Comparative Analysis of the Economic Security of the Regions and the Methodology of Its Implementation

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Abstract The research aims at developing a methodological approach to conducting a comparative analysis of the economic security of the Russian regions in terms of the COVID-19 pandemic. The authors substantiate the scientific hypothesis that during a pandemic it is necessary to take into account all groups of indicators, including relative indicators characterizing the sanitary and epidemiological component of regional economic security, which will contribute to increasing the reliability of the results of a comparative analysis of the economic security of regions. In the article, the authors systematize the existing methodological approaches to conducting a comparative analysis of the economic security of regions and also identify their disadvantages. The authors develop their methodology for conducting a comparative analysis of the economic security of regions, adapted to the period of the COVID-19 pandemic. The use of a wide range of research tools (methods of mathematical analysis, comparison, grouping, expert evaluation method) allowed the authors to substantiate the practical significance of the proposed methodology, as well as to evaluate and compare the economic security of several regions of Russia (Rostov, Belgorod Regions and Krasnodar Territory).

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1 Introduction

The relevance of the study is determined by the negative processes taking place in the economy of the regions of the Russian Federation caused by the spread of COVID-19 and other reasons that significantly reduce the economic security of the country's territories [12, 17, 19]. In order to know how effectively federal and regional authorities work, it is necessary not only to evaluate but also to conduct a comparative analysis of the economic security of the regions.

Traditionally, when conducting a comparative analysis of the economic security of regions, researchers select and compare indicators that characterize its key components [11, 27, 32]. Before the spread of the COVID-19 coronavirus infection, there was no need to pay attention to the indicators of sanitary and epidemiological safety of the regions. However, the negative effects of the pandemic on the economy are becoming increasingly important. They increasingly threaten the well-being of regions. Therefore, it is becoming increasingly relevant to conduct a reliable comparative analysis of the economic security of the regions of the Russian Federation, taking into account sanitary and epidemiological indicators.

Therefore, the development of methodological approaches to the comparative analysis of the economic security of the regions of the Russian Federation in terms of the COVID-19 epidemic is currently of particular relevance.

2 The Theoretical Basis of the Study

The methodology of analyzing the economic security of regions is of interest to Russian authors [1, 2, 5, 6, 20, 21, 30] etc. Abroad, the research topic is presented in the works of [8, 9, 31] etc.

Raevneva et al. [23] noted that the economic security of each country directly depends on the level and state of economic security of the regions. Their socioeconomic and natural resource potential should be interconnected and balanced to ensure sustainable economic development and maintain their competitiveness both at the national and international levels. Regional security is a set of economic, environmental, legal, geopolitical and other conditions that should ensure the security of state interests, regional development, financial stability, infrastructure and business development, as well as affecting the development of internal and external security [15]. Hacker [8] interprets the economic security of the region as a vulnerability to economic losses, its consequence may be a decrease in income. Heinz [9] emphasizes

that the economic security of the region is an important aspect of national security. Korableva et al. [13] agree with the opinion of Heinz. According to [31], "economic security presupposes the existence of a socially defined subsistence minimum of real income for all people, as well as a constructive policy that supports macroeconomic stability and conditions for individual and social development. Ensuring economic security is perhaps the most difficult problem faced by modern industrial culture."

According to [4], the economic security of the region is realized through a change in the state of its economic system, reflecting its ability to withstand internal and external threats, to realize economic interests and effectively use the competitive advantages of the region. Povzun [22] calls these risks and threats to the economic security of the region, including low profitability of business entities; low level of internal and external investments; insufficient introduction of innovations; reduction of the financial potential of the region.

Despite the extensive number of works devoted to the assessment of the economic security of regions and methods of its comparative analysis, they all have a common drawback—focusing mainly on indicators of financial and socio-demographic security of regions. However, during the spread of COVID-19, this is not enough for a reliable assessment and comparison of the comprehensive level of economic security of the regions.

3 Methodology

The scientific hypothesis of the study is based on the assumption that during the pandemic, the emphasis on all groups of indicators, including indicators characterizing the sanitary and epidemiological component of the economic security of the region, will contribute to increasing the reliability of the results of a comparative analysis of the economic security of the regions.

