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SYSTEM BALANCE OF THE RUSSIAN ECONOMY: A REGIONAL PERSPECTIVE[1]

Balance is one of the cornerstone concepts of economics. Researchers have identified various types of balance, including commodity-money, industry, territorial, inter-period, etc. The universal representation of socio-economic systems in the form of a complex of object-oriented, project-oriented, environment-oriented and process-oriented systems enables us to question the balance in the system, i.e., whether the scales of these subsystems are proportionate in the system. Furthermore, the concept of a system balance of the economy of federal subjects of the Russian Federation, federal districts, and the country as a whole, becomes comprehensible. This paper aims to quantify the system balance of each Russian subject region and determine the current ratio of systemically balanced and unbalanced subjects. The application of these correlations in the development of the Russian Federation's socio-economic strategy will allow for an increase in the connectivity of the overall socio-economic space. Moreover, it will impact the continuity of socio-economic policy and targeting over time, and the national economy's sustainable development in general. Based on the provisions and methods of system economic theory, we evaluated the system balance of the Russian economy from a regional perspective. We calculated a system balance index of the federal subjects of the Russian Federation, federal districts and the country as a whole. Then we identified groups of those subjects with a high, medium and low degree of system balance. Further, we investigated the dynamics of the structure of groups of 'regions-leaders' and 'regions-outsiders' according to the degree of system balance over the period from 2012 to 2016. We created a heat map of the Russian economy's system balance from a regional perspective. As a result, we created guidelines for a system economic policy for territorial development, aimed at increasing the number of 'system balanced' regions, and provide recommendations for areas of further pertinent research. This research also justifies the need for policymakers to include considerations on the relationship between the development of the object-oriented, environment-oriented, process-oriented and project-oriented subsystems of the region in the strategy of the Russian Federation subjects in any long-term economic policy strategies.

Keywords: system balance index, region, regional economic policy, system balance, system economic theory, socio-economic system, sustainable development, federal subject, Russian economy, regional economy

Introduction

The problem of balance in the economy is among the most salient issues traditionally discussed in the economic literature (see e.g. [1–6]). Strategically, balance is the cornerstone of sustainable development of any economy [7–14]. Researchers have identified commodity-money, industry, territorial, and other types of economic balance. For example, in [15], an analysis of the causes of imbalance in material and financial subjects is carried out. In [16–17], approaches to the study of imbalances in the sectoral structure of the national economy are presented. Papers [18–23] cover the issues of balanced development of the economy in a regional context and study the spatial imbalances of the national economy as a whole. The various financial and economic crises of 2014–2016 exposed the structural problems of the Russian economy. These problems manifested themselves in structural and systemic imbalances in the size and efficiency of the financial and real sectors, the development of mining and high-tech industries, the level of socio-economic development of territories and the social stratification of the population [24]. In [25], it was shown that during this period, a figurative 'dual model' of the structure of the Russian economy's sectors emerged. The first group in this model encompasses the commodity sector and the services sector (high profitability and low risk); the second group comprises the various manufacturing sectors (low profitability and high risk). The type of imbalance illustrated here limits the development of the manufacturing sectors, since the resources move to the industries with the highest profitability.

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Imbalances are also present in the socio-economic development of the Russian regions and the income distribution of the population. There are variations in distribution and quality across fundamental socio-economic categories such as gross regional product, fixed assets in the economy, investments in fixed capital, and others. The levels of imbalances are high in living standards and infrastructural development across the regions [26–28].

Inter-period imbalance in economic development, reflected in, for example, the lack of continuity of the development of effective economic and social mechanisms and institutions, deserve a separate study.

Thus, we may conclude that the Russian economy has problems of system imbalance, summarised in the following unified categories: financial and economic imbalances, inter-sectoral imbalance, inter-regional imbalance, social imbalance, and inter-period imbalance. System balance is a more basic and volumetric characteristic than by its particular cases and individual occurrences.

The main objective of this paper is to quantify the system balance of each subject area and determine the current overall ratio of balanced and unbalanced federal entities of Russia. We expect that these ratios can aid the development of socio-economic strategy, increasing the connectivity of the socio-economic space, continuity and focus of Russia's socio-economic policy across time, and support the national economy's sustainable development

This article analyses the system balance of the Russian economy in a regional context. In pursuit of this, we calculated an index of system balance for the Russian federal entities, federal districts, and the country as a whole. Then, we identified and categorised groups of entitles with a high, medium and low degree of system balance. Further, we built a heat map of the system balance of the Russian economy in accordance with the regions' development. Finally, we determined the guidelines for a systematic economic policy of territorial development, aimed at increasing the number of systemically balanced regions of the Russian Federation.

