Assessing the Potential of Agglomeration Processes in the Regions of the Russian Federation

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Abstract. To substantiate the levers and mechanisms of influence on agglomeration processes in the territorial space, a significant and relevant area of economic science is theoretical and methodological developments related to identifying and assessing the potential of agglomeration processes in Russia's regions, which is determined by the aim of the work. We have designed a system of indicators for agglomeration processes, which includes the following blocks: concentration of production and economic activity; concentration of population; concentration of science and technology potential and innovations; concentration of housing infrastructure; people's welfare. The proposed methodological toolkit involves analyzing the specialization of Russia's regions by calculating location quotient for certain types of economic activity and assessing the interaction of the territory's agglomeration process potential and concentration of certain types of economic activity in it by constructing the matrix "agglomeration process potential in the region – location quotient for certain types of economic activity". Our methodological

approach was tested on 85 constituent entities of the Russian Federation. The research period included the years 2000, 2008, 2016–2022. The information base comprised data from the Federal State Statistics Service. According to the results of the calculations, we see a high degree of differentiation of agglomeration processes potential in the Central and Northwestern federal districts. Intensive agglomeration processes are observed in the Kaliningrad, Leningrad, Rostov, Nizhny Novgorod, Sverdlovsk, Tyumen, Novosibirsk regions, Krasnodar and Krasnoyarsk territories, the city of Sevastopol and the Republic of Tatarstan. There is a low potential for agglomeration development in the North Caucasus and the Far East, and in some years there were no agglomeration processes in the Chechen Republic and the Republic of Ingushetia. The findings of our research can be used by regional authorities in designing strategic planning documents, by a wide range of researchers in the field of spatial economics, and by teachers and students in the framework of personnel training in economic specialties.

Key words: region, agglomeration, potential, agglomeration process, location quotient, spatial economy, socio-economic inequality.

Introduction

Today, the issues of agglomeration processes development in the regions of the Russian Federation are gaining special popularity for a number of reasons. First, the Strategy for Spatial Development of the Russian Federation for the period until 2030 with a forecast until 2036[1] identifies urban agglomerations as key centers of economic growth, scientific, technological and innovative development of the Russian Federation constituent entities within the framework of the formation of a supply economy in the country, focused on the development of the domestic market. Second, the presence of large urban agglomerations contributes to the accelerated economic growth of the region, against the background of desertification of municipal districts of the subject and shrinking economic space, while strengthening interregional and intraregional differentiation. Third, based on a wrong understanding of the interconnection of territories, without taking into account the links and interactions within regions, it is possible to get a distorted picture of the object under consideration, which will lead to incorrect results.

All this dictates the need to substantiate the levers and mechanisms of impact on agglomeration processes in the territorial space, in this regard, a significant and relevant area of economic science is the theoretical and methodological development of identification and assessment of the potential of agglomeration processes in the regions of the Russian Federation.

The study will assess the potential of agglomeration processes in the constituent entities of the Russian Federation. The work is organized as follows: in the first section we will consider the theoretical foundations of the stated problems in the works of domestic and foreign scientists; in the second, it is the methodology and information base of the study; in the third — a general idea of the development of agglomeration processes in the regions of the Russian Federation and the analysis of the results obtained. In conclusion, we will present the main results and recommendations.

The scientific novelty of the study lies in the possibility to correctly measure the differentiation of the potential of agglomeration processes in the regions of the Russian Federation, to position each constituent entity of the RF in relation to other regions.

Theoretical and methodological basis of the study was provided by scientific publications of Russian and foreign scientists in the field of theory, methodology, assessment and analysis of agglomeration processes, as well as in the field of spatial economy.

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[1] It is approved by Governmental Order 4146-r, dated December 28, 2024.

Evolution of aspects of research on agglomeration processes

The scientific category of "agglomeration" in the national literature was widely used in the second half of the 20th century. Agglomeration (from the Latin *agglomerare* – to join, accumulate) is "a compact arrangement, grouping of urban settlements united into a single whole by intensive production, labor, cultural, domestic and recreational ties"[2]. The term "agglomeration" was introduced into the scientific economic turnover by Adna Ferrin Weber (USA). She defined the main reason for the concentration of population in the city as economic (structural) forces, to which she attributed technological progress, the emergence and development of trade, the territorial division of labor, etc. (Weber, 1903). E.Y. Boze correctly notes that "today agglomeration is characterized not so much by the integrity of production and settlement systems as by the integrity of labor, real estate, land markets, as well as the level of functional connectivity of its individual elements" (Boze, 2007).

S.N. Rastvortseva understands agglomeration process as "the concentration of economic activity in the region (in the city) in dynamics" (Rastvortseva, 2013). A team of authors led by N.N. Kiseleva gives a broader definition of agglomeration process, in their opinion, it is "spatial and temporal dynamics of concentration of economic, innovation and business activity as a degree of concentration of production" (Kiseleva et al., 2016). B.M. Grinchel' and A.A. Antonova consider the regional agglomeration process as "an integral part (component) of the innovation-oriented process of transformation of the socio-economic space of the Russian Federation" (Grinchel', Antonova, 2012), the scientists mean primarily "measuring the dynamics of the regional agglomeration process" (Grinchel', Antonova, 2012). S.A. Kozhevnikov and N.V. Voroshilov conclude that "agglomeration

processes from the core spread mainly only to the territory nearest to it, which is manifested in the presence of a high level of long-distance commuting along this line only, in the convergence and certain synchronization of their development in terms of key socio-economic indicators" (Kozhevnikov, Voroshilov, 2024).

The study of agglomeration processes has received much attention from the representatives of the new economic geography. According to the results of a number of empirical studies, it was argued that the agglomeration process continues until a certain point – the beginning of the dispersion process, when centrifugal forces begin prevailing over centripetal forces.