The purpose of the study is to develop a methodological approach to conducting a comparative analysis of the economic security of the regions of the Russian Federation during the COVID-19 pandemic.

Research objectives:

1. Disclosure of the concept of "economic security," as well as the study of existing methodological approaches to conducting a comparative analysis of the economic security of regions;
2. Development of the author's approach to conducting a comparative analysis of the economic security of regions during the pandemic;
3. Substantiation of the practical significance of the proposed methodology for conducting a comparative analysis of the economic security of regions during the COVID-19 period.

4 Results

According to [21], the economic security of the region has a multi-level structure. Therefore, the assessment of the economic security of the regions cannot have a single methodological basis [1].

In [7] opinion, the economic security of a country can be measured by the degree of fluctuations in the gross domestic product (GRP) depending on external changes, and the economic security of a region, respectively, by the degree of fluctuations in the gross regional product. Most often, researchers use GRP to compare the levels of economic security of regions. However, this indicator is not the only one. For example, [2] for these purposes uses the index of the physical volume of the gross regional product, the index of labor productivity, the ratio of the trade balance to foreign trade turnover, the share of innovative goods, works, services in the total volume of exports of goods, works, services, etc. Gordienko [6] uses indicators of the gross grain harvest, the share of mechanical engineering and metalworking in industrial production. Kurepina [16] adds the region's competition index to these indicators. Shestiperova [26] points out the need to evaluate other comprehensive performance indicators. Tokhirov [29] emphasizes the need for a more in-depth comparison of indicators reflecting the state of specific systems in the region (including transport).

A graphical method can be used to conduct a comparative analysis. For example, [20] chose petal distribution diagrams to represent indicators of economic security of regions. Some authors use rating assessment and methods of applied mathematics, in particular, [30].

Karanina and Kartavyh [10] conducted a comparative analysis of existing methods for determining the economic security of the region. They believe that when assessing the economic security of a region, several criteria should be compared: the magnitude of regional risk (a method that should be used to process the probability of negative events that will change the prospects for the profitability of investments, a loss or, at least, a decrease in the expected profitability of investments in the region; objects of economic security (negative risk events and threats to economic security); the result of the loss of economic security (decrease in investment attractiveness and economic growth rates of the regional economy). However, the method of processing the probability of negative events has not been widely used in assessing the economic security of the region, in the guise of the indicator method. Indicators are usually identified as indicators that characterize financial, technical and technological, socio-demographic and other important components. But during the COVID-19 pandemic, it is important to take into account the indicators of sanitary and epidemiological safety of the regions. Therefore, the methodology of comparative analysis of the economic security of regions should be based on a systematic approach ([5], in particular, speaks about its importance) and an integral method (with an emphasis on all groups of indicators, including indicators of the sanitary and epidemiological component of the regional economic security). The importance of this aspect

is demonstrated by statistics. In 2020, 144,691 people died in the Russian Federation from COVID-19 coronavirus infection, according to the Federal State Statistics Service. This is 6.77% of all deaths in the country [28].

Conducting a comparative analysis requires the selection of three regions included in the top 15 regions with a high socioeconomic status (Krasnodar Territory—10th place, Rostov Region—14th, and Belgorod Region—15th place) [24]. This makes it possible to demonstrate the advantages of the proposed methodology and compare any regions, including those relatively close in terms of economic security (that is, without the obvious superiority of one of the regions).

By the end of 2020, the most deaths from COVID-19 were in the Rostov Region (2076 people), and the least in the Belgorod Region (258 people). In the Krasnodar Territory, the number of deaths reached 932 people [18]. However, to select more accurate indicators of the state of the sanitary and epidemiological component of the economic security of the regions, we will calculate not absolute, but relative indicators per 10,000 people of the population, as well as expressed as a percentage. According to the Federal State Statistics Service and the MediaZone website, the number of recovered per 10,000 cases in the Rostov Region is 8152 people, in the Krasnodar Territory—6732 people, in the Belgorod Region—8545 people. Percentage of the population with natural immunity against COVID-19 (ratio of recovered people to the population (excluding vaccinated)) in the Rostov region is equal to 1.01%, in the Krasnodar region—0.33%, in the Belgorod region—1.21% [3, 14, 25].