1. Research Methodology

The conceptual basis of this study is a system economic theory. It has emerged at the turn of the twentieth and twenty-first centuries, based on the system paradigm in economics [29–30], which developed some provisions of the preceding neoclassical, institutional and evolutionary economic theories. A key feature of the system economic theory is choosing as the main object of research a socio-economic system — a formation, which includes such components as economic agents and their populations, institutions, and socio-economic processes in space and time. Defining the boundaries of such systems in the space-time continuum is not an easy task, but it is necessary for solving the management problems. Definition of the boundaries involves considering the system from two perspectives: internal observation (the classical approach [31–32]) and external observation (an alternative approach [33]).

In the system economic theory, there are four basic types of economic systems: objects, environments, processes, and projects. The system belongs to the object type if it has definite boundaries in space and indefinite boundaries in time (examples: a commercial enterprise, a federal entity of Russia, a federal district), and environment type if its boundaries are not defined in space and time (examples: the internal atmosphere of an enterprise, a social network, a market). A process type correlates with having indefinite boundaries in space and definite boundaries in time (examples: a distribution of innovations, an intra-company business process, logistic process). Finally, a project type is appropriate if the boundaries are defined in space and time (examples: the construction of a stadium, the implementation of a renovation program, a merging of federal subjects of Russia).

Each of the four types of economic systems performs its basic socio-economic function (mission): object systems — production, environment systems — consumption, process systems — distribution, project systems — exchange. The fulfilment of these functions and the exchange of space and time resources, which are less accessible for some systems and more accessible for others, leads to the integration of systems into stable ring-shaped structures in the form "object — environment — process — project — object" called tetrads [33].

Most real socio-economic systems, to a certain extent, are endowed with features of all four basic types and, therefore, are tetrads. For example, a region as a socio-economic system has separate spatial boundaries and unlimited duration of existence (the observer at the current time cannot accurately determine the time horizon of the system). At the same time, other object systems (enterprises,

organizations, individuals) are located in the region, and the region is an environment that is considered by the system's participants as free space intended for their functioning. The process component of the region is manifested in various socio-economic, political, administrative, and other processes taking place in a given territory. The project component of the region combines development projects and programs (federal, regional, municipal) that are implemented in this territory. From the position of system economic theory, the hierarchical structure of the Russian economy may be represented as a four-sided pyramid with three kinds of levels: country, region, enterprise. At each level, the system is represented as a tetrad containing the object, environment, process, and project subsystems [34].

The balance of the economic system is achieved in the case of proportionality (equality) of its structural components (subsystems). The balance is a prerequisite for the successful functioning of the economic system from a strategic perspective. An equiponderous configuration of an economic system is a case of equal fullness of the object, environment, process, and project components inside the studied system. Such a tetrad can be depicted in the form of a square, divided into four equal parts. The non-equilibrium situation (i.e. the dominance of one (or several) system components over the others) will negatively affect the functioning of the system as a whole, causing the hyper function of one types of systems and the dysfunction of other types.

2. The Model of the Socio-Economic System and the Algorithm for Calculating the System Balance Index

As stated in Section 1, the model of the economic system is the tetrad, which includes the object, environment, process, and project subsystems interacting with each other according to the "object — environment — process — project — object" scheme. As a geometric representation of the tetrad, we will use a square divided into four non-intersecting quadrilaterals by two segments, the ends of each of which are on the opposite sides of the given square. Moreover, each of the quadrilaterals represents one of the tetrad subsystems. The side of the square corresponds to the total volume of the two subsystems, and the location of the ends of the segments on the sides of the square reflects the contribution of each of these subsystems to their total volume. We assume that the entire system and its subsystems can be characterized using a certain indicator, which we will consider the results of measuring the volume of the system, for example, the volume of output produced by the system or the number of employees of this system.

