and a systematic approach to assessment are presented. The main requirements for indicators are presented. An integrated model of economic security has been developed. The algorithm of the method for assessing the influence of the parameters of the consumer market development on the economic security of the region is presented. The model was tested on the data of the Kirov region and showed its effectiveness. It can be used to assess the economic security of the region and the Federal District.

1. Introduction
The most urgent problem for the development of the Russian economy is the economic security of the region, which determines the integrity and sustainability of the functioning and development of the regional system. The socio-economic system of any region is aimed at ensuring the quality of life of the population, and therefore, to meet the needs of the inhabitants of the region through the economic security of the consumer market and its condition. Consumption of residents reflects the standard of living, increase or decrease in incomes of the population. [2]

It is necessary to note the full reflection in the consumer market of all the problems of the economic security of the region. Therefore, it seems relevant and possible to assess the level of economic security in the region through the prism of the development of the consumer market in the region and its reverse impact on the region's economy.

The requirements of a systematic approach to the implementation of the economic security of a region are the need for such characteristics as activity, dynamism, complexity, universality, purposefulness, concreteness and reliability.

2. Methods and materials
The main research methods are indicative analysis, scenario analysis, graph theory, simulation modeling. Used methods of system analysis, probability theory and mathematical statistics. [4]

The information base of the study was compiled by data from the Federal State Statistics Service, the Ministry of Health and Social Development, the Ministry of Internal Affairs, empirical material contained in monographs and periodicals, on the Internet pages, and the author’s own research.
The development of a theoretical and methodological approach and the development of methodological tools for diagnosing the state of the consumer market, aimed at improving the economic security of the region.

The problems of analyzing the risks of the consumer market taking into account the factors of the quality of life of the population were considered earlier by the authors in a complex of works based on the results of studies of the systems for ensuring the economic and food security of the regions [7, 8, 9].

3. Results
The main requirements for the system of indicators of economic security of regional socio-economic systems, taking into account the peculiarities of the regions, serving as the basis for building a system of indicators for assessing the sustainability of regional systems, are the following:
- indicators should be mutually exclusive;
- when selecting indicators, a systematic approach is required, taking into account the interaction of subsystems;
- the number of indicators should be sufficient, however, as far as possible, limited;
- data collection should not be associated with the need to organize complex, expensive and time-consuming work;
- all indicators must have a transparent nature;
- indicators should be complementary.

Currently, one of the important problems of regional development is the problem of the formation and effective development of the consumer market in the region. The acceleration of the pace of economic development, both in individual regions and in the national economy as a whole, is largely due to the state of the consumer market. Based on this, the rapid variability of supply and demand, the difficulty of accurately determining, accounting, measuring and forecasting the consumer market determined the dependence of the domestic market of commodity resources on foreign producers and retailers. This requires an integrated approach to solving the problem of production and consumption, based on the study of supply and demand, identifying the socio-economic factors that determine the patterns of their development. Therefore, the consumer market is one of the most important socio-economic subsystems of society, the main purpose of which is to maintain a balance between production and consumption, demand and product supply and satisfaction on this basis of the material, spiritual and social needs of the population. It is interconnected with production, trade, labor activity of the person, and also with monetary, financial and credit and banking systems. Thus, the development of the consumer market through its own production, as well as the formation of effective interregional relations will contribute to the achievement of the economic security of the region. Diagnostics of the consumer market development is a process of research that determines the nature and essence of the phenomenon in the context of various signs and indicators [3].

The consumer market is, on the one hand, one of the sectors of a market economy that interacts with other sectors according to the rules established by the state, on the other hand, it is an autonomous system in which relations between participants are interconnected and regulated, first of all, by state legal acts. Such a system cannot function and develop on the basis of self-regulation.

The need to study and measure each socio-economic phenomenon involves the identification of certain criteria and indicators. This task is complicated by the multidimensional and multifaceted nature of each socio-economic phenomenon; at present, there is no single criterion basis for studying the economic security of the region and, all the more, sustainability in this context of the consumer market. The existing methods for assessing the sustainability of the consumer market do not take into account such criteria as the degree of market sovereignty (presence of foreign enterprises on the market), the level of market monopolization, the level of availability of the region’s own products in the consumer market of the region, etc.

According to the author, the economic security of the consumer market should be investigated not as a collective characteristic of certain criteria, but as a possible aspect of the economic security of the
region through the development of the necessary indicators of the regional consumer market [10,11].

The selection of indicators of the regional consumer market development level is implemented by identifying the most significant areas of regional activity, taking into account the simultaneity of their mutual consistency, the assessment period and the accuracy of indicators, which is difficult at the moment and requires some compromise solutions, but their uniformity is necessary in the assessment of indicators.