For the other components of the economic security of the region, it is proposed to use standard indicators. Indicators of each component of the economic security of the regions will undergo a normalization procedure by dividing the indicator by a reference value (among the three regions—a higher value). The significance of each indicator will be determined by the expert survey method. Such a sequence of actions will make it possible to calculate the integral level of economic security of each component, as well as the complex integral level of economic security of the three regions. This is important for the clarity of comparing the results and forming conclusions.

Let's consider the effect of this technique on the example of the Rostov, Belgorod Regions and Krasnodar Territory. We will calculate the normalized indicators of economic security of the Rostov, Belgorod Regions and Krasnodar Territory, and also determine the weight of each normalized indicator using the expert survey method (Table 1).

The ideal value in the group is a unit, which means that by all indicators of one or another component of economic security, the region is the best. The closer the indicator value is to one, the higher the economic security of the region and vice versa. The ideal value for the complex integral level of economic security of the region is 5 (in terms of the number of components of the economic security of the region).

The comparison of integral indicators of economic security of the Rostov, Belgorod Regions and Krasnodar Territory is illustrated by the data in Fig. 1.

Figure 1 shows that among the three regions in the Krasnodar Territory, economic security is the highest, however, the region is inferior to the Belgorod Region in

Table 1 Actual, reference and normalized indicators of economic security of the Rostov, Krasnodar and Belgorod regions, 2020

Indicator	Rostov region	Krasnodar territory	Belgorod region	The best value among the three regions	Weight of normalized indicator
The financial component of the economic security of the region					
GRP, billion rubles	1558.71	2890	966.7	2890	
Normalized indicator of GRP	0.54	1	0.33		0.4
Consolidated budget revenues, billion rubles	257.2	387.1	133.46	387.1	
Normalized indicator of consolidated budget revenue	0.66	1	0.34		0.3
Foreign trade turnover, billion US dollars	11.3	10.2	4.57	11.3	
Normalized indicator of foreign trade turnover	1	0.9	0.4		0.3
Technical and technological components of the economic security of the region					
Commissioning of the total area of residential buildings, thousand sq. m	2644	5124	1148.6	5124	
Normalized indicator of the commissioning of the total area of residential buildings	0.52	1	0.22		0.2
Investments in fixed assets, billion rubles	323.8	500.3	168.12	500.3	
Normalized indicator of investments in fixed assets	0.65	1	0.34		0.4

(continued)

Table 1 (continued)

Indicator	Rostov region	Krasnodar territory	Belgorod region	The best value among the three regions	Weight of normalized indicator
Index of the physical volume of investments in fixed assets, in % compared to the previous year	106.2	99.7	95.5	106.2	
Normalized indicator of index of the physical volume of investments in fixed assets	1	0.94	0.9		0.4
Socio-demographic component of the economic security of the region					
Real monetary incomes of the population, in %, compared to the previous year	98.4	99.1	98.1	99.1	
Normalized indicator of real monetary incomes of the population	0.99	1	0.99		0.4
Real accrued wages, in % of the previous year	102.1	103.2	104.8	104.8	
Normalized indicator of real accrued wages	0.97	0.98	1		0.4
The real size of the average annual value of the assigned monthly compensation in % compared to the previous year	102.6	100.2	102.3	102.6	
Normalized indicators of the real size of the average annual value of assigned monthly pensions	1	0.98	1		0.2

(continued)

Table 1 (continued)

Indicator	Rostov region	Krasnodar territory	Belgorod region	The best value among the three regions	Weight of normalized indicator
Sanitary and the epidemiological component of the economic security of the region					
Recovered by 10,000 sick people, people	8152	6732	8545	8545	
Normalized indicators of the recovered per 10,000 cases	0.95	0.79	1		0.5
Percentage of the population with natural immunity to COVID-19 (the ratio of recovered to the number (excluding vaccinated)), %	1.01	0.33	1.21	1.21	
Normalized indicator of the percentage of the population with natural immunity to COVID-19	0.83	0.27	1		0.5
Resource and production component of the economic security of the region					
The industrial production index, in %, compared to the previous year	101.7	97.0	101.4	101.7	
Normalized indicator of the industrial production index	1	0.95	1		0.5
Agricultural products, billion rubles	289.9	399.5	266.01	399.5	
Normalized indicators of agricultural products	0.73	1	0.67		0.5