We conduct a quantitative assessment of the balance of the system, which is based on determining the intensity of the connections between the components of the tetrad corresponding to it. Since each tetrad includes four subsystems, and its structure has a ring-shaped form, it is necessary to assess the intensity of interaction in four pairs of subsystems: "object — environment", "environment — process", "process — project", and "project — object". We denote the interaction intensity of the presented pairs through the indicators a, b, c and d, respectively. On the graphical image of the tetrad, each of these indicators shows the length of the segment from the point on the side of the square to the point of intersection of two segments dividing the square into four parts (Figure 1). When $a \approx b \approx c \approx d$, the tetrad will be considered balanced.

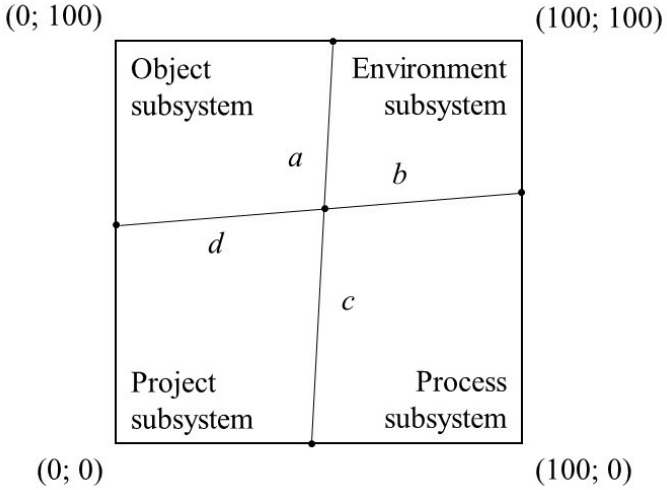

Fig. 1. *Graphical representation of tetrad*

The system balance index can be calculated using the formula proposed in [35]:

$$I = 1 / \left(\frac{a}{b} + \frac{b}{a} + \frac{a}{c} + \frac{c}{a} + \frac{a}{d} + \frac{d}{a} + \frac{b}{c} + \frac{c}{b} + \frac{b}{d} + \frac{d}{b} + \frac{c}{d} + \frac{d}{c} - 11 \right).$$

The system balance index is measured within $0 < I \leq 1$; moreover, the closer the index value is to one, the more balanced the tetrad is considered. This is also true vice versa, as the closer the index value is to zero, the less balanced the tetrad is. Depending on the interval at which the index values fall, we can conclude the degree of system balance of the studied tetrad: $0{,}0 < I \leq 0{,}2$ — extremely low balance, $0{,}2 < I \leq 0{,}5$ — low balance, $0{,}5 < I \leq 0{,}7$ — medium balance, $0{,}7 < I \leq 0{,}9$ — high balance, $0{,}9 < I \leq 1{,}0$ — maximum balance (see also [36)].

The algorithm for calculating the system balance index involves five stages:

1. The choice of indicators characterizing the volumes of the subsystems of the studied tetrad and the system as a whole.

2. Determination of the ratios between the volumes of the components of the tetrad in pairs.

3. Determination of values of the indicators *a*, *b*, *c* and *d*, demonstrating the intensity of interaction in four pairs of subsystems.

4. Calculation of the system balance index.

5. Making conclusion about the degree of system balance of the tetrad based on the obtained index value.

Let us hereby demonstrate the calculation of the system balance index using an example.

1. Assume that after implementation of the first stage of the algorithm, the following values of the subsystem volume indicators are obtained: object subsystems — 220 units, environment subsystems — 180 units, process subsystems — 320 units, and project subsystems — 280 units.

2. Determine the relationship between the volumes of the tetrad subsystems in pairs, round up the obtained values to integers and fill table 1.

Table 1

Relations between volumes of tetrad subsystems by pairs

Subsystem	**Volume, units**	**Ratio within a pair of subsystems, %**			
		"object — environment"	**"environment — process"**	**"process — project"**	**"project — object"**
Object	220,0	55	—	—	44
Environment	180,0	45	36	—	—
Process	320,0	—	64	53	—
Project	280,0	—	—	47	56

3. As a result of the calculation of indicators following the above algorithm, the values $a \approx 40$, $b \approx 48$, $c \approx 60$ and $d \approx 52$ are obtained.

4. The calculation of the system balance index using the provided formula gives the value $I = 0{,}74$.

5. The index value characterizes the studied tetrad as high degree balanced since it falls within the interval $0{,}7 < I \leq 0{,}9$.

