R-ECONOMY, 2023, 9(1), 19-37

Original Paper

CC I

doi <u>10.15826/recon.2023.9.1.002</u> **UDC** 332.1 **JEL** P25, P51, R11, R13

Differentiated approach to the diagnostics of economic security and resilience of russian regions (case of the volga federal district)

E.V. Karanina 🖂, V.M. Karaulov

Vyatka State University, Kirov, Russia; 🖂 <u>karanina@vyatsu.ru</u>

ABSTRACT

Relevance. Given the volatile global economy, unfriendly policy towards Russia and other external challenges, it is necessary to improve tools for predicting threats and risks to regional economic security and resilience. To this end, individual projections and indicators, as well as complex models should be examined.

Research objective. The study aims to develop a new differentiated approach to diagnostics of indicators (projections) of economic security and resilience at the regional level, which can help visualize and evaluate threats to economic meso-systems.

Data and Methods. Comparative and indicative approaches, ranking, piecewise linear approximation (scaling) and correlation analysis were used in the study.

Results. As a result, the study presents the author's system of indicators of economic security and risks to the regional economy based on a differentiated approach. 36 indicators were grouped into 4 projections – general economic, social, technological and financial – and divided into sub-projections. In order to provide adequate and comparable estimates in the regional and temporal context, various methodological principles were used: application of relative indicators; assessment of cost indicators of regional development using the number of fixed market baskets (FMB) of the region (ratio of the regional cost indicator and the cost of a fixed market basket). Such approach allowed us to evaluate regional economic security in dynamics. The diagnostics of resilience of regional economic systems was performed in the context of individual projections by comparing crisis and relatively stable periods.

Conclusions. The methodology was tested using data from regions of the Volga Federal District. The study revealed specific projections, sub-projections and indicators affected by threats, as well as demonstrated the ability of regions of the Volga Federal District to face the crisis and, in particular, resist sanctions.

KEYWORDS

economic security, threats, indicators, socio-economic system of the region, projections, diagnostics, differentiated approach, resilience, sanction factors

ACKNOWLEDGMENTS

The article has been prepared in the framework of the project "Development and substantiation of the concept, integrated model of resilience diagnostics of risks and threats to the security of regional ecosystems and technology of its application based on a digital twin" (grant of the President of the Russian Federation NSh-5187.2022.2 for state support of leading scientific schools of the Russian Federation).

FOR CITATION

Karanina, E.V., & Karaulov, V.M. (2023). Differentiated approach to the diagnostics of economic security and resilience of russian regions (case of the volga federal district). *R-economy*, 9(1), 19–37. doi: 10.15826/recon.2023.9.1.002

Дифференцированный подход к диагностике экономической безопасности и стрессоустойчивости регионов России (на примере Приволжского федерального округа)

Е.В. Каранина 🖂, В.М. Караулов

Вятский государственный университет, Киров, Россия; 🖂 <u>karanina@vyatsu.ru</u>

АННОТАЦИЯ

Актуальность. Нестабильность ситуации в мировой экономике, недружественные действия ряда стран по отношению к России и другие внешние вызовы ставят задачу совершенствования инструментов диагностики угроз и рисков обеспечения экономической безопасности национальной и региональных экономик с позиции их стрессоустойчивости и стабильности как в разрезе отдельных проекций и индикаторов, так и на основе комплексного моделирования.

Целью исследования послужила разработка нового дифференцированного подхода к диагностике индикаторов в разрезе рекомендуемого комплекса

© E.V. Karanina, V.M. Karaulov, 2023

19 R-ECONOMY

КЛЮЧЕВЫЕ СЛОВА

экономическая безопасность, угрозы, индикаторы, социально-экономическая система региона, проекции, диагностика, дифференцированный подход, стрессоустойчивость, санкционные факторы



проекций экономической безопасности с позиции стрессоустойчивости регионов, позволяющего наглядно представлять и оценивать угрозы экономических систем мезо-уровня.

Данные и методы. В ходе исследования были использованы сравнительный, индикативный подходы, ранжирование, метод кусочно-линейной аппроксимации (масштабирования), корреляционный анализ.

Результаты. В рамках исследования получены результаты, обладающие научной новизной: предложена авторская система индикаторов экономической безопасности и рисков региональной экономики в рамках дифференцированного подхода с позиции группировки по следующим направлениям – проекциям: общие экономические, социальные, производственно-технологические и финансовые с разбивкой на подпроекции (36 индикаторов), при этом для получения адекватных и сопоставимых оценок в региональном и временном разрезе использован ряд методологических принципов: применение относительных показателей; оценка стоимостных показателей развития региона в количестве фиксированных потребительских корзин (ФПК) региона, т.е. в форме отношения стоимостного индикатора региона к стоимости ФПК, что позволило оценить в динамике уровень угроз экономической безопасности регионов с учетом их региональных особенностей. Также уделено внимание диагностике уровня стрессоустойчивости экономики регионов в разрезе отдельных проекций и в целом относительно периода стабильного развития.

Заключение. Диагностика проведена на примере регионов Приволжского федерального округа. Выявлены конкретные проекции, подпроекции и индикаторы, подверженные влиянию угроз в динамике, а также уровень стрессоустойчивости к кризисным, в частности, санкционным факторам, в разрезе регионов ПФО.

БЛАГОДАРНОСТИ

Исследование проведено в рамках проекта «Разработка и обоснование концепции, комплексной модели резилиенс-диагностики рисков и угроз безопасности региональных экосистем и технологии ее применения на основе цифрового двойника» (грант Президента Российской Федерации НШ-5187.2022.2 для государственной поддержки ведущих научных школ Российской Федерации).

ДЛЯ ЦИТИРОВАНИЯ

Karanina, E.V., & Karaulov, V.M. (2023). Differentiated approach to the diagnostics of economic security and resilience of russian regions (case of the volga federal district). R-economy, 9(1), 19–37. doi: 10.15826/ recon.2023.9.1.002

诊断俄罗斯地区经济安全和抗压能力的差异化方法 (以伏尔加联邦管区为例)

卡拉尼娜,卡劳洛夫 俄罗斯维亚卡州立大学,基洛夫市,俄罗斯;邮箱:<u>karanina@vyatsu.ru</u>

摘要

现实性:全球经济形势的不稳定、一些国家对俄罗斯的不友好行为以及 其他外部挑战使得改进诊断威胁和风险的工具成为任务。这是为了确保 国家和地区的经济安全。该研究以复杂建模为基础,用抗压能力和稳定 性的指标来单独分析。

研究目标:在预测的经济安全背景下,从区域抗压能力的角度,文章开发了一种新的差异化指标诊断方法。它可对经济系统的威胁进行可视化展示和评估。

研究方法:在研究过程中,使用了比较、指示性、排序、分段线性近似 (定标)的研究方法和相关分析。

研究结果:在研究中获得了以下具有科学新颖性的结果:在差异化方法的框架内,在一定时间和区域内,将经济、社会、生产技术和金融细分为36个指标,对经济安全和区域经济风险指标进行了分组预测。研究还评估了区域固定篮子指数的发展成本,即以区域成本指标与固定篮子指数进行比较,从而评估各区域的动态经济安全威胁。此外,研究还诊断了在稳定发展时期和特殊时期的区域抗压能力。

结论:研究是以伏尔加联邦区为例进行的。文章确定了该区域在动态中受到威胁的具体预测和指标,以及对危机,特别是对制裁因素的抗压能力。

Introduction

20 R-ECONOMY

Given the volatile global economy, imposed sanctions, COVID-19 spread and other external challenges, nowadays it becomes important to ensure economic security of national and regional systems in Russia.