The fundamental works of the new economic geography are the works of P. Krugman. According to the scientist, "low transportation costs and economies of scale stimulate agglomeration processes" (Krugman, 1991), "low transportation costs lead to agglomeration processes: concentration of industries in the region where initial conditions are better, with average transportation costs agglomeration processes occur when initial conditions differ significantly between regions" (Krugman, Venables, 1996).

Spanish scholar D. Puga argues that "in the presence of labor mobility, high trade costs lead to convergence, low trade costs stimulate agglomeration processes" (Puga, 1999). M. Fujita and H. Ogawa conclude that "agglomeration processes in a region are characterized by economic relations between producers that weaken as the distance between them increases" (Fujita, Ogawa, 1982). F. Marten and D.I.P. Ottaviano concluded from empirical studies that "if initially a larger number of firms produce differentiated goods in one region, the agglomeration process occurs in that region because the cost of innovation is lower. Then all innovation is concentrated in that region" (Martin, Ottaviano, 2001). "Modern research explains the emergence and development of agglomeration processes as a consequence of interregional interaction at large spatial scales" (Brakman, van Marrewijk, 2009).

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[2] Big Economic Dictionary (2002). 5th edition, supplement and revision. Moscow: In-t novoi ekonomiki. 1280 p.

Considering the evolution of methodological approaches to the assessment of agglomeration processes and spatial inequality in foreign and Russian studies, it is advisable to identify separate blocks, the totality of which creates a unified methodological framework.

1. Methodological approaches to the identification and assessment of agglomerations.

To assess the development of agglomerations by the level of formation and development of its outer zone, scientists of the Institute of Geography of RAS and the Central Research Institute of Urban Development presented a system of indicators: agglomerativity coefficient (K_a), agglomerativity index (I_a), agglomeration development coefficient (K_{time}). Yu.L. Pivovarov presented a methodological approach to defining agglomeration boundaries (Pivovarov, 2002).

2. Methodological approaches to spatial concentration assessment

The scientific literature uses a number of indices to assess spatial concentration: Gini index (Gini, 1914); Theil index (Kolomak, 2013; Malkina, 2016); Atkinson index (Atkinson, 1970); Herfindahl — Hirschman concentration index (Suvorova, Kotlyarova, 2023; Lin et al., 2011; Han, Song, 2021), P. Krugman specialization index (Krugman, 1991).

3. Methodological approaches to the identification and assessment of periphery are in the process of formation and establishment, let us define the significant, in our opinion, indices of peripheralization of territories: Keeble's peripherality index (Copus, 2001), Eder's peripheralization index (Eder, 2019).

A common approach to assessing the emergence of agglomeration processes in the region is the method of W.S. Strange, which consists in analyzing the dynamics of population density in cities. If the density of specific cities increases at a faster rate, it indicates the emergence of agglomeration process (Strange, 2009). S.N. Rastvortseva modified this method by adding the assessment of migration growth and presented an algorithm for analyzing

the development of agglomeration process in the regional economy (Rastvortseva, 2013).

Thus, we can conclude that to date in the foreign and Russian scientific literature there is no universally recognized methodological approach for identification, assessment, management and forecasting of agglomeration processes in the spatial economy, which confirms the significance and relevance of this study.

Methodology and information base of the research

1. The first step in assessing the potential of agglomeration processes is the definition of indicators. We should emphasize that the justification of indicators is intertwined with the opinions of researchers who define agglomerations and agglomeration processes.

The criteria of agglomeration processes of the region are:

— concentration of production and economic activity — in the process of defining the essence of agglomeration processes, this criterion is highlighted as their main indicator;

— population concentration is an important criterion of agglomeration processes taking place in the territorial space, as the economically active population migrates to cities and regions attractive for living, working and studying, contributing to the development of agglomeration processes;

— concentration of scientific and technological potential and innovations – this criterion in modern conditions of globalization development is important for assessing the potential of agglomeration processes, because along with the concentration of industry in regions with active agglomeration processes there is a concentration of technologies and innovations;

— concentration of housing infrastructure — housing infrastructure ensures the quality of life; in agglomerated regions, namely in the agglomeration core, the quality of life is higher, which determines the choice of this indicator;

— population welfare — it characterizes financial opportunities of the region's residents; an important indicator of the region's active agglomeration processes is a higher level of population welfare.

Each of the presented indicators describes agglomeration processes in the region from a certain perspective, which in general establishes the multifactoriality and complexity of this concept.

2. At the second stage of assessment, for each selected indicator, we will form a system of indicators with information availability, reliability and relevance, which will make it possible to comprehensively assess the potential of agglomeration processes in Russian regions. Within the framework of our methodology, it is advisable to use, on the one hand, a sufficient number (18 in our own set) of indicators combined into five functional blocks corresponding to the indicators of the agglomeration process, and, on the other hand, the resulting index that allows quantitatively assessing the potential of the agglomeration process in a particular region in dynamics. When forming the

system of indicators of agglomeration processes in Russian regions, we took into account the intrinsic interconnectedness, which, when calculating the final index, ensures the cumulative accumulation of qualitative attributes and the reliability of the results obtained. We emphasize that each block includes the number of indicators that is really necessary and sufficient to ensure the reliability of the final assessment for each indicator of the agglomeration process. In our opinion, the presented system of indicators characterizes the whole range of significant aspects of agglomeration processes in Russian regions (*Table*).

The indicator "Concentration of production and economic activity" presents factors that most objectively reflect the level of concentration of production and economic sphere in the region, which in turn determines the intensity of agglomeration processes.