Examples of calculating the system balance index of real socio-economic systems are also presented in [37].

3. Initial Data for Calculating the System Balance Index of Federal Subjects of Russia

To conduct a quantitative assessment of the system balance of the entities of the Russian Federation, macro-objects (federal districts) and the country as a whole, we calculate the systemic balance indices of these economic systems. We based the calculation of this index on the algorithm described in Section 2.

The gross regional product is the primary indicator of the development and performance of an economic activity in the region. If we consider the region as a tetrad, then each of its subsystems contributes to the region's economic activity. Thus, we can estimate the volume of the object, environment, process and project subsystems of this tetrad, based on the gross regional product indicators. The Russian Classification of Economic Activities (OKVED) determines the structure of the

Table 2

The Results of the Distribution of Economic Activities by Types of Subsystems

OKVED section	Section title	Subsystem type			
		object	environment	process	project
A	Agriculture	+	–	–	–
B	Fishing and fish farming	+	–	–	–
C	Mining	+	–	–	–
D	Manufacturing	+	–	–	–
E	Electricity, gas and water supply	+	–	–	–
F	Construction	–	–	–	+
G	Wholesale and retail trade and others	–	–	–	+
H	Hotels and restaurants	–	+	–	–
I	Transport and communication	–	–	+	–
J	Financial activities	–	–	–	+
K	Real estate activities and others	–	+	–	–
L	Public administration and others	–	+	–	–
M	Education	–	–	+	–
N	Health care and others	–	+	–	–
O	Other public services	–	+	–	–
P	Household activities	+	+	+	+

country's economic activities. Accordingly, it is required to determine which types of economic activity characterise systems of one type or another. The results of this distribution are presented in Table 2.

The analysis shows that the activities of the object subsystems are characterised by sections A, B, C, D and E of the classifier. The environmental systems are characterized by sections H, K, L, N and O. The process systems are characterised by sections I and M. The project systems are characterized by sections F, G, and J. The last section P applies equally to all four types of economic systems; therefore, its values should be divided into four equal parts. The presented structure of types of economic activity is determined by the version of OKVED (OK 029–2001), which was in effect until January 1, 2017.

The statistical data necessary for determining the volume of subsystems of the entities of the Russian Federation (a macro-object, a country as a whole) are available on the Rosstat website in the table "Structure of GRP created by industry (at current prices; as a percentage of the total)"[2]. The gross regional product of the Russian Federation entities is calculated and published with a large lag, therefore, the site has relevant data for the period from 2004 up to 2016.

The sectoral structure duplicates the structure of types of economic activity, but the values of the corresponding indicators are calculated in various ways [38].

Based on the available data, we calculate the volume of subsystems for each entity of the Russian Federation, the macro-object and the country as a whole, and the system balance indices for five years (from 2012 to 2016). There is no need to take into account inflation indicators in the GRP since we calculated the indices of system balance separately for each year.

4. Calculation Results

At present, there are 85 constituent entities in the Russian Federation, divided into 8 federal districts. In 2014, Crimea joined the Russian Federation, as a result of which two new subjects were formed, and the total number changed from 83 to 85.

Based on the obtained values of the system balance indices, we divided the entities of the Russian Federation into the following groups: I—maximum balance ($0{,}9 < I \leq 1{,}0$), II—high balance ($0{,}7 < I \leq 0{,}9$), III—medium balance ($0{,}5 < I \leq 0{,}7$), IV—low balance ($0{,}2 < I \leq 0{,}5$), V—extremely low balance ($0{,}0 < I \leq 0{,}2$).

The results of this distribution are presented graphically in Figure 2.

[2] Structure of GRP created by industry (at current prices; as a percentage of the total). Updated: 02.03.2018. Federal State Statistics Service. Retrieved from: http://www.gks.ru/free_doc/new_site/vvp/tab-vrp2.htm (Date of access: 14.01.2019).