关键词

经济安全、威胁、指标、地区 社会经济体系、预测、诊断、 差异化方法、抗压能力、制裁 因素

供引用

Karanina, E.V., & Karaulov, V.M. (2023). Differentiated approach to the diagnostics of economic security and resilience of russian regions (case of the volga federal district). R-economy, 9(1), 19–37. doi: 10.15826/ recon.2023.9.1.002

The present study examines economic security of regional systems and its projections, economic and mathematical methods and tools for predicting risks and threats to regional economic security and resilience in the context of economic sanctions and crisis. The National Economic Security Strategy defines a threat to economic security of the Russian Federation as "the set of conditions and factors creating a direct or indirect possibility of harm to national interests". Economic security risk is "the possibility of harming national interests of the Russian Federation associated with the implementation of the threat to economic security"¹. Thus, a set of negative factors can be seen as a threat to economic security, while probabilistic damage assessment can be considered as economic security risk, evidenced by decreasing indicator values. For instance, a decline in gross national product (GDP) poses a threat, and negative GDP dynamics characterizes a risk of a decrease in economic security.

In this study, the following concept is used as a key one. Economic security of the region is a category characterizing the system's ability to operate sustainably for a long time, including in the context of negative external influence. Economic security of the system is defined through the realization of its potential, taking into account the external influences. Realization of the long-term potential of the economic system depends on the current external environment. The potential of the system should correspond to the average level of external threats, meaning that the relationship between the potential and external threats characterize the security of the whole system. The potential should be sufficient to reduce the negative external influence and ensure sustainable operation of the system. In this case, it is possible to talk about high level of economic security. Comparison of the current system with its baseline state (long-term average state of the system) in the absence of negative external influence) can define the level of economic security in any given moment. In order to assess the resilience of the system, the rate of recovery to the previous level of economic security (after an increase in external threats) should be compared with the baseline period.

Various studies focused on predicting the impact of external factors on security and resilience of regional socio-economic systems; in 2020, particular attention was paid to assessing the influence of the COVID-19 pandemic (Pobedin, Balynskaya & Williams, 2021; Romanova & Ponomareva, 2021; Turgel & Usoltseva, 2020).

In addition to the virus, external threats include the sanctions imposed on Russia by other states, which significantly affected the economic devel-

R-ECONOM

21

opment of the country (Baranovsky, 2017; Nureev & Busygin, 2016; Glaziev, 2020). To consider their influence, several studies analyzed observations at equal time intervals to compare sanction and relatively stable periods (Glazyev & Arkhipova, 2018; Minat & Polyakov, 2018; Gladkov, 2017).

Numerous approaches to predicting indicators are present in the modern theory and methodology of economic security. To improve the diagnostics of economic security at the national and regional level, it is required to create a set of indicators (that can be grouped into projections) and establish a threshold for their assessment. The number of both projections and indicators can differ depending on the methodology used. The present article offers a new differentiated approach to diagnostics of threats and risks to economic security and resilience at the regional level. It can help visualize and evaluate threats to economic meso-systems. The developed approach can be applied to assess economic security of regional systems and its projections based on the economic and mathematical methods and tools for predicting threats and risks to regional economic security and resilience in the context of economic sanctions and crisis. Using the scoring system, we defined points for security projections (group assessment) and the final (integral) assessment. Accordingly, three levels of economic security were distinguished: dangerous state – high risk of a significant decline in economic security; safe state high level of economic security, low risk of stability deterioration; intermediate (uncertain) state - negligible risk of a decline in economic security.

The concept of economic security and resilience of regional systems based on a historical approach is applied to demonstrate the systems' resistance to 2022 sanctions and other external challenges, identify their strengths and weaknesses, indicate risks and threats to economic security of the constituent entities of the Russian Federation and the duration of adverse effects.

Theoretical basis

Both Russian and foreign scientists have investigated the issues of monitoring and diagnostics of economic security. For example, European authors often pay special attention to circular economy monitoring (Alaerts, Acker & Rousse, 2019; Avdiushchenko, 2018; Llorente-González & Vence, 2019). Katsikaris and Parcharidis (2010) examined indicators of social monitoring. There are also wellknown studies on the development of financial stability monitoring (Adrian, Covitz & Liang, 2015).

¹ Order of the President of the Russian Federation of May 13, 2017 No. 208. "On the Russian Federation Economic Security Strategy until 2030". Retrieved from: <u>https://www.garant.ru/products/ipo/prime/doc/71572608</u>/ (In Russ.)

Combinations and differences between the concepts "monitoring" and "diagnostics" are given sufficient attention in several works. For instance, the Cambridge Dictionary defines the verb "to monitor" as follows: to watch and check a situation carefully for a period of time.

The term "diagnostics" comes from the Greek "diagnostikos", which literally means "the ability to recognize threats." Thus, based on the initial definitions, it can be established that "monitoring" and "diagnostics" are different concepts. "Monitoring" is associated with supervision or control of an object, while the concept of "diagnostics" is linked with the subject's ability to identify and assess risks and threats.

Scientific literature presents the following combinations of the concepts "monitoring" and "diagnostics":

1) diagnostics is one of the stages (dimensions) of monitoring (Yushchuk, 2019);

2) monitoring is one of the stages of diagnostics (Khoroshko, 2011);

3) monitoring as a kind of diagnostics.

Most researchers of financial and economic security, including Baidova and Kopylova (2020), support the first statement and consider diagnostics as the process of determining the state of an object, object, phenomenon or management by using a number of procedures in order to identify the most dangerous threats and vulnerabilities.

Diagnostics aims to determine the actual state of the research object. Simultaneously, Baidova and Kopylova define monitoring as the technology of continuous and regular observation and analysis of a phenomenon or process. In contrast to diagnostics, monitoring allows researchers to compare data obtained at different time intervals, determine certain relationships between variables using the correlation approach and identify dynamic trends of these relationships.

Lyaushina and Sergeev (2018) as well as Minakov and Lapina (2021) adhere to a similar approach, stating that monitoring includes two key dimensions: diagnostics of economic security and reaction to the identified violations and deviations. Minakov and Lapina (2021) point out that monitoring is aimed not only at assessing the severity of risks, but also at predicting the emergence of new risks or an increase in existing ones.

Noskova (2020) also considers diagnostics to be part of the monitoring process, which includes the assessment of security, as well as strategic planning measures.

22 R-ECONOMY

In particular, it is necessary to consider the view of scientists of the Financial University under the Government of the Russian Federation, Moscow, Russian Federation on the relationship between the definitions of "monitoring" and "diagnostics". From their perspective, diagnostics is a process focusing on determining the actual state of the research object by using various analytical procedures, while monitoring is defined as "constant surveillance of a process in order to determine whether it corresponds to the desired result or initial assumptions" (Zemskov et al., 2020).

Scholars of our research school (Karanina & Loginov, 2017; Karanina & Kartavyh, 2017; Loginov et al., 2017) also participated in studies in the field of diagnostics and monitoring of risks and threats to economic security of the regions. The author's proposed approach uses monitoring for ranking economic security in the context of individual projections, regions, periods and other parameters. Dynamic monitoring can help determine the level of security and its variation over time, as well as assess stability and variability relative to the average/threshold security.

Several studies examined the issues of diagnostics of security indicators and creation of projections taking into account factors and signals of crisis and sustainable development (Chichkanov, Belyaevskaya-Plotnik & Andreeva, 2020; Vasilyeva & Vasileva, 2022; Ignatieva, Mariev & Serkova, 2020; Zubarevich, 2020; Kuznetsova, 2014).