In the process of analyzing the scientific literature and the works of various authors, it was revealed that there is no specific set of factors and indicators indicating the impact on regional economic security and consumer market security, which determines the approach to the selection of these criteria based on the social and economic development of the region [2].

In connection with the above, the definition of basic indicators is being updated as a characteristic of the level of development of the regional consumer market as an indicator of the economic security of the region.

The proposed indicative method of analysis implements an assessment of the socio-economic security of the region using indicative indicators of the development of the consumer market.

In this case, the region should be considered as a multi-block system of interrelated elements: economy, society, ecology, technology, and institutions of power. The economic security of the regional system as a whole depends on the level of development of each of the blocks. In this case, the basic principles of research and the subsequent management of the economic security of the region should be the principles of consistency, comprehensiveness and integration [6].

The principle of consistency lies in the study of the region as a set of system elements. The relationship of the constituent elements of the region as a system is presented in Figure 1.

![Figure 1. The Relationship of the elements of economic security of the region as a system.](image)

The principle of complexity is the need to take into account external and internal factors affecting the economic security of the region.

The violation of the development of one unit of the system leads to an imbalance in the process of functioning of the entire region. Each component has its own control mechanism. Their integration is important, which will allow to take into account the peculiarities and points of development of the region, to work out an optimal development strategy [5].

As indicators, indicators are proposed that reflect various aspects of the region’s economic security, taking into account indicators of the development of the region’s consumer market (Table 1).

**Table 1. Indicators for assessing the economic security of a region on the example of the Kirov region.**

| Block                              | Indicator value                                                                 |
|------------------------------------|----------------------------------------------------------------------------------|
| - economic indicators              | 1. Gross regional product per capita (thousand rubles)                           |
|                                    | 2. The index of physical volume of the gross regional product (in constant prices; as a percentage of the previous year) |
|                                    | 3. Actual final consumption of households per capita (at current market prices; rubles) |
|                                    | 4. Indices of agricultural production (as a percentage of the previous year)       |
5. Index of the physical volume of retail trade (in comparable prices; as a percentage of the previous year)

6. Retail sales per capita (in actual prices; rubles)

7. Dynamics of real incomes of the population (as a percentage of the previous year)

8. Average per capita income of the population (per month; rubles)

9. The number of people with cash incomes below the subsistence minimum (as a percentage of the total population of the subject)

10. Consumer spending on average per capita (per month; rubles)

11. The share of food products in the structure of monetary incomes of the population (as a percentage of total monetary incomes)

12. The turn of public catering (in actual prices), mln. Rub.

13. Index of the physical volume of catering turnover, as a percentage of the previous year.

14. Volume of paid services to the population (in actual prices), mln. Rub.

15. Index of the physical volume of paid services to the population, as a percentage of the previous year.

16. Share of retail networks with participation of Russian and regional capital,%

17. Investments in fixed capital per capita (in actual prices; rubles)

18. Consumer price indices (percent)

19. The cost of a fixed set of consumer goods and services (at the end of the year)

- social indicators

20. Change in population (annual growth; in percent)

21. Total fertility rate (number of births per 1000 population)

22. Total mortality rate (number of deaths per 1000 population)

23. Changes in the average annual number of employees (as a percentage of the previous year)

24. Unemployment Rate (Percentage)

25. Consumption of meat and meat products

26. Milk and dairy products consumption

27. Consumption of eggs, pcs.

28. Sugar consumption, kg

29. Potato consumption

30. Consumption of vegetables and food melons

31. Consumption of vegetable oil

32. Consumption of bread products

- environmental indicators

33. Emissions of pollutants into the air from stationary sources (thousand tons)

34. Use of fresh water (millions of cubic meters)

35. Discharge of polluted wastewater into surface water bodies (million cubic meters)

- technological indicators

36. Index productivity index

37. The share of high-tech and knowledge-intensive industries

38. The degree of depreciation of fixed assets at the end of the year, in percent

39. Innovative activity of organizations (the percentage of organizations that carried out technological, organizational, marketing innovations in the total number of organizations surveyed, in percent)

40. Volume of innovative products, works, services
41. Organizations that carry out innovations that ensure the improvement of environmental safety in the production of goods, works, services (as a percentage of the total number of organizations that carry out environmental innovations)

- institutional indicators

42. Number of recorded crimes per 100,000 population

43. Revenues of the consolidated budget of the entity, mln. Rub.

44. Expenditures of the consolidated budget of the entity, mln. Rub.

The analysis of the economic security of the region used both direct and reverse indicators.

The value of indicators is determined based on data from the Federal State Statistics Service. Each indicator will be given in the same for calculating the type of coefficient. In order to determine the level of economic security, the cost parameters will be reduced to growth rates. Where indicators of the level of consumption of the main food groups were used, in order to obtain a coefficient, we associate each indicator with the consumption rate. Percentages bring to the form of the coefficient.