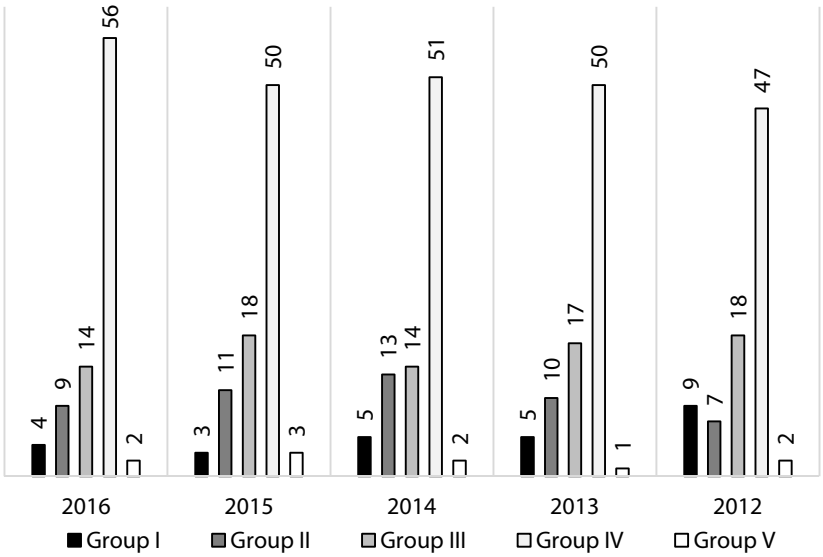

Fig. 2. *Distribution of entities of the Russian Federation by groups based on the values of the system balance indices*

Thus, in 2016, 32 % of entities of the Russian Federation had a high and medium system balance (groups I, II, III). In 2015 this figure was at 38 %, in 2014 it was at 38 %, in 2013 at 39 %, and in 2012 this figure was at 41 %.

Table 3 shows the dynamics of the structure of the group 'regions-leaders' (the five entities of the Russian Federation with the highest system balance) and 'regions-outsiders' (the five subjects of the Russian Federation with the lowest system balance) from 2012 to 2016.

Table 3

Dynamics of the structure of the group of regions-leaders and regions-outsiders from 2012 to 2016

Year	№	Regions-leaders	*I*	№	Regions-outsiders	*I*
2016	1.	Chechen Republic	0,99	81.	Lipetsk Oblast	0,21
	2.	Primorsky Krai	0,97	82.	Sakhalin Oblast	0,21
	3.	Khabarovsk Krai	0,93	83.	Mari El Republic	0,20
	4.	Krasnodar Krai	0,91	84.	Kaluga Oblast	0,19
	5.	St. Petersburg	0,87	85.	Yamalo-Nenets AO	0,17
2015	1.	Primorsky Krai	0,95	81.	Sakhalin Oblast	0,21
	2.	Chechen Republic	0,95	82.	Yamalo-Nenets AO	0,20
	3.	Khabarovsk Krai	0,92	83.	Mari El Republic	0,20
	4.	Krasnodar Krai	0,88	84.	Nenets Aut. Okrug	0,19
	5.	Novosibirsk Oblast	0,86	85.	Lipetsk Oblast	0,18
2014	1.	Primorsky Krai	0,99	81.	Kaluga Oblast	0,24
	2.	Amur Oblast	0,98	82.	Nenets Aut. Okrug	0,24
	3.	Khabarovsk Krai	0,94	83.	Belgorod Oblast	0,20
	4.	Novosibirsk Oblast	0,91	84.	Lipetsk Oblast	0,19
	5.	Republic of Ingushetia	0,90	85.	Sakhalin Oblast	0,19
2013	1.	Primorsky Krai	0,99	79.	Chukotka Aut. Okrug	0,28
	2.	Amur Oblast	0,95	80.	Kaluga Oblast	0,25
	3.	Republic of Ingushetia	0,95	81.	Lipetsk Oblast	0,24
	4.	Chechen Republic	0,94	82.	Belgorod Oblast	0,22
	5.	Khabarovsk Krai	0,93	83.	Sakhalin Oblast	0,20
2012	1.	Chechen Republic	0,99	79.	Karachay-Cherkessia	0,25
	2.	Khabarovsk Krai	0,98	80.	Lipetsk Oblast	0,24
	3.	Jewish Aut. Oblast	0,98	81.	Kaluga Oblast	0,23
	4.	Primorsky Krai	0,97	82.	Belgorod Oblast	0,20
	5.	Republic of Buryatia	0,95	83.	Sakhalin Oblast	0,18

Translation

It should be noted that the structure of the regions-leaders, as well as the regions-outsiders, is relatively constant. The Primorsky Krai and the Khabarovsk Krai were among the leaders 5 times, the Chechen Republic appeared 4 times. The Lipetsk Oblast and the Sakhalin Oblast were among the regions-outsiders 5 times, and the Kaluga Oblast was in this position 4 times.