The use of factors in the indicator "Concentration of population" is based on the hypothesis: regions with a higher potential for agglomeration processes have higher population density, natural and migratory population growth, hence, a greater

Indicators for assessing agglomeration processes potential in Russian regions

No.	Indicator	Factor
1	Concentration of production and economic activity	1.1 Number of organizations, units 1.2 Retail trade turnover (without small businesses), in 2017 prices, thousand rubles 1.3 Number of labor force, total, persons 1.4 Density of economically active population, persons/km^2
2	Concentration of population	2.1 Population density; persons/km^2 2.2 Coefficient of natural increase, ppm 2.3 Migration, growth per year, ppm 2.4 Specific weight of urban population, % 2.5 Number of active subscribers of fixed mobile broadband access to the Internet per 100 persons, persons
3	Concentration of scientific and technological potential and innovation	3.1 Number of organizations performing scientific research and development, units 3.2 Share of economically active population engaged in R&D, % 3.3 Internal current expenditures on innovative research and development, million rubles 3.4 Volume of innovative goods, works and services, million rubles
4	Concentration of housing infrastructure	4.1 Total area of residential premises per inhabitant on average, total, m^2 4.2 Commissioning of residential buildings per 1,000 people, m^2
5	People's welfare	5.1 Median average per capita monetary income of the population, rubles 5.2 Individuals' funds (deposits) in ruble accounts with Sberbank of Russia per capita, rubles 5.3 Number of own passenger cars per 1,000 people, units
Source: Regions of Russia. Socio-economic indicators. Available at: https://rosstat.gov.ru/folder/210/document/47652 (accessed: January 8, 2025).		

number of active Internet users and a greater share of urban population.

The factors of the indicator "Concentration of scientific and technical potential and innovations" allow objectively assessing the innovative development level of the region, the subjects with intensive agglomeration processes have a higher level of innovative development.

An important indicator of agglomeration processes is "Concentration of housing infrastructure". This block in our own methodology reveals the provision of the population with housing and construction rates, which directly depend on agglomeration processes in the region.

For the indicator "People's welfare", it is proposed to use indicators that characterize the financial capabilities of the region's residents. An important characteristic of agglomerated regions is the level of money income. The statistical parameter "the number of own passenger cars per 1,000 people" demonstrates not only the level of people's welfare, but also shows the concentration of personal vehicles, which are necessary for making daily trips to work, school, etc. to the "core" of the agglomeration.

The computational apparatus of the study includes several steps.

Standardization of indicators will be based on the variation spread to a single numerical measure (0−1) using the following formula:

$$P_i = \frac{X_{ij} - X\mathrm{cp}_{min}}{X\mathrm{cp}_{max} - X\mathrm{cp}_{min}}, \qquad (1)$$

where:

Pij – standardized i indicator of region j;

Xij – actual i indicator of region j;

Xav_{min} – averaged over the five worst regions, the minimum value of indicator i of the factor in the sample of regions;

Xav_{max} – maximum value of indicator i of the indicator in the sample of regions averaged over the five best regions.

$$I_j = (\sum P_{ij})/n, \qquad (2)$$

where:

I_j – normalized assessment of the agglomeration process potential of region j for each indicator,

n – total number of indicator factors.

$$AP_j = \frac{I_{j1} + I_{j2} + I_{j3} + I_{j4} + I_{j5}}{5}, \qquad (3)$$

where:

AP_j – normalized index of agglomeration potential in region j;

I_{j1}–I_{j5} – normalized estimates of the agglomeration process potential of region j for each of the five indicators.

Let us explain that the averaging of the five worst/best regions of the indicator values was carried out to reduce the gap in values, but the ranking of the subjects in the sample is not violated.

The final index (AP_j) obtained by calculation allows correctly measuring the interregional differentiation of the potential of agglomeration processes in Russia's regions and position each constituent entity of the RF in relation to other regions.

At the third stage, we will analyze the specialization of the Russian regions (agriculture, hunting, fishing and fish farming; forestry and logging; mining; manufacturing; research and development) by calculating the location quotient:

$$LQ = \frac{\frac{E_{ji}}{E_j}}{\frac{E_i}{E}}, \qquad (4)$$

where:

LQ –location quotient;

E_{ji} – number of employed in sector of economy i in region j;

E_j – total employment in region j;

E_i – number of employed persons in economic sector i;

E – total number of employed in the country;

i – sector of the economy;

j – region.

The location quotient shows how many times the concentration of a particular type of economic activity exceeds the national average, i.e. it characterizes the region in relation to the specifics of industrial production.

At the fourth stage of the assessment, we use the results obtained by calculation to construct a matrix "level of agglomeration process potential in the region − location quotient of certain types of economic activities". It is assumed that the matrix takes into account the interaction between the agglomeration process potential of the territory and the level of concentration of certain types of economic activities in it. The study was conducted for 85 Russia's regions. The data for the Arkhangelsk and Tyumen regions were taken separately, excluding autonomous areas. Autonomous okrugs were taken into account as separate subjects of the Federation. The study period was 2000, 2008, 2016−2022. The information base was the data of the Federal State Statistics Service.

Results obtained and discussions

An important feature of cities and regions of the Russian Federation is their high level of differentiation in a number of important socio-economic and natural-geographical indicators, which creates conditions for the emergence and development of agglomeration processes in some territories and the outflow of resources (human capital, innovation, investment, etc.) from peripheral regions. To give a general picture of the differentiation of Russian regions, let us calculate the Gini index by individual socio-economic parameters (*Fig. 1, 2*). The choice of the Gini coefficient is determined by the simplicity of calculation, the absence of the need to identify the subjects of assessment.