In the present study, we propose to use a system of indicators (projections) of economic security and risks of the regional economy grouped as follows: general economic, social, technological and financial projections.

To provide adequate and comparable estimates in the regional and temporal context, we selected the methodological principles presented by Kislitsyna et al. (2017):

1) to use, if possible, relative indicators;

2) to assess indicators of regional economic development in terms of per capita;

3) to assess cost indicators of regional development using the number of fixed market baskets (FMB) of the region (ratio of the regional cost indicator and the cost of a fixed market basket).

Due to the transformations of the indicators, we can assess the risk and economic security of regions taking into account their regional characteristics (regardless of the region's size and the current price level). On the other hand, there is a possibility of diachronous comparison.

Data and methods

The system of regional economic indicators is based on characteristics that can be found in open sources. In particular, this study mostly uses data obtained from the collection "Regions of Russia. Social and economic indicators" and its appendices².

Selected indicators show two dimensions of economic security: security of the whole system (regional economy in general) and its most important elements (economic security of producers and consumers, including security of the regional population).

High, low and intermediate levels of economic security (or risks that are economic distress signals) were distinguished. These levels of economic security were determined by individual indicators using two threshold values. Threshold values can be established in different ways. First, it is possible to use target indicators set by regulatory documents or various socio-economic development programs. Another approach to the establishment of threshold values involves setting realistically achievable levels of security in the constituent entities of the Russian Federation, which can be further incorporated into regional development programs for managing economic security. To this end, thresholds for some indicators of economic security can be determined using average Russian (or average for the federal district) values. In this case, indicators of economic security can be interpreted as follows: economic security is considered sufficient if the value of the examined indicator is higher than the average Russian (average for the federal district) value, possibly with some margin.

Tables 1-4 below present characteristics and indicators calculated on their basis for four projections of economic security. In particular, Table 1 includes characteristics and indicators of general economic security. In this study, numerical values of economic security of the region are considered as indicators, calculated on the basis of characteristics – statistical data from open sources.

Table 1

Symbol	Used characteristic (from open sources)	racteristic en sources) Symbol Model indicator (calculated based on characteristics)							
Economic development security of the region									
C1.1	Gross regional product (GRP) per capita (RUB)	I1.1	GRP per capita (fixed market baskets)	C1.1 / C1.11					
C1.2	GRP volume index (in constant pric- es; % compared to the previous year)	I1.2	GRP volume index (in constant prices; % compared to the previous year)	C1.2					
C1.3	Industrial production index (% com- pared to the previous year)	I1.3	Industrial production index (% com- pared to the previous year)	C1.3					
		Food securit	y of the region						
C1.4	Agricultural production index (% compared to the previous year)	I1.4	Agricultural production index (% compared to the previous year)	C1.4					
C1.5	Agricultural production, million rubles	C1.5 / C1.11 / C1.10 • 1000							
C1.6	Shipping volume of own produc- tion, million rubles (manufacturing industries)		Shipping volume of own production per capita (fixed market baskets)	C1.6 / C1.11 / C1.10 • 1000					
	Consume	er security of	f the region's population						
C1.7	Average per capita income (per month, rubles)	I1.7	Average per capita income (per month, fixed market baskets)	C1.7 / C1.10					
C1.8	Real disposable income (% compared to the previous year)	I1.8	Dynamics of real disposable income (% compared to the previous year)	C1.5					
C1.9	Average consumption expenditure per capita (per month; rubles)	I1.9	Average consumption expenditure per capita (per month; fixed market baskets)	C1.9 / C1.10					
C1.10	Cost of the market basket of goods and services (fixed market basket) (rubles at the end of the year)								
C1.11	Average annual population, thousand people								

Characteristics and indicators of general economic security of the region

Source: compiled by the authors.

R-ECONOMY

23

² Regions of Russia. Social and economic indicators. Appendix to the collection "Regions of Russia. Social and economic indicators". Retrieved from: https://rosstat.gov. ru/storage/mediabank/pril-region2021.rar (In Russ.)

Characteristics and indicators of social security of the region are presented in Table 2.

Characteristics and indicators of technological security of the region are presented in Table 3.

Table 2

Characteristics and indicators of social security of the region										
Symbol	Used characteristic (from open sources)	Used characteristic (from open sources) Symbol Model indicator (calculated based on characteristics)								
Personnel security of the region										
C2.1	Population change (%, annual growth)	I2.1	Population change (%, annual growth)	C2.1						
C2.2	Average annual change in the num- ber of employees (% compared to the previous year)	I2.2	Average annual change in the number of employees (% compared to the previous year)	C2.2						
C2.3	Dependency ratio (number of people not in the labor force per 1000 work- ing-age people)	C2.3								
	Health ca	re security c	of the region's population							
C2.4	Infant mortality rate (deaths of chil- dren under one year of age per 1000 live births)	I2.4	Infant mortality rate (deaths of chil- dren under one year of age per 1000 live births)	C2.4						
C2.5	Life expectancy at birth (men, years)	I2.5	Life expectancy at birth (men, years)	C2.5						
C2.6	Life expectancy at birth (women, years)	I2.6	Life expectancy at birth (women, years)	C2.3						
	Social well-l	eing securit	y of the region's population							
C2.7	Share of population with income below the subsistence level (% of the total population of the constituent entity)		Share of population with income below the subsistence level (% of the total population of the constituent entity)	C2.7						
C2.8	Unemployment rate (%)	I2.8	Unemployment rate (%)	C2.8						
C2.9	Share of food products in the structure of household consumption expenditure (% of total consumer expenditure)	I2.9	Share of food products in the structure of household consumption expenditure (% of total consumer expenditure)	C2.9						

Source: compiled by the authors

Table 3

Characteristics and indicators of technological security of the region

Symbol	Used characteristic (from open sources)	Symbol	Model indicator (calculated based on characteristics)	Calculation of the indicator							
	Technological security of the regional economy										
C3.1	Per capita investment in fixed assets (in actual prices; rubles)		Share of investments in fixed assets in the GRP structure (%)	C3.1 / C1.1 • 100							
C3.2	Depreciation of fixed assets at the end of the year (%)	I3.2	Depreciation of fixed assets at the end of the year (%)	C3.2							
C3.3	Labor productivity index (%)	I3.3	Labor productivity index (%)	C3.3							
	Innovati	ive security c	of the regional economy								
C3.4	Innovative activity of enterprises (share of innovative enterprises in the total number of examined enterpris- es, %)	I3.4	Innovative activity of enterprises (share of innovative enterprises in the total number of examined enter- prises, %)	C3.4							
C3.5	Innovative goods, works, services, million rubles	I3.5	Share of innovative goods, works, services in the GRP structure (%)	C3.5 / C1.10 / C1.1 • 1000							
C3.6	Share of high-tech and knowl- edge-intensive industries (%)	I3.6	Share of high-tech and knowl- edge-intensive industries (%)	C3.6							