The system balance and, as a result, the region's position within the group of leaders or the group of outsiders is not determined unequivocally by the degree of the region's economic development or its activity in the sphere of innovation. System balance is determined by the proportionality of the volumes of the object, environment, process, and project subsystems of each territory. The proportionality criterion is used to assess the system balance because of its importance from a long-term perspective: strategically, none of the four individual subsystems of a region should dominate the others. This condition was active and influential in the entry into the group of leaders of such subsidised regions as the Chechen Republic, the Republic of Ingushetia and others. This condition caused the entry into the group of outsiders of such industrialised regions as Lipetsk and Kaluga oblasts.

Thus, a high level of balance in the Chechen Republic and the Republic of Ingushetia is associated with the peculiarities of their financing from the federal centre, as well as with a high degree of the government's centralisation in these republics. The low level of balance in Lipetsk and Kaluga oblasts is associated with a high share of the object subsystem in the structure of the economy, and a low level of development of the process subsystems of these territories. This trend threatens these regions' coherence and integrity, especially taking into account the power of influence of the expansive transnational corporations in these regions.

We proceed under the initial assumption of assessing the federal character of the state structure of Russia and, accordingly, the desirability of increasing the sustainable development potential of each of its entities. It is important to note that this approach does not intend to diminish the importance of an interregional supply of products, overflow of labour resources, exchange of information, and so forth. However, neglect of the principles of the system balance of the Russian constituent entities from a strategic perspective reduces the individual entities' competitiveness, and in turn, the overall level of the country's socio-economic security.

Obviously, a wide spectrum of variable factors affects the system balance of each region, from cultural and historical development to natural and climatic conditions. For this reason, regional

Fig. 3. *Heat map of the system balance of the Russian economy in a regional perspective for 2016*

Translation

Fig. 4. *Heat map of the system balance of the Russian economy in the perspective of federal districts for 2016*

economic policy should focus at levelling imbalances and maintaining poorly developed industries in a given territory.

The calculation of the system balance indices and the corresponding rating presented herein do not replace such alternative indicators as the rating of innovative development, investment attractiveness, economic dynamics, and others. However, our approach supplements the existing methods by considering the new aspect of the functioning of the Russian Federation regions.

In Figure 3 we demonstrate the overall picture of the system balance of the Russian economy for 2016 in a regional context in the form of a heat map. The overall system balance is presented in the context of federal districts in Figure 4. In these images, the darker the area is filled, the higher is the system balance of the Russian Federation entity (i.e. the federal district in question).

The entities of the Russian Federation, characterized by the highest degree of system balance, are located in the border areas of the Russian Federation (Primorsky Krai, Khabarovsk Krai, Amur Oblast, Republic of Buryatia, Zabaykalsky Krai, and others).

By utilizing the absolute values of gross regional product[3], we can calculate the contribution of the entities of the Russian Federation to the total gross regional product (GRP) of the country as a whole. For this purpose, we perform the required calculations and design the map of the influence of the GRP of the Russian entities on the total GRP of the federal districts and the country as a whole. The result is shown in Figure 5.

The analysis of the influence map indicates that in each federal district, it is possible to single out one or several entities, which make the most significant contribution to the GRP of a higher-level system. For example, in the Central Federal District such a subject is Moscow, St. Petersburg occupies this role in the North-Western Federal District, in the Southern Federal District Krasnodar Krai and Rostov Oblast stand out, etc. This situation shows a significant imbalance in the allocation of resources. We can assume that the entities with a higher share in the volume of the GRP of the federal district have a higher influence on the systemic balance index of their district.

The analysis of the dynamics of the system balance indices of the entities of the Russian Federation is also relevant. We assessed the variation of the values of the system balance index of the Russian

[3] Gross regional product by the subjects of Russian Federation for 1998–2016 (basic prices, million roubles). Updated: 02.03.2018. Federal State Statistics Service. Retrieved from: http://www.gks.ru/free_doc/new_site/vvp/vrp98–16.xlsx (Date of access: 14.01.2019).