The Gini index for the indicator "increase (decrease) of money with the population", which amounted to 0.39 (minimum value) in 2000, reached the maximum value in 2022 − 0.62; the current trend allows concluding about the growth of inequality by this criterion. In 2000, 22.5% of

Figure 1. Social inequality dynamics of Russian regions in 2000–2022, Gini index
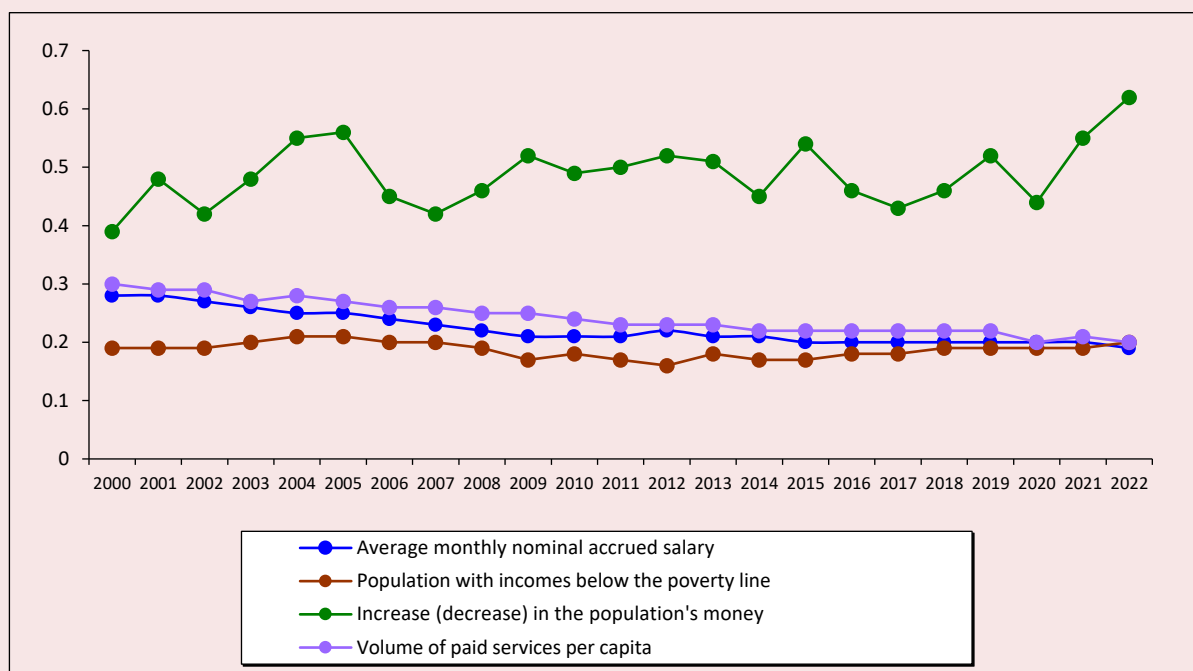
According to: Federal State Statistics Service data. Available at: https://rosstat.gov.ru/folder/210/document/13204 (accessed: August 15, 2024).