The remaining indicators initially had the form of a coefficient [5].

At the same time, to determine the limit value of indicators (LVI) of economic security using the statistical functions of MS Excel, the median value was calculated for each of the indicators over a five year period corresponding to the upper value of the Jagler industrial cycle duration.

The next step is to determine the individual impact factors (IIFi) for each of the indicators of economic security (Ii), which represent the deviation of the indicator from its limit value (LVIi).

For direct indicators of the impact on economic security, the formula $IIF_i = I_i - LVI_i$.

For reverse indicators of the impact on economic security formula $IIF_i = LVI_i - I_i$.

Moreover, if $IIF_i > 0$, therefore, an increase in the indicator has a positive effect on economic security.

If $IIF_i < 0$, therefore, a decrease in the indicator has a negative impact on regional social security [4].

Based on the individual impact factors of the proposed system of indicators, we calculate the integral estimated coefficients of economic security indicators for each block using the formula:

$$I_{ek \ block} = \sqrt{\frac{\sum IIF_i / \sum \text{periods}}{2}}$$

where $I_{ek \ block}$ is the integral estimated coefficient of the sum of indicators in the block.

Thus, the level of economic security of the Kirov region is as the arithmetic mean of the normalized integral estimated coefficients. It is proposed to use the following scale, demonstrating the level of economic security.

| Economic Security Indicator | Interpretation of indicators |
|-----------------------------|-----------------------------|
| $0.2 < LES < 0.5$           | Critical level of economic security |
| $0.5 < LES < 0.7$           | Crisis level of economic security |
| $0.7 < LES < 0.9$           | Pre-crisis level of economic security |
| $0.9 < LES < 1$             | Safe level of economic security |

The choice of these intervals due to the percentage effect of the normalized integral coefficients.

4. Discussion

For a safe level, only one indicator out of eleven or about 4 indicators out of 44, that is, 8.3% of the total number of indicators, has a significant negative impact. Its value during normalization is reset. In addition, the positive effect of 91.7% of the remaining indicators of economic security virtually eliminates the negative impact of the discarded indicator.

For the pre-crisis level, dropping up to 25% of indicators is typical, that is, from 70% to 90% of the studied coefficients have a positive effect. This level corresponds to the situation of the potential possibility of a crisis, in accordance with which, with some external influence, there is the possibility
of further movement of the region either along a trajectory leading to an uncontrollable position, eliminating the socio-economic structure and leading to an unstable position, or transforming the socio-economic structure with further upward movement of economic security. In this case, the determining forces for choosing a trajectory are institutional-political forces with a broad socio-economic base and the necessary political will.

For the crisis level is characterized by zeroing 50% of the indicators. This level corresponds to the concept of degradation of the socio-economic structure, which flows in two opposite directions. The first direction involves the leveling of the socio-economic structure, the pre-revolutionary nature of the events, entrepreneurial incentives and initiatives in the economy. The second direction causes the gradual formation of a new socio-economic structure, potentially disrupting the normal processes of the socio-economic movement.

The critical level is characterized by a positive impact of only 25% of the indicators. The concept of polarization of the socio-economic structure corresponds to this level. This structure has a negative tendency towards increasing polarization and high potential for growth of social and economic tensions. In addition to these socio-economic consequences, leveling the middle class as a source of effective demand has a significant inhibitory effect on the development of the domestic consumer market. The market, in turn, is symmetrically polarized on the market of elite imported goods, and the market of low-grade goods, satisfied by virtue of its cheapness, mainly imported goods from the third world countries of China. The predominance of imported products leads to stagnation of the economy, leading to an investment crisis, a decline in domestic production, a reduction in jobs and a decrease in incomes of the bulk of the population, predetermining the self-replicating nature of the process as marginalization develops.

5. Conclusions
The calculated level of regional economic security of the Kirov region corresponds to the crisis level of sustainability, the main trends of which are currently:

- a decrease in the growth rate of the GRP, the level of production and indicators of the consumer market;
- population decline and excess of death rate over birth rate, non-compliance with the norms of consumption of basic foodstuffs;
- there is a decrease in the rate of emissions of pollutants, but the consumption of clean water is unstable;
- there is an increase in technological indicators, but labor productivity is decreasing;
- institutional indicators are also unsustainable for 11 years.

A study of economic security, taking into account indicators of the consumer market, made it possible to draw up an action algorithm for determining a single integrated indicator and its interpretation (Figure 2).
In accordance with this algorithm, the level of economic security of the Kirov region was determined, which by its quantitative characteristic refers to a crisis situation. This technique can be used for another region and federal district.

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