Symbol	Used characteristic (from open sources)	Symbol	Model indicator (calculated based on characteristics)	Calculation of the indicator					
Environmental security of the region									
C3.7	Organizations implementing inno- vations to ensure the environmental security improvement in the pro- duction of goods, works, services (% of the total number of enterprises implementing environmental inno- vations): 3.7.1) Reduction of unit production costs (for goods, works, services); 3.7.2) reduction of unit energy consumption (for goods, works, services); 3.7.3) reduction of carbon dioxide emissions; 3.7.4) substitution of hazardous ma- terials with harmless ones; 3.7.5) reduction of environmental pollution (ambient air, land, water pollution, noise reduction); 3.7.6) recycling of waste, water or materials.	I3.7	Intensity of ensuring the environ- mental security improvement in the production of goods, works, services (average percentage of the total number of enterprises implement- ing environmental innovations in 6 directions – the arithmetic mean) ³	C3.7 = (3.7.1 + 3.7.2 + 3.7.3 + 3.7.4 + 3.7.5 + 3.7.6) / 6					
C3.8	Emissions of pollutants into the atmosphere from stationary sources (thousands tons)	I3.8	Emissions of pollutants into the atmosphere from stationary sources from producing 1000 fixed market baskets (tons)	C3.8 / C1.1 / C1.11					
C3.9	Discharge of contaminated wastewa- ter into surface water	13.9	Discharge of contaminated wastewa- ter into surface water from pro- ducing 1000 fixed market baskets (thousand cubic meters)	C3.9 / C1.1 / C1.11					

Source: compiled by the authors³

³ Since 2015, the corresponding indicators are published every two years. Thus, 2016 and 2018 indicators were estimated as the arithmetic mean of neighboring years, and the 2020 indicator was calculated as the arithmetic mean of 2018-2019. Characteristics and indicators of financial security of the region are presented in Table 4.

Table 4

Symbol	Used characteristic (from open sources)	Symbol	Model indicator (calculated based on characteristics)	Calculation of the indicator					
	Security of financial support of the regional economy								
C4.1	Net financial result (income minus expenses) of enterprises, million rubles		Ratio of the net financial result (income minus expenses) of enterprises and GRP (%)	C4.1 / C1.1 /C1.11 • 1000 • 100					
C4.2	Share of unprofitable enterprises (% of the total number of enterprises)	I4.2	Share of unprofitable enterprises (% of the total number of enterprises)	C4.2					
		I4.3	Ratio of investment and the net finan- cial results of enterprises, %	C3.1*C1.11 / C4.1/1000 • 100					
	Ви	dgetary se	ecurity of the region						
C4.3	Consolidated budget expenditures of the constituent entity, million rubles	I4.4	Consolidated budget expenditures in the GRP structure, %	C4.3 / C1.1 / C1.11 • 1000 • 100					
C4.4	Consolidated budget revenues of the constituent entity, million rubles		Ratio of balance and consolidated bud- get revenues of the constituent entity, %.	C4.5 / C4.4 • 100					
C4.5	Revenues – expenditures (balance) of the consolidated budget of the constit- uent entity, million rubles								
C4.6	Budget investments in fixed assets (% of total investments)	I4.6	Budget investments in fixed assets (% of total investments)	C4.6					



Symbol	Used characteristic (from open sources)	Calculation of the indicator								
Financial well-being security										
C4.7	Debt for loans granted by credit institu- tions to legal entities, thousand rubles	I4.7	Ratio of debt for loans granted by credit institutions to legal entities and GRP, %	C4.7 / C1.1 / C1.11 • 100						
C4.8	Debt for loans granted by credit institutions to individuals, thousand rubles	I4.8	Debt for loans granted by credit institu- tions to individuals per capita relative to annual income, %	C4.8 / C1.7 / 12 • 1000 • 100						
C4.9	Consumer Price Index (%)	I4.9	Inflation rate (%)	C1.9 – 100						

Source: compiled by the authors

Thus, to measure economic security of the region, we used 4 projections including 9 indicators each, i.e. a total of 36 indicators. Additionally, three sub-projections of economic security can be distinguished in every projection, thus, it is possible to assess economic security of the constituent entities of the Russian Federation using 12 sub-projections.

The proposed basic system of indicators can be used not only for analyzing the impact of sanctions imposed on the Russian Federation, but for examining the country's resistance to external shocks, including the spread of coronavirus. Other indicators of economic security can be added to the basic model; for example, in this article, we study the influence of the indicators of foreign economic activity on the basic model.

To compare different indicators, their values were converted into a scoring scale, ranging from 1 to 100 points. 100 points indicate full economic security; 1 point means low economic security and a high risk of instability in the functioning of the regional economy according to the measured indicator.

To establish the scale, the piecewise linear approximation (scaling) was used for converting the indicator values. It is assumed that when indicator values change from the minimum to the maximum possible values, the impact of the assessed factor on economic security can be represented graphically as an S-shaped curve. In particular, sufficiently small values of the factor (indicator) demonstrate the lack of economic security, while sufficiently large values mean the provision of economic security necessary.

This curve can be approximated by a piecewise linear function (graph). The function is defined on an interval of real numbers (indicator values) and changes linearly between two threshold values. Thus, it is necessary to identify adequate threshold values in order to define intervals indicating changes in economic security. In this research, threshold values are established using target indicators set by regulatory documents or various socio-economic

26 R-ECONOMY

development programs, scientific and expert studies. Threshold values are fixed deviations from the average Russian indicators noted in the period of relatively stable positive development. To determine the threshold values, the round number bias was taken into account. For example, for dynamics indicators, the lower threshold corresponds to the index 100 (as a percentage), while the upper threshold is 106. Thus, dynamics is considered low below 102, average in the interval from 102 to 104 and high if the index is above 104.

If the initial value of the indicator is x and its threshold values are a and b, then the score of the indicator y is calculated as follows (given that larger values of x indicate a higher level of security):

If x < a, then y = 1 (points); If x > b, then y = 100 (points); Otherwise $y = \frac{x-a}{b-a} \cdot 99 + 1$ (points). In case a larger value x means a lower level of

economic security, the calculation changes:

If x < a, then y = 100 (points); If x > b, then y = 1 (points); Otherwise $y = (1 - \frac{x-a}{b-a}) \cdot 99 + 1$ (points).

Using the score of the indicators, we determined the points for security projections (group assessment) as the arithmetic mean. Then, based on the values of economic security for all projections, the integral (final) indicator of economic security (IIES) of the region was calculated as the geometric mean. A simple arithmetic mean within one projection was used, since the indicators of the same projection can be quite strongly interconnected. Weighting coefficients would not be of use here, as the indicator values in one group are mutually compensated due to a significant number of indicators. On the contrary, indicators of different projections characterize various aspects of economic security. In this case, the low values of some projections should not be compensated by the high values of others. Thus, it is appropriate to use the geometric mean for assessing the integral indicator.

For measuring qualitative characteristics of various aspects of economic security, we defined two threshold levels: 34 and 67 points:

• 34 or less points – dangerous state, high risk of a significant decline in economic security;

• 67 points or more – safe state, high level of economic security, low risk of stability deterioration and decline in economic security;

• from 34 to 67 points – intermediate (uncertain) state, negligible risk of a decline in economic security.

This technique can be used for both individual indicators and group assessments, including projections (sub-projections) the final (integral) assessment of economic security.

This study considers years 2010-2013 as the baseline period. In 2014, foreign countries imposed sanctions against the Russian Federation due to the events in Ukraine, as well as Sevastopol and the Republic of Crimea becoming part of the Russian Federation. Analysis of economic security in 2014-2016 and subsequent years demonstrates the ability of regional systems to resist sanctions, identifies their strengths and weaknesses, estimates the resilience of the system as the rate of recovery to the previous level of economic security. It can be assumed that regional economic security systems can react similarly in connection with the 2022 events and the introduction of sanctions packages imposing further restrictions.