Figure 2. Economic inequality dynamics in Russian regions in 2010–2022, Gini index
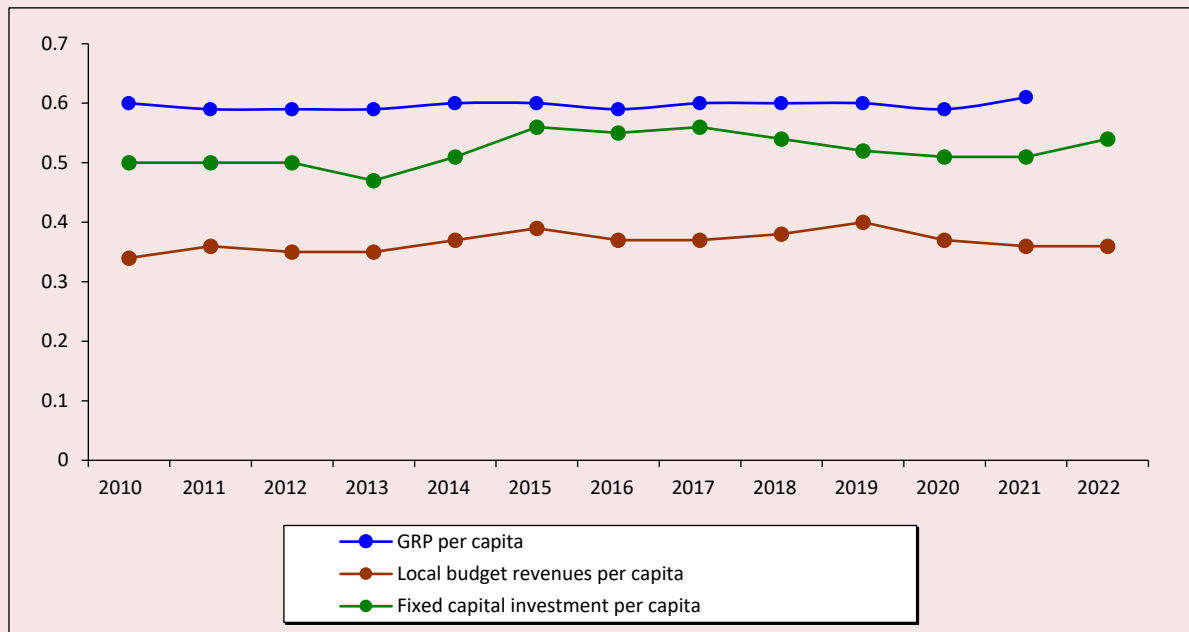
According to: Federal State Statistics Service data. Available at: https://rosstat.gov.ru/folder/210/document/13204 (accessed: August 15, 2024).
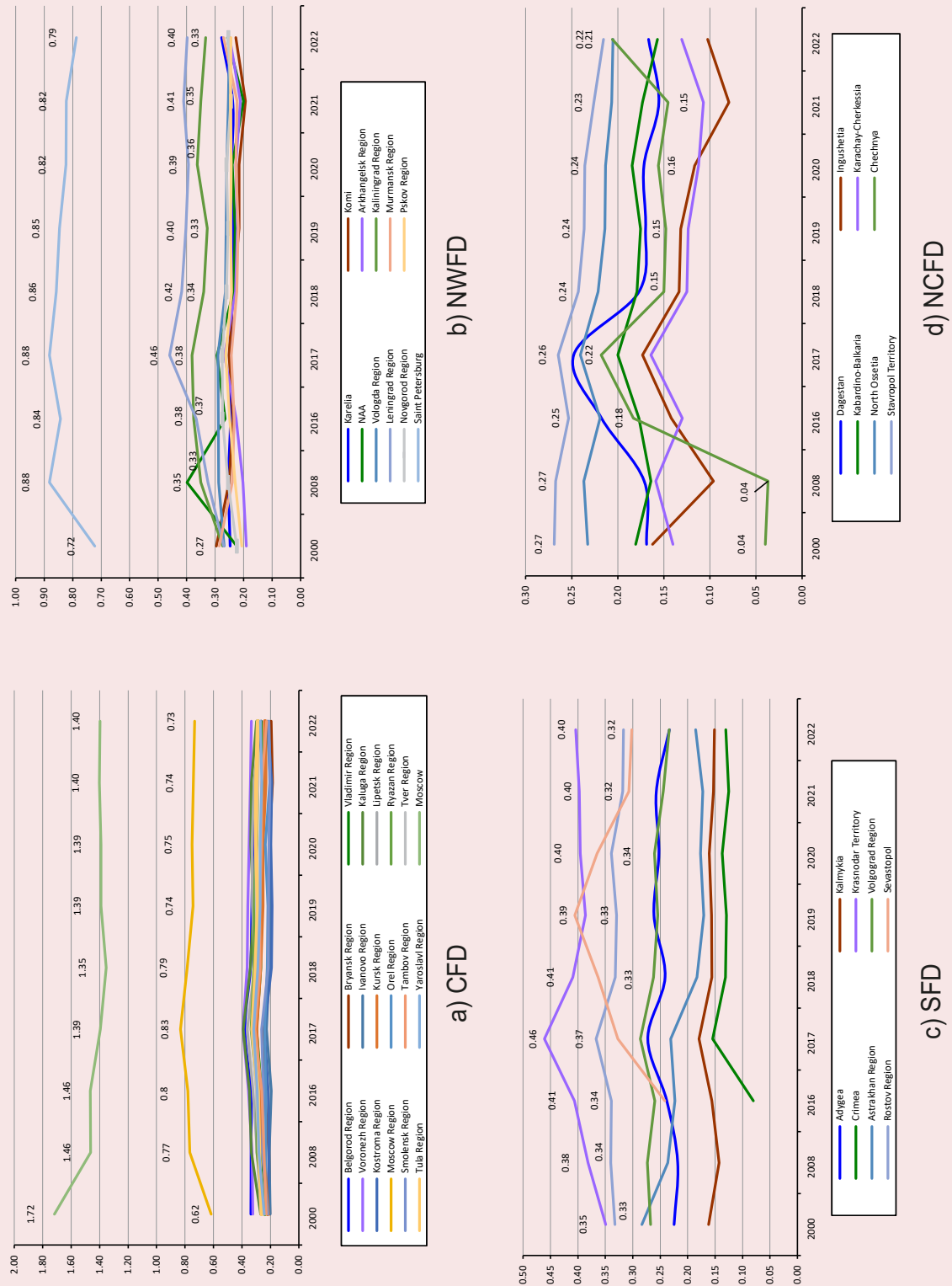
the population's money savings were concentrated in the five leading regions, in 2002 − 26.6%, in 2022 − 48.8%. According to the criteria "average monthly nominal accrued wages", "population with incomes below the poverty line", "the volume of paid services per capita", there was a tendency to reduce differentiation, but no significant changes were observed.

The data presented in *Figure 2* show a consistently high level of inequality for the indicator "GRP per capita", we emphasize that there is no significant dynamics during the analyzed period. An ambiguous dynamics of the Gini coefficient was obtained for the indicator "investment in fixed capital per capita": there are both periods of growth and decline in inequality. The calculations showed a low level of inequality of Russian regions by the criterion "local budget revenues per capita".

*Figure 3* shows the dynamics of the agglomeration potential index in Russian regions by federal districts.

According to the data presented in Figure 3, we can conclude that there is a high differentiation in the Central and Northwestern Federal Districts, with Moscow, Saint Petersburg and the Moscow Region being the leaders over the analyzed period. In 2008, negative dynamics of the agglomeration process potential is observed in Moscow, but at the same time in the Moscow Region, there is a growth trend (*Fig. 3a*), i.e. high cost of living (prices for real estate, rent of apartments and offices, technical premises) has created a situation when the inflow of human potential to the Moscow Region has increased. The population buys real estate in the Moscow Region, while making daily trips to Moscow for work, study, as well as using cultural, medical and sports spheres of the capital region. In the Northwestern Federal District (Fig. 3b), the maximum value of the agglomeration processes potential index was obtained for Saint Petersburg with ambiguous dynamics. Significant positive dynamics of the analyzed indicator was recorded