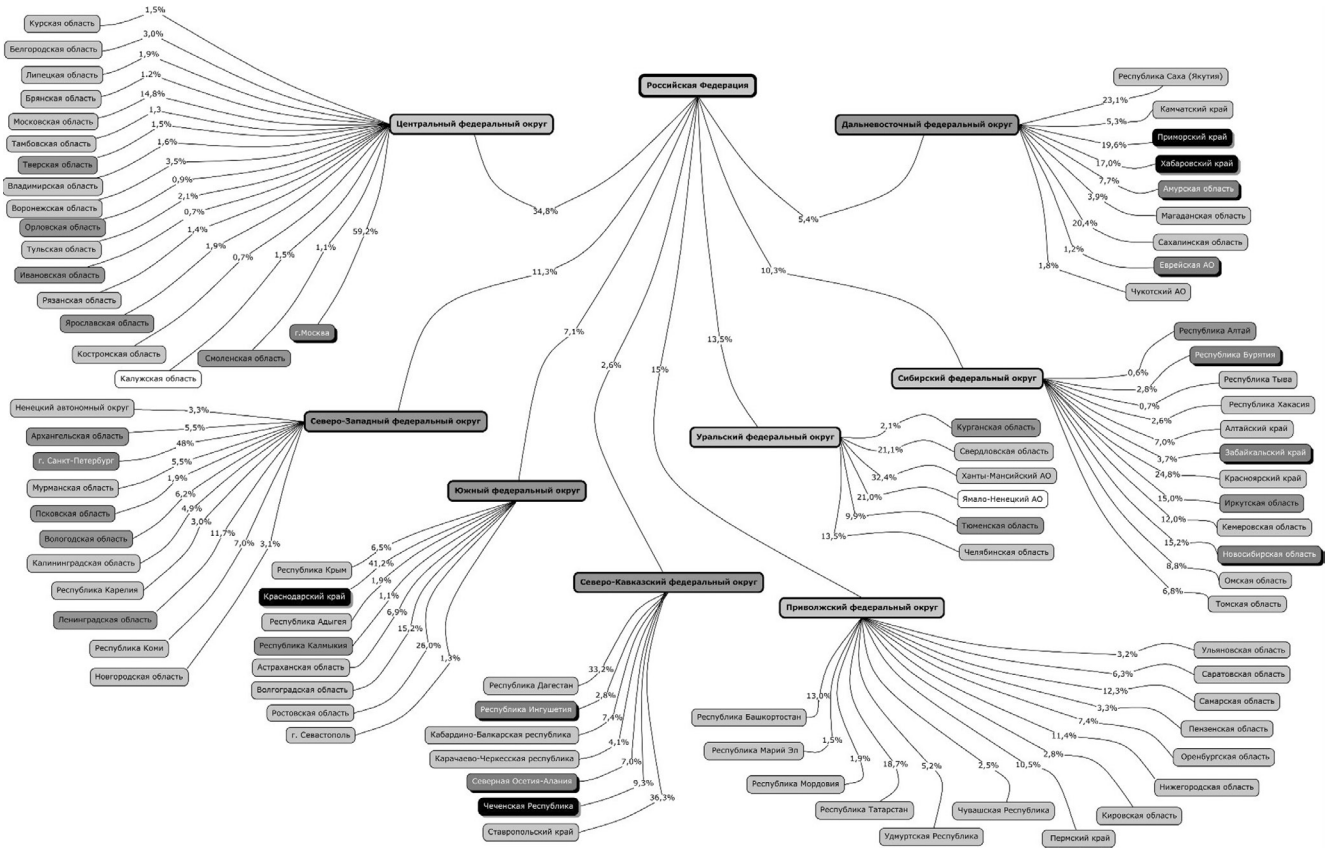

Fig. 5. *Map of the influence of the GRP of the entities of the Russian Federation on the total GRP of federal districts and the country as a whole*