27 R-ECONOMY

Sanctions primarily affect foreign economic relations of the constituent entities of the Russian Federation, namely, export, import and financial transactions. In particular, decline in net foreign investment to Russian regions, reduction in trade with non-CIS countries, increase in the share of trade with the CIS countries are expected. It should be noted that while the share of trade between Russia as a whole and the CIS countries changes insignificantly during the study period (the impact of the 2014 events is unnoticeable), different situation is observed in individual regions. Thus, the influence of sanctions on regional development is an important factor. In order to assess the short-term impact, correlation analysis was applied to examine the relationship between current indicators of foreign economic activity and indicators of economic security for the current and next year.

Results

The proposed methodology was tested using data from regions of the Volga Federal District (VFD) and the Russian Federation as a whole for the period 2010-2020. In some cases, missing baseline data were replaced by estimates.

Average values of indicators for the Russian Federation and the Volga Federal District, their coefficients of variation, threshold deviations from the average Russian indicators and thresholds of economic security are presented in Table 5.

Table 5

Indicator	Russian Federation		Three	shold	Threshold from	Share of VFD m in RF m				
	Average, $m = \sqrt{V} = \sigma/m$		Lower, <i>a</i> Upper, <i>b</i>		a from m			b from m		
I1			General economic (GES)							
I1.1.	35.5	8.3%	28.0 units	40.0 units	-21.1%	12.7%	82.7%			
I1.2	102.3	1.7%	100.0%	106.0%	-2.2%	3.6%	100.2%			
I1.3	102.7	2.8%	100.0%	106.0%	-2.6%	3.2%	100.5%			
I1.4	102.8	8.6%	100.0%	106.0%	-2.7%	3.1%	99.7%			
I1.5	2.32	6.2%	1.80 units	3.00 units	-22.4%	29.3%	127.6%			
I1.6	17.7	7.9%	13.0 units	22.0 units	-26.5%	24.3%	115.6%			
I1.7	2.24	3.8%	2.00 units	2.60 units	-10.7%	16.1%	92.5%			
I1.8	101.1	3.5%	100.0%	106.0%	-1.1%	4.8%	99.6%			
I1.9	1.74	6.5%	1.40 units	2.00 units	-19.4%	15.1%	93.6%			
I2				Social (SS)						
I2.1	0.27	202.0%	-0.15%	0.15%			-87.3%			
I2.2	100.5	2.0%	98.5%	101.5%	-2.0%	0.9%	98.8%			
I2.3	720.1	8.7%	650 people	800 people	-9.7%	11.1%	102.6%			

Average values of indicators (*m*) in the Russian Federation for 2010-2019, their variation (coefficient of variation *V*) and threshold of economic security (lower – *a* and upper – *b*)⁴

Indicator	Russian Federation		Three	shold	Threshold from	Share of VFD m	
	Average, m	$V = \sigma/m$	Lower, a	Upper, b	a from m	b from m	IN KF <i>m</i>
I2.4	6.7	19.2%	4.5 children	5.7 children	National Proje	ect Healthcare	92.4%
I2.5	65.8	2.6%	62.5 years	70.4 years	-5.0%	7.0%	98.6%
I2.6	76.7	1.4%	72.8 years	82.0 years	-5.0%	7.0%	99.8%
I2.7	12.2	7.9%	7.0%	16.0%	Targe	t 7-10	105.0%
I2.8	5.6	14.3%	3.5%	8.0%	Targe	et < 4	92.8%
I2.9	33.2	4.6%	28.0%	40.0%	-15.6% 20.6%		100.0%
I3				Technological	(TS)		
I3.1	22.3	10.2%	15.0%	30.0%	-32.8%	34.3%	104.3%
I3.2	46.8	6.9%	45.0%	60.0%	-3.8%	28.3%	109.2%
I3.3	102.0	1.6%	100.0%	106.0%	-2.0%	3.9%	101.1%
I3.4	11.0	19.0%	10.0%	10.0% 25.0% Target			
I3.5	5.34	17.0%	8.0%	20.0%	Target		227.3%
I3.6	19.2	3.0%	15.0%	30.0%	-21.8%	56.3%	119.7%
I3.7	49.9	6.4%	45.0%	60.0%	-9.8%	20.2%	100.6%
I3.8	3.5	13.0%	2.5 т	4.0 т	-29.3%	13.1%	83.0%
I3.9	2.9	17.1%	2.0 th. m ³	3.5 th.m ³	-30.7%	21.3%	102.7%
I4				Financial (F	S)		
I4.1	14.0	23.4%	7.0%	16.0%	-49.8%	14.7%	76.0%
I4.2	31.3	4.9%	24.0%	36.0%	-23.2%	15.2%	93.6%
I4.3	15.2	10.8%	12.0%	18.0%	-21.2%	18.2%	98.6%
I4.4	-1.66		-9.0%-0.0%	1.0%-10.0%	Target [-	3%; 4%]	219.8%
I4.5	171.3	34.2%	100.0%	400.0%	-41.6%	133.4%	150.4%
I4.6	17.5	8.4%	12.0%	24.0%	-31.4%	37.1%	86.8%
I4.7	10.3	10.0%	16.0%	40.0%	-44.8%	37.9%	81.4%
I4.8	5.1	24.1%	16.0%	40.0%	-15.1%	112.2%	109.7%
I4.9	6.8	50.4%	2.0%	11.0%	-70.4%	63.0%	95.0%

Source: compiled by the authors⁴

⁴ The coefficient of variation *V* is calculated using the formula: $V = \sigma/m$, where σ is the mean square deviation of the indicator for 2010-2019, and *m* is its average value. In the General economic indicators group, the thresholds of five indicators are measured as the number of fixed market baskets (units) of the constituent entity.

During the study period, the changes in general economic indicators across Russian regions were insignificant, as indicated by the low coefficient of variation (less than 10%). Social indicators differ more significantly. In particular, moderate coefficient of variation was observed for two indicators, while the indicator I2.1 "Population change" was characterized by high variation (more than 200%) due to Sevastopol and the Republic of Crimea becoming part of the Russian Federation. For this reason, estimates of threshold deviations from the average population change for 2010-2019 are not presented.

Low and moderate coefficients of variation are characteristic of technological indicators. Indicators

28 R-ECONOM

of the financial projection are the most volatile: high coefficients of variation (more than 25%) are recorded for two of them. The coefficient of variation is different for the indicator I4.4 "Ratio of balance and consolidated budget revenues of the constituent entity", since it has both positive and negative values, for which thresholds should be established separately.

Further, we present the results of the diagnostics of individual projections and integral level of economic security (using data from regions of the Volga Federal District).

Table 6 includes indicators for assessing the dynamics of the integral indicator in the "General economic security" projection.