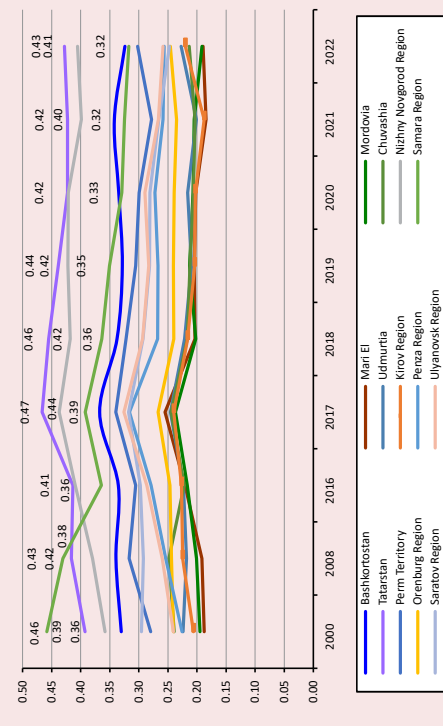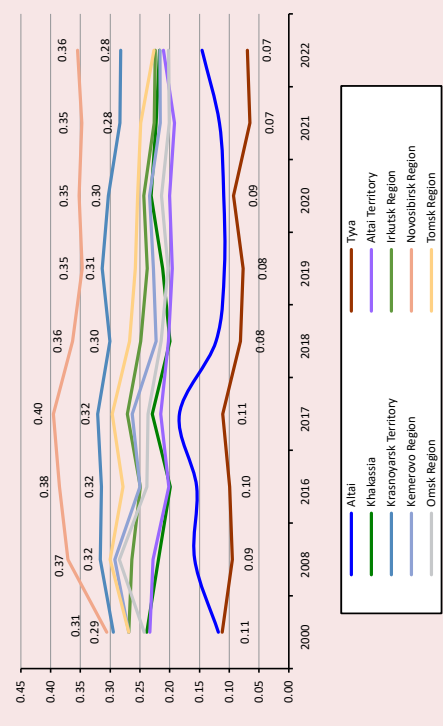Figure 3. Dynamics of the agglomeration process potential index in Russian regions in 2000–2022
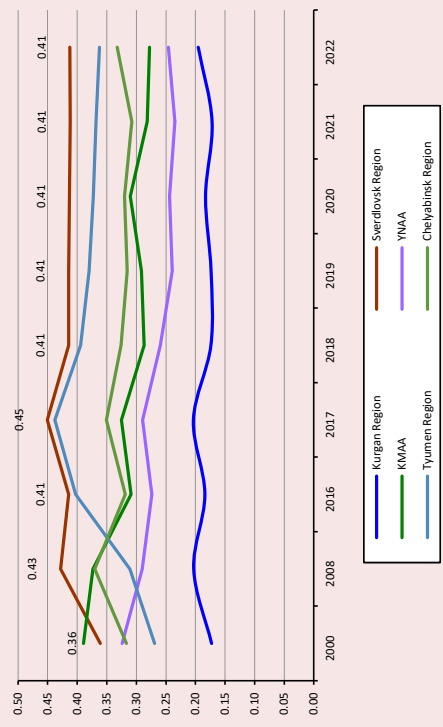
a) CFD

b) NWFD

c) SFD

d) NCFD

e) VFD

f) UFD

g) SibFD

h) FEFD
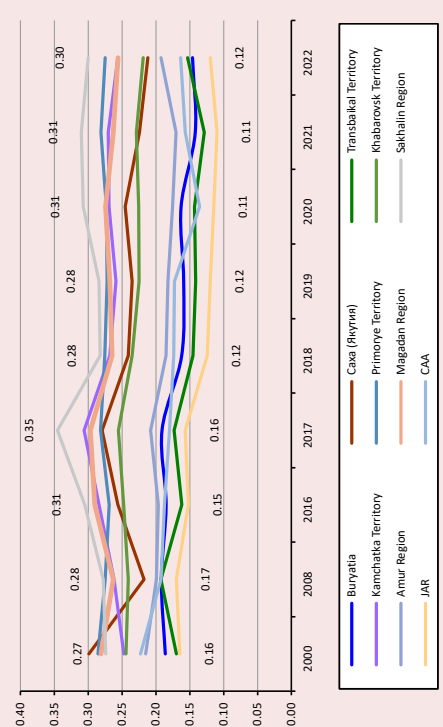
According to: Federal State Statistics Service data. Available at: https://rosstat.gov.ru/folder/210/document/13204 (accessed: August 15, 2024).

in the Leningrad and Kaliningrad regions, which indicates the intensity of agglomeration processes and the formation of agglomerations in these subjects of the Russian Federation. In the Southern Federal District (Fig. 3c), the Krasnodar Territory, the Rostov Region and Sevastopol can be referred to the subjects with intensive agglomeration processes (high values and positive dynamics of the agglomeration processes potential index). Negative dynamics of the analyzed index was recorded in the Astrakhan Region. Assessing the agglomeration processes in the North Caucasus Federal District (Fig. 3d), we conclude that, in general, all subjects are characterized by low agglomeration development potential, and in some years the Chechen Republic and the Republic of Ingushetia have no agglomeration processes. Among the subjects of the Volga Federal District (Fig. 3e), it is reasonable to single out the Republic of Tatarstan and the Nizhny Novgorod Region as leaders in the analyzed index. Of interest is the Samara Region, where the negative dynamics of agglomeration processes potential is observed. In the Urals Federal District (Fig. 3f), a significant positive dynamics,

indicating the intensity of agglomeration processes, is observed in the Sverdlovsk and Tyumen regions. In the Siberian Federal District (Fig. 3g), the leaders in terms of agglomeration processes development are the Novosibirsk Region and the Krasnoyarsk Territory. The absence of agglomeration processes was recorded in the Republic of Tyva. The results of calculations obtained for the Far East (Fig. 3h) indicate a low potential of agglomeration processes and their absence in some regions.