Source Compiled by authors based on [3, 14, 25]

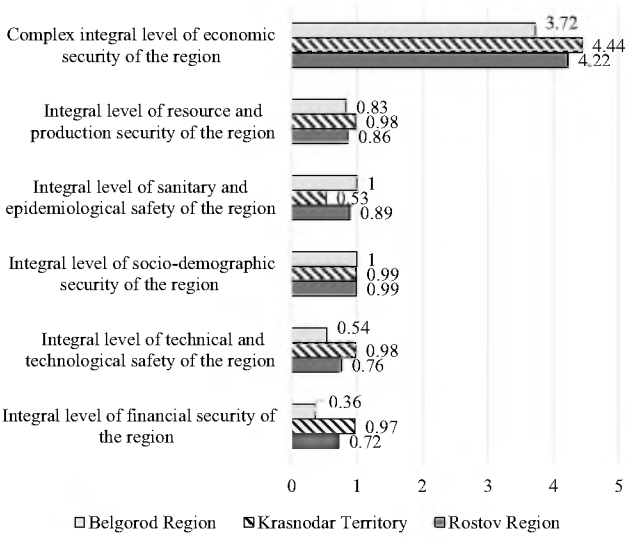

Fig. 1 Comparison of the economic security of the Rostov, Krasnodar and Belgorod regions. *Source* Author's calculations

terms of sanitary epidemiological and socio-demographic security. The region lags behind the Rostov Region in terms of sanitary and epidemiological safety. The authors attribute this to a larger population and the burden on medical personnel when doctors cannot pay patients the same attention as in the Belgorod and Rostov Regions.

5 Conclusions

As a result of solving the first problem, the concept of "economic security" was revealed and the existing methodological approaches to conducting a comparative analysis of the economic security of regions were investigated.

To solve the second problem, the author's approach was proposed to conduct a comparative analysis of the economic security of regions, taking into account a set of relative indicators that are of key importance in a pandemic and reflect the state of the sanitary and epidemiological component of the economic security of the regions. The advantage of the developed methodology is the simplicity of calculations, as well as the availability of information for analysis (all indicators for each region of the Russian Federation are available in statistical collections or are calculated according to statistics on the spread of coronavirus infection published on the MediaZone website and similar ones). In addition, the set of indicators for comparison is not fixed. It can be replaced, taking into account the objectives of the analysis. In future, the proportion of people vaccinated against COVID-19 in the region should be added

to these indicators. However, today there are no such statistics for 2020 (by region), so the indicator was not included in the calculation.

As a result of solving the third task, the practical significance and expediency of using the author's methodology for comparative analysis of the economic security of regions in a pandemic were substantiated. This technique allows you to visually compare the integral levels of each component of the economic security of the region and identify weaknesses. For example, the absolute leader in economic security among the three regions is the Krasnodar Territory, but it is inferior to the Belgorod and Rostov Regions in terms of sanitary and epidemiological security. Thus, the hypothesis of the study is proved. In the conditions of a pandemic, the emphasis on all groups of indicators, including indicators characterizing the sanitary and epidemiological component of the economic security of the region, really contributes to increasing the reliability and practical significance of the results of a comparative analysis of the economic security of the regions.

Data Availability

1. Data on actual, reference and normalized indicators of economic security of the Krasnodar Territory, Rostov and Belgorod Regions, 2020, which confirm the findings of the study, are available in https://figshare.com/ with https://doi.org/10.6084/m9.figshare.16904002
2. Data on the economic security of the Rostov, Belgorod Regions and Krasnodar Territory calculated by the authors, which confirm the findings of the study, are available in https://figshare.com/ with https://doi.org/10.6084/m9.figshare.16904185

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