Table 6

Assessing economic security of regions of the voiga rederal District: General economic security projection											
Regions \ year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Russian Federation	42	60	53	56	42	33	40	44	48	57	33
Volga Federal District	46	61	59	56	46	29	35	38	36	51	36
Republic of Bashkortostan	59	75	77	76	47	40	29	42	37	49	29
Mari El Republic	40	46	57	38	55	45	14	31	32	40	20
Republic of Mordovia	43	40	35	24	53	25	36	37	30	45	43
Republic of Tatarstan	77	92	88	68	72	66	73	70	66	75	59
Udmurt Republic	41	46	34	31	37	29	31	16	31	30	23
Chuvash Republic	33	45	45	15	23	20	17	17	16	40	19
Perm Krai	45	63	40	49	48	30	20	34	36	32	30
Kirov Oblast	34	37	20	5	36	11	20	9	23	14	26
Nizhny Novgorod Oblast	46	53	49	50	45	29	29	33	29	54	28
Orenburg Oblast	44	45	38	51	32	20	28	36	31	38	32
Penza Oblast	32	45	46	50	43	39	31	28	31	40	41
Samara Oblast	51	56	63	57	38	23	30	28	27	45	34
Saratov Oblast	30	45	41	46	37	20	26	31	21	29	37
Ulyanovsk Oblast	32	43	29	32	23	13	25	32	8	28	24

Source: compiled by the authors

29

In the second half of the study period, a decrease in economic security in the "General economic security" projection is observed. The main reason for that is the introduction of sanctions in 2014 due to Sevastopol and the Republic of Crimea becoming part of the Russian Federation. In general, economic security of the country and the Volga Federal District declined to dangerous levels in 2015, but it reached the intermediate level in 2016. By 2019, economic security returned to its pre-sanctions level. However, security risks are unevenly distributed among regions of the Volga Federal District. According to the "General economic security" projection, economic security in the Republic of Tatarstan slightly declined, but remained high or close to high. In the majority of other constituent entities, economic security declined from intermediate to dangerous levels (less than 34 points); only half of them managed to recover and return to the intermediate state by 2019. In 2020, economic security of numerous constituent entities (and of Russia in general) once again declined to a dangerous level due to the negative influence of the spread of coronavirus and introduction of quarantine measures. Dynamics of the "General economic security" projection for regions of the Volga Federal District is shown in Figure 1.

R-ECONOM

Assessment of economic security and risks of regions of the Volga Federal District in 2010-2020 for the "Financial security" projection is presented in Table 7.

During the study period, general financial security of all regions of the Volga Federal District remained at the intermediate level. Nevertheless, the situation developed in different ways in terms of individual projections. For instance, values of the "Debt for loans granted by credit institutions to individuals per capita" indicator declined from safe (for all regions of the Volga Federal District in the beginning of the study period) to dangerous levels in 12 constituent entities in 2020. Simultaneously, the situation improved in terms of price growth. Financial security is quite sensitive to negative effects. The sanctions policy greatly affected financial security of regions of the Volga Federal District in 2014 leading to its decline. After a couple of years, financial security completely recovered in some constituent entities, and remained at a lower level in others. Collective declines in financial security also were recorded in 2018 and 2020 due to the negative impact of the COVID-19 spread. Dynamics of the "Financial security" projection is presented in Figure 2.



Figure 1. Dynamics of general economic security in regions of the Volga Federal District Source: compiled by the authors

Table 7	/
---------	---

Assessing economic security of regions of the Volga Federal District: "Financial security" projection

Region \ year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Russian Federation	66	68	62	51	41	45	57	55	48	57	52
Volga Federal District	57	60	62	51	38	39	54	60	46	55	53
Republic of Bashkortostan	71	64	54	55	47	49	52	55	44	53	52
Mari El Republic	54	61	59	44	44	42	50	51	45	47	59
Republic of Mordovia	58	62	62	56	47	49	55	47	47	64	56
Republic of Tatarstan	60	65	72	63	42	51	61	53	57	56	53
Udmurt Republic	46	65	59	59	53	36	55	61	47	50	46
Chuvash Republic	56	68	58	59	36	41	55	59	52	67	68
Perm Krai	54	52	55	45	32	42	53	55	46	47	39
Kirov Oblast	68	62	58	56	47	53	65	69	60	66	66
Nizhny Novgorod Oblast	52	59	60	52	40	40	57	63	52	59	55
Orenburg Oblast	54	63	55	41	39	39	48	46	34	43	38
Penza Oblast	61	59	66	57	40	39	60	60	51	53	56
Samara Oblast	56	55	65	55	41	35	50	57	46	52	59
Saratov Oblast	54	55	58	46	38	38	58	59	49	58	60
Ulyanovsk Oblast	52	61	62	51	34	38	59	63	62	58	52

Source: compiled by the authors

R-ECONOMY

30

31 R-ECONOMY

Figure 2 clearly demonstrates that the years 2014 and 2015 were the hardest in terms of financial security. Despite increasing sanctions, financial security was restored in all of the examined regions.

Results of the final (integral) assessment of economic security and risks of regions of the Volga Federal District in 2010-2020 are presented in Table 8.



Figure 2. Dynamics of indicators of the "Financial security" projection by regions of the Volga Federal District *Source:* compiled by the authors

Regions \ year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Russian Federation	46	53	51	48	41	39	44	47	49	55	42	
Volga Federal District	45	51	52	48	43	34	41	46	43	51	43	
Republic of Bashkortostan	53	50	53	55	42	36	34	42	39	45	37	
Mari El Republic	39	45	47	42	47	37	24	37	32	41	30	
Republic of Mordovia	50	48	44	43	51	44	53	46	44	58	50	
Republic of Tatarstan	62	73	73	68	62	64	68	68	68	68	61	
Udmurt Republic	40	48	41	38	40	30	37	34	37	38	35	
Chuvash Republic	45	54	53	40	39	39	40	39	36	51	39	
Perm Krai	40	46	40	41	36	29	32	40	41	43	37	
Kirov Oblast	34	40	31	23	39	29	31	29	39	37	41	
Nizhny Novgorod Oblast	46	50	54	54	48	39	45	48	43	56	43	

Final (integral) assessment of economic security

Table 8

Regions \ year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Orenburg Oblast	37	46	42	37	31	28	33	35	30	39	33
Penza Oblast	37	46	47	49	43	43	40	43	43	44	46
Samara Oblast	46	49	58	54	47	35	39	42	38	47	40
Saratov Oblast	36	47	43	45	38	29	35	40	35	42	42
Ulyanovsk Oblast	41	47	42	41	33	28	38	41	29	45	38

Source: compiled by the authors based on their own calculations

The study shows that net foreign direct investment per capita in 2014-2016 reduced almost thrice compared to the average Russian value in 2011-2013 under sanctions. This percentage has not increased significantly: the 2017-2019 annual indicator is 2.5 times less than the 2011-2013 average indicator, while the 2020 indicator decreased by 6 times due to the COVID-19 pandemic. The situation developed differently in regions of the Volga Federal District. For example, in Ulyanovsk oblast, positive net foreign direct investment increased by 3 times in 2014-2016, and then decreased by almost 8 times in 2017-2019 compared to the period 2011-2013. In the Republic of Tatarstan, this indicator first increased by 70%, and then exceeded twice the value of 2011-2013. In Nizhny Novgorod Oblast, positive net foreign direct investment decreased by almost 2 times, and then became negative.

32 R-ECONOMY

More indicative of the impact of sanctions is the indicator of per capita trade with non-CIS countries. This indicator grew only in Ulyanovsk oblast; as for the remaining 13 regions, the indicator decreased by more than 10% in 11 constituent entities and by more than 20 % in 7 regions. In the Republic of Bashkortostan, Udmurt Republic, Orenburg oblast and Samara oblast, the average annual indicator continued to decline in 2017-2019. In the Republic of Mordovia and Penza oblast, however, the indicator recovered and even increased by a third compared to the pre-sanction level. In general, introduction of sanctions did not lead to a significant increase in trade with the CIS countries: the share of trade remained relatively stable or unstable in various constituent entities. In particular, 6 regions of the Volga Federal District are characterized by volatile changes in the share of trade (coefficient of variation is 30% or more) (Figure 3).