Figures 4–8 present the results of the analysis of specialization of the Russian regions. We emphasize that the development of agriculture, forestry and extractive industries is determined by factors concerning the first nature: fertile soils, availability of minerals, climatic conditions.

According to the data presented in Figure 4, we can conclude that in the sector "agriculture" the maximum level of specialization is observed in the Tambov Region (LQ − 3.2), the Stavropol Territory (LQ − 3.02), the Republic of Mordovia (LQ − 2.8), the Orel (LQ − 2.8), Belgorod (LQ − 3), Kursk (LQ − 2.8), Lipetsk (LQ − 2.7), Penza (LQ − 2.3) regions, and the Altai Territory (LQ − 2.3).

Figure 4. Location quotient by type of activity "agriculture, hunting, fishing and fish farming" in the regions of the Russian Federation in 2022
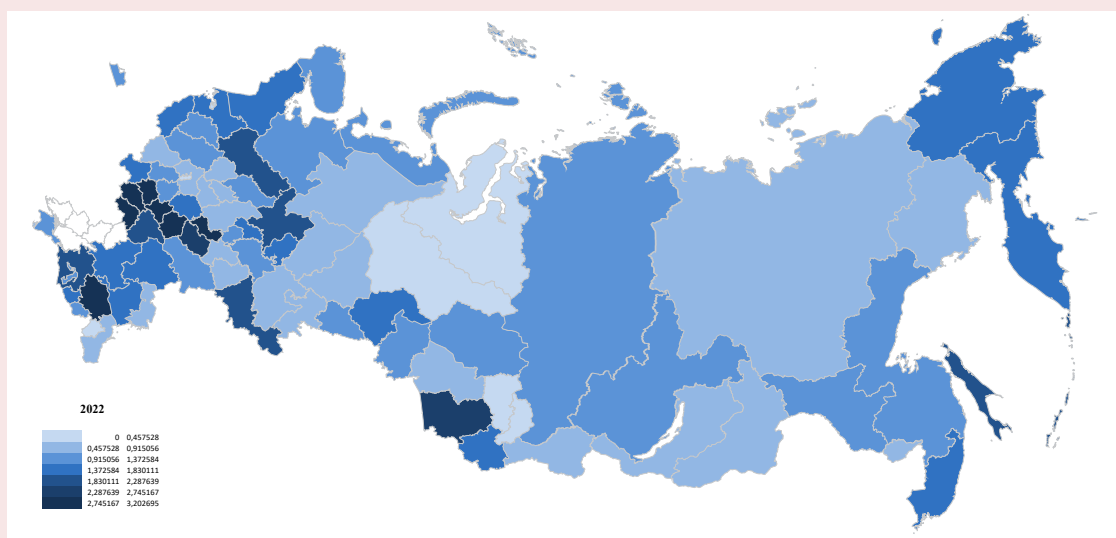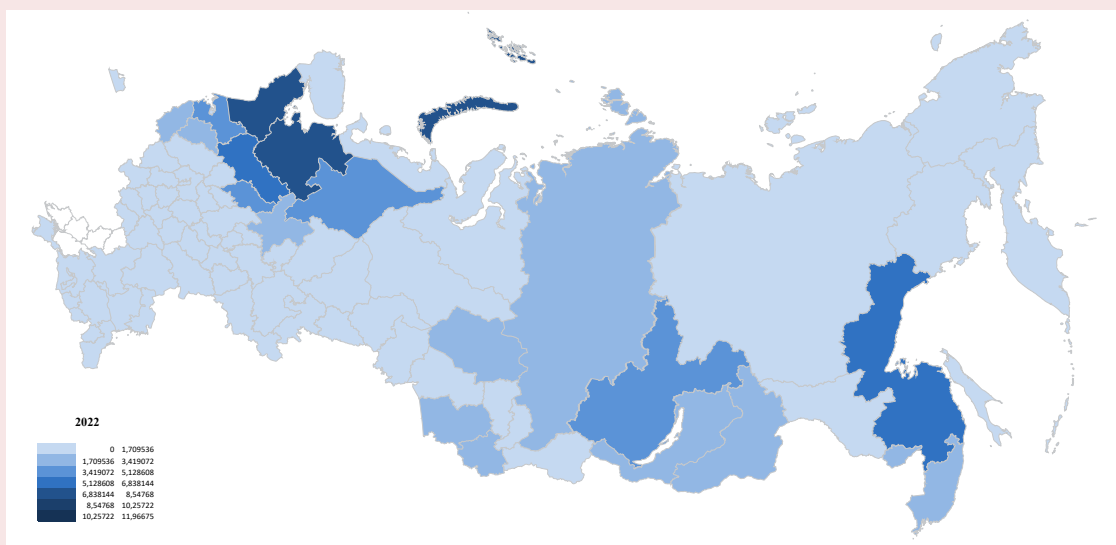
According to: EMISS data. Available at: https://rosstat.gov.ru/emiss (accessed: September 15, 2024).

The leading regions of the Russian Federation specializing in the "forestry and logging" sector include the subjects of the European North and Siberia: the Arkhangelsk Region (LQ − 7.2), the Republic of Karelia (LQ − 6.9), the Vologda Region (LQ − 5.9), the Khabarovsk Territory (LQ − 5.4), the Irkutsk Region (LQ − 4.9), the Leningrad Region (LQ − 4.7), the Komi Republic (LQ − 4.4) (*Fig. 5*).