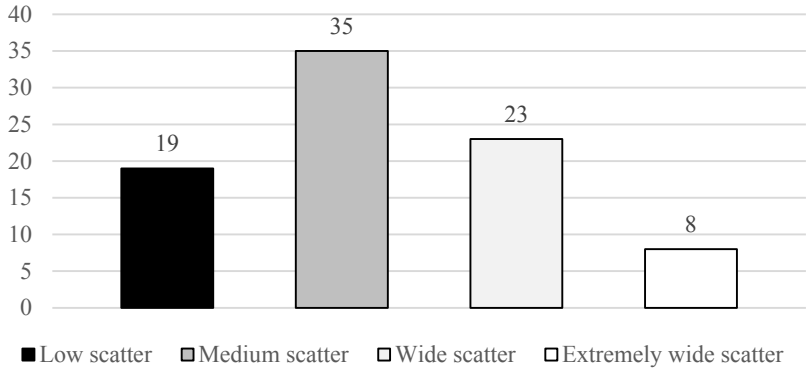

Fig. 6. *The distribution of the entities of the Russian Federation by groups depending on the values of the standard deviations of the system balance indices for the period from 2012 to 2016*

Federation entities by years, calculating their standard deviations for the period from 2012 to 2016. Within this set of results, we distinguished four groups of subjects, arranged according to the degree of variation of the values of standard deviations of their system balance indices:

1) low scatter — $0 \le s < 0{,}03$;

2) medium scatter — $0{,}03 \le s < 0{,}06$;

3) wide scatter — $0{,}06 \le s < 0{,}10$;

4) extremely wide scatter — $s \ge 0{,}10$.

The results of the grouping are presented in Figure 6.

Thus, 54 regions or 63,5 % of the total number of the entities of the Russian Federation (groups within the low and medium range for scatter of values) are characterised by stability in terms of the system balance index for the period from 2012 to 2016.

Conclusion

We analysed the system balance of the federal entities of Russia, based on the calculation of the system balance index. The results provided have shown a significant variation across regions in terms of balance and a high proportion of structurally unbalanced regions. The number of such

regions slightly fluctuates around 62 % in the period from 2012 to 2016. They include such entities of the Russian Federation as Lipetsk oblast, Kaluga oblast, Sakhalin oblast, and others. In most of these entities of the Russian Federation, the dominant influence is accounted for by variables within the object subsystems. This fact indicates the underdevelopment of the communication, logistics, and information infrastructure in these regions. A high degree of system balance is characteristic for such subjects of the Russian Federation as the Chechen Republic, Primorsky Krai, Khabarovsk Krai, St. Petersburg, Moscow, and others. These regions have a high potential for comprehensive system development. In other cases, the dysfunction in the system structure of the entities of the Russian Federation may be overcome using the targeted regional economic policies. We claim that part of the economic strategy for entities of the Russian Federation should include reflections on the proportions between the development of the region's object, environment, process, and project subsystems. Ideally, any long-term strategies in this field should aim towards increasing the balance of these subsystems, and the system balance index should be used as an indicator characterising the balance. The strategy, including the large-scale socio-economic measures for the development of the economy of an individual entity, should take into account their specific impact on the region's system balance. It is also necessary to organize a monitoring of system balance, aimed at reducing negative influences on socio-economic development in areas such as sustainability, innovation, connectivity, and territorial homogeneity.

This kind of analysis can also provide important data for improving the administrative and territorial organisation of the country in order to increase the sustainability of productive regional operations. This would have a beneficial effect on the national economy as a whole.

In conclusion, the proposed method of calculating the index of the systemic balance of the regions has demonstrated its efficiency and has proved useful for analysing the spatial structure of the Russian economy. Nevertheless, further improvement is necessary, notably in the context of detailing the types of economic activity that characterise the functions of subsystems of each type.

The need for an analysis of the mutual influence of the system balance of economic sectors and the system balance of territories is a separate problem that requires addressing. Modern statistics of economic development only provide indirect data on the ratio of the size of the object, environment, process and project subsystems of the Russian Federation entities. However, these characteristics determine the potential for stability (object and environment subsystems), connectivity and homogeneity (environment and process subsystems), and innovation (project subsystems) in regards to the overall development of territories.

In general, modern statistics collecting the socio-economic information are based on neoclassical economic theory, fundamental to which is the concept of an economic agent (autonomous enterprise). Expanding the theoretical base of statistics through system economic theory would allow supplementing the arrays of economic data with information about the processes of formation, interaction, transformation, and liquidation of economic systems. In this way, we can not only define the dynamics of system balance in the economy, but also eliminate a number of existing discrepancies between statistics based on the subjectivity of enterprises and statistics based on the subjectivity of legal entities.

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