Figure 3. Share of trade between regions of the Volga Federal District and the CIS countries *Source:* compiled by the authors

Correlation study of the influence of foreign economic activity on economic security shows that the change in per capita trade with non-CIS countries has a direct tangible (absolute value of the correlation coefficient is at least 0.5) shortterm impact on the integral indicator of economic security in the current year in the Russian Federation, the Volga Federal District and 8 regions of the Volga Federal District. However, with a one-year lag, the tangible impact was observed only in the Chuvash Republic and Saratov oblast. The impact on general economic security is similar or slightly higher. Per capita trade with non-CIS countries has a longer lasting effect on technological security. In the current period, it has an inverse and negligible effect (absolute value of correlation coefficient is less than 0.3) in the Russian Federation and the Volga Federal District, becoming tangible with a one-year lag. In regions of the Volga Federal District, significant correlation is observed in 5 regions in the current period, and in 7 regions with a one-year lag. Simultaneously, either direct or inverse (not necessarily short-term) correlation can be observed.

33

R-ECONOMY

The effect of net foreign direct investment per capita on economic security is less pronounced and somewhat different. In general, this indicator has a tangible impact on the integral indicator of economic security, as well as on projections of general economic security, social security and financial security across the Russian Federation. In the Volga Federal District, it has a tangible impact only on social security with a one-year lag. As for regions of the Volga Federal District, the studied indicator has a tangible but multi-directional impact with a one-year lag on the indicator of economic security (5 regions), social security (4 regions) and technological security (4 regions).

Based on the correlation analysis, it is possible to predict the impact of 2022 sanctions on economic security of the constituent entities of the Russian Federation. Sanctions significantly affect foreign economic activity of the constituent entities of the Russian Federation, trade and net foreign direct investment may decrease several times. This impact on the integral indicator of economic security and general economic security is usually short-term (during the current year).



Figure 4. Correlation between the trade volume with non-CIS countries per capita and economic security Source: compiled by the authors



Figure 5. Correlation between net foreign direct investment per capita and economic security Source: compiled by the authors

As for individual regions, the effect may be multi-directional and last longer. The effect on technological security may not be immediately obvious; it also may be multi-directional and last longer. Feedback can indicate the implementation of import substitution policy in regions. The structure of trade has a significant impact on economic security of regions, usually with a time lag, especially on technological security. On the other hand, sanctions did not lead to growth in trade with the CIS countries, as the share of trade remained the same across the Russian Federation. Dynamics of net foreign direct investment per capita significantly affects short-term financial security. Simultaneously, financial security influences technological security with a one-year lag.

The COVID-19 spread in 2020, as well as introduction of sanctions significantly limited foreign economic activity. Thus, indicators of economic security recovery in 2021 can be used to predict the possibility of restoring economic security of Russian regions affected by international sanctions in 2022. The proposed differentiated approach takes into account sustainability and eco-

R-ECONOMY

34

nomic security of various regions, as well as their ability to respond to external threats.

Conclusions

The proposed approach to diagnostics can be applied to evaluate economic security of the constituent entities of the Russian Federation, identify emerging risks, compare them and study in dynamics. Additionally, it can be used to assess the sustainability of the economic security system and the ability of regional economy to adapt to negative external challenges, in particular, the 2014 sanctions affecting economic development of regions of the Volga Federal District.

In general, intermediate level of security regions in terms of resilience was characteristic for all regions of the Volga Federal District (with the exception of Kirov oblast) until 2014. In 2014-2015, however, the values of 5 constituent entities decreased to dangerous levels. By 2019, economic security in terms of its integral indicator returned to the intermediate level in all regions of the Volga Federal District. During the study period, economic security in the Republic of Tatarstan remained high or close to high. Thus, external challenges practically do not affect economic security of the Republic, which can be considered the most resilient.

Decrease in financial security of the regions in 2014-2015 after a year caused a decline in technological security. However, increase in technological security will not necessarily lead to the recovery of technological security; moreover, this decline may continue.

Sanctions affect indicators of foreign economic activity, in particular, trade volume with non-CIS countries per capita and net foreign direct investment per capita. The impact on the structure of trade (the share of trade with the CIS countries)

35 R-ECONOMY

is insignificant. Changes in trade with non-CIS countries in the current period have a tangible impact of the integral indicator of economic security and general economic security. After a year, such an impact becomes insignificant. The impact on technological security, however, usually becomes evident after one year. Changes in net foreign direct investment significantly affect financial security in the current period.

Since the introduction of COVID-19 restrictions in 2020 led to a weakening of foreign economic and trade relations, the ability of regional systems to restore economic security in 2021 can be used to predict the possibility of restoring economic security affected by international sanctions in 2022.

References

Adrian, T., Covitz, D., & Liang, N. (2015). Financial Stability Monitoring. *Annual Review of Financial Economics*, 7, 357-395. <u>https://doi.org/10.1146/annurev-financial-111914-042008</u>

Alaerts, L., Acker, K.V., & Rousse, S (2019). Towards a more direct policy feedback in circular economy monitoring via a societal needs perspective. *Resources, Conservation & Recycling, 149, 363-371.* <u>https://doi.org/10.1016/j.resconrec.2019.06.004</u>

Avdiushchenko, A. (2018). Toward a Circular Economy Regional Monitoring Framework for European Regions: Conceptual Approach. *Sustainability*, *10*, 1-26. <u>https://doi.org/10.3390/su10124398</u>

Baidova, N.V., & Kopylova, L.Ya. (2020). Diagnostics and monitoring of threats economic security. In *Scientific support of technological breakthrough: theory, practice, forecasts* (pp. 21-31). Petrozavodsk: International Center for Scientific Partnership "New Science". (In Russ.)

Baranovsky, V. G. (2017). Transformation of global world order: dynamics of systemic changes. *Polis. Political Studies = Polis. Politicheskie issledovaniya*, *3*, 71-91. (In Russ.) <u>https://doi.org/10.17976/jpps/2017.03.05</u>

Chichkanov, V. P., Belyaevskaya-Plotnik, L. A., & Andreeva, P. A. (2020). Modelling the Assessment of the Impact of Industry Factors on the Level of the Territories' Socio-Economic Development and Economic Security. *Economy of regions = Ekonomika regiona*, *16*(1), 1-13. (In Russ.) <u>https://doi.org/10.17059/2020-1-1</u>

Gladkov, I.S. (2017). Foreign trade relations of the Russian Federation: trends in the sanctions period and the results of 2016. *Vlast*, 25(3), 94-105. (In Russ.)

Glaziev, S.Yu. (2020). The Russian economy at the beginning of 2020: the root causes of the growing chaos and the complex of anti-crisis measures. *Russian economic journal = Rossiyskiy ekono-micheskiy zhurnal*, *2*, 3-39. (In Russ.) <u>https://doi.org/10.33983/0130-9757-2020-2-03-39</u>

Glazyev, S.Yu., & Arkhipova, V.V. (2018). Sanctions and other crisis factors impact assessment on the Russian economy's state. *Russian economic journal = Rossiyskiy ekonomicheskiy zhurnal*, *1*, 3-29.

Ignatieva, E.D., Mariev, O.S., & Serkova, A.Ye. (2020). Impact of Infrastructure on Socio-Economic Development of Russian Regions: Methodology and Analysis. *R-Economy*, 6(2), 65-73. <u>https://doi.org/10.15826/recon.2020.6.2.006</u>

Karanina, E., & Kartavyh, K. (2018). Economic security of modern Russia: The current state and prospects. In *MATEC Web of Conferences: 2017 International Science Conference on Business Technologies for Sustainable Urban Development (SPbWOSCE 2017). Vol. 170.* St. Petersburg.

Karanina, E., & Loginov, D. (2017). Indicators of economic security of the region: a risk-based approach to assessing and rating. In *IOP Conference Series: EMMFT 2017 (90(1))*. Far Eastern State Transport University. Russia. <u>https://doi.org/10.1088/1755-1315/90/1/012087</u>

Katsikaris, L., & Parcharidis, I. (2010). Monitoring and evaluation of the social economy. *Journal* of *Community Positive Practices*, 10(3-4), 84-92.

36 R-ECONOMY

Khoroshko, A.M. (2011). Monitoring as a process of diagnosing the financial condition of an enterprise. *Bulletin of the Khabarovsk State University of Economics and Law = Vestnik Khabarovskogo gosudarstvennogo universiteta ekonomiki i prava, 2,* 119-123. (In Russ.)

Kislitsyna, V.V., Cheglakova, L.S., Karaulov, V.M., & Chikisheva, A.N. (2017). Formation of the Integrated Approach to the Assessment of the Socio-Economic Development of Regions. *Economy of regions = Ekonomika regiona*, 13(2), 369-380. (In Russ.) Retrieved from: <u>https://elar.urfu.ru/bitstream/10995/91655/1/2017_13_2_004.pdf</u>

Kuznetsova, O.V. (2014). Typology of factors of socio-economic development of Russian regions. Vestnik Moskovskogo universiteta. Seriya 5: Geografiya, 2, 3-8. (In Russ.)

Llorente-González, L.J., & Vence, X. (2019). Decoupling or 'Decaffing'? The Basing Conceptualization of Circular Economy in the European Union Monitoring Framework. *Sustainability*, *11*(18), 1-21. <u>https://doi.org/10.3390/su11184898</u>

Loginov, D., Karanina, E., Bakhtimov, A., & Ryazanova, O. (2017). Economic Security as a Basis for National Food Sovereignty. In E.G. Popkova (ed.), Overcoming Uncertainty of Institutional Environment as a Tool of Global Crisis Management. Contributions to Economics (pp. 69-76). Springer International Publishing. Retrieved from: <u>https://link.springer.com/chapter/10.1007%</u> 2F978-3-319-60696-5_10

Lyaushina, R.O., & Sergeev, A.Yu. (2018). Efficient management of economic security with the method of "Financial monitoring". In *Economic Security of Society, State and Individual: Problems and Directions of Ensuring: Proceedings of the Conference* (pp. 110-113). Prague: Vědeckovydavatelské centrum "Sociosféra-CZ". (In Russ.)

Minakov, A.V., & Lapina, S.B. (2021). Financial monitoring in the system of ensuring the economic security of the state. *Vestnik of economic security = Vestnik ekonomicheskoy bezopasnosti, 3,* 276-281. (In Russ.) <u>https://doi.org/10.24412/2414-3995-2021-3-276-281</u>

Minat, V. N., & Polyakov, V. N. (2018). External economic activity influence on food security in the Russian Federation. *International penitentiary journal = Mezhdunarodnyy penitentsiarnyy zhurnal*, 4(1), 51-58. (In Russ.)

Noskova, M.A. (2020). Diagnostics of the state and monitoring of economic security in the Kursk region. In *Topical issues of economic security and customs* (pp. 331-334). Proceedings of the conference. (In Russ.)

Nureev, R.M., & Busygin E.G. (2016). Economic sanctions of the West and Russian anti-sanctions: success or a failure? *Journal of Institutional Studies = Zhurnal institutsionalnykh issledovaniy*, 8(4), 6-27. (In Russ.) <u>https://doi.org/10.17835/2076-6297.2016.8.4.006-027</u>

Pobedin, A.A., Balynskaya, N.R., & Williams, D. (2021). Socio-economic consequences of the first and second waves of the pandemic in Russian regions. *R-Economy*, 7(3), 146-157. <u>https://doi.org/10.15826/recon.2021.7.3.013</u>

Romanova, O.A., & Ponomareva, A.O. (2021). The structural factor of regional economic stability in Russia during the coronacrisis period. *R-Economy*, 7(3), 158-169. <u>https://doi.org/10.15826/</u> recon.2021.7.3.014

Turgel, I. D., & Usoltseva, A. A. (2020). An assessment of the degree of openness of state policy in countering COVID-19 in the post-Soviet countries. In G. B. Kleiner (Ed.), *The First International Lviv Forum (October, 2020). Collection of scientific reports* (pp. 70-172). Moscow.

Vasilyeva, E.V., & Vasileva, A.V. (2022). Demographic Research in the Context of Economic Development and Security of Regions. *Economy of regions = Ekonomika regiona*, 18(1), 1-20. (In Russ.) https://doi.org/10.17059/ekon.reg.2022-1-1

Yushchuk, V.E. (2019). Features and Capabilities of Monitoring the Reputation of an Organization. *Russian Journal of Economic Theory = Zhurnal Economicheskoy Teorii, 1,* 169-174. (In Russ.) <u>https://doi.org/10.31063/2073-6517/2019.16-1.15</u>

Zemskov, V.V., Dadalko, V.A., Starovoitov, V.G., Notasheva, L.Kh., Kashurnikov, S.N., Lebedeva, N.E., & Khudyakov, D.S. (2020). *Diagnostics and monitoring of the economic security of the country*. Moscow: Prometheus, 338. (In Russ.)

Zubarevich, N.V. (2020). Opportunities and limitations of quantitative assessment of factors of the Russian regions' economic development. *Journal of the New Economic Association = Zhurnal Novoy ekonomicheskoy assotsiatsii*, 2(46), 158-167. (In Russ.) <u>https://doi.org/10.31737/2221-2264-2020-46-2-8</u>

Information about authors

Elena V. Karanina – Head of the Department of Finance and Economic Security, Vyatka State University (36, Moskovskaya Str., Kirov, 610000, Russia); ORCID: 0000-0002-5439-5912; e-mail: karanina@vyatsu.ru

Vasily M. Karaulov – Associate Professor of the Department of Finance and Economic Security, Vyatka State University (36, Moskovskaya Str., Kirov, 610000, Russia); ORCID: 0000-0002-9599-3740; e-mail: <u>vm_karaulov@vyatsu.ru</u>

ARTICLE INFO: received June 17, 2022; accepted December 28, 2022

Информация об авторах

Каранина Елена Валерьевна – заведующая кафедрой финансов и экономической безопасности, Вятский государственный университет (Россия, 610000, г. Киров, ул. Московская, 36); ORCID: 0000-0002-5439-5912; e-mail: <u>karanina@vyatsu.ru</u>

Караулов Василий Михайлович – доцент кафедры финансов и экономической безопасности Вятский государственный университет (Россия, 610000, г. Киров, ул. Московская, 36); ORCID: 0000-0002-9599-3740; e-mail: <u>vm karaulov@vyatsu.ru</u>

ИНФОРМАЦИЯ О СТАТЬЕ: дата поступления 17 июня 2022 г.; дата принятия к печати 28 декабря 2022

作者信息

卡拉尼娜·埃琳娜·瓦列里耶夫娜——金融与经济安全系主任,俄罗斯维亚卡州立大学(俄罗斯,邮编:610000,基洛夫市,莫斯科大街36号);ORCID: 0000-0002-5439-5912;邮箱:<u>karanina@vyatsu.ru</u>

卡劳洛夫•瓦西里•米哈伊洛维奇——金融与经济安全系副教授,俄罗斯维亚卡州立大学(俄罗斯,邮编:610000,基洛夫市,莫斯科大街36号);ORCID: 0000-0002-9599-3740;邮箱:<u>vm_karaulov@vyatsu.ru</u>