According to the results of the calculations, the leading regions specializing in the extractive industry sector include Khanty-Mansi (LQ – 11.9), Nenets (LQ – 10.4), Yamal-Nenets (LQ – 9.50), Chukotka (LQ – 8.80) Autonomous Areas, the Magadan Region (LQ – 8.4). It is important to emphasize the high level of differentiation of the location quptient for the "extractive industry" sector

Figure 5. Location quotient by type of activity "forestry and logging" in the regions of the Russian Federation in 2022

According to: EMISS data. Available at: https://rosstat.gov.ru/emiss (accessed: September 15, 2024).

Figure 6. Location quotient by type of activity "mining of minerals" in the regions of the Russian Federation in 2022
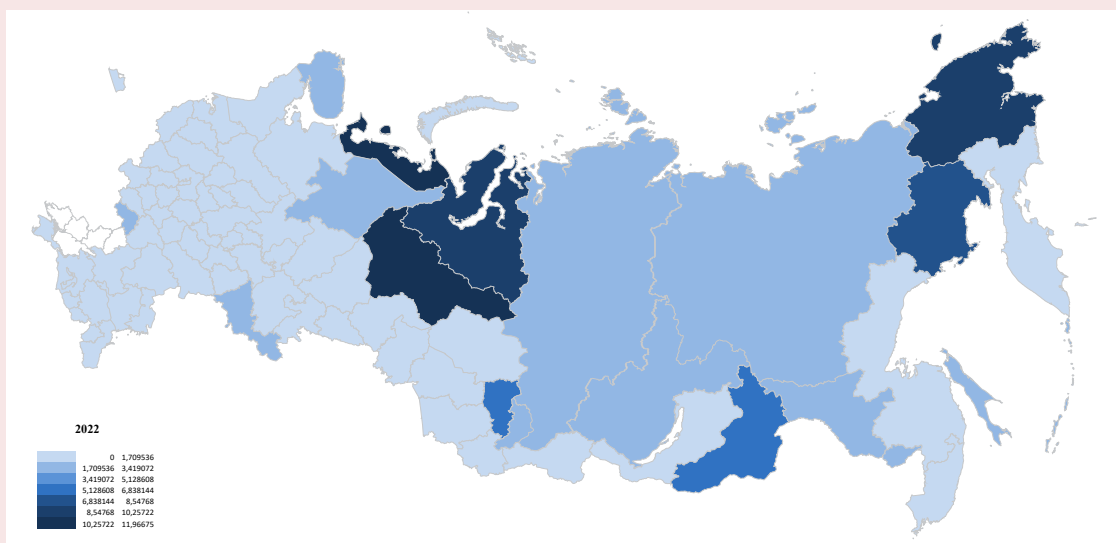
According to: EMISS data. Available at: https://rosstat.gov.ru/emiss (accessed: September 15, 2024).
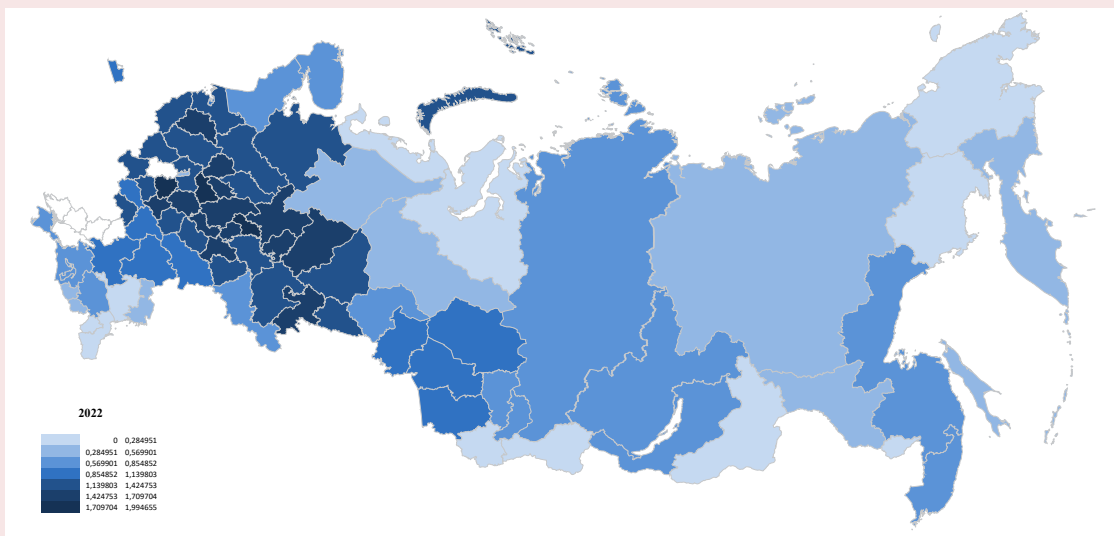
in the regions of the Russian Federation, since the development of this industry is determined by the availability of minerals (*Fig. 6*).

According to the data presented in *Figure 7*, we conclude that the regions specializing in the "manufacturing industry" sector form a "belt" from the north-west to the south-east up to the Urals, with the exception of the subjects of the North

Caucasus and the south. In this sector, a high level of differentiation is not observed due to the fact that the specialization of the "manufacturing industry" sector is not dictated by natural factors.

The specialization of regions in the "research and development" sector is also not dictated by factors of the first nature, but is widely differentiated in the RF constituent entities (*Fig. 8*). The maximum values

Figure 7. Location quotient by type of activity "manufacturing industry" in the regions of the Russian Federation in 2022

According to: EMISS data. Available at: https://rosstat.gov.ru/emiss (accessed: September 15, 2024).

Figure 8. Location quotient by type of activity "research and development" in the regions of the Russian Federation in 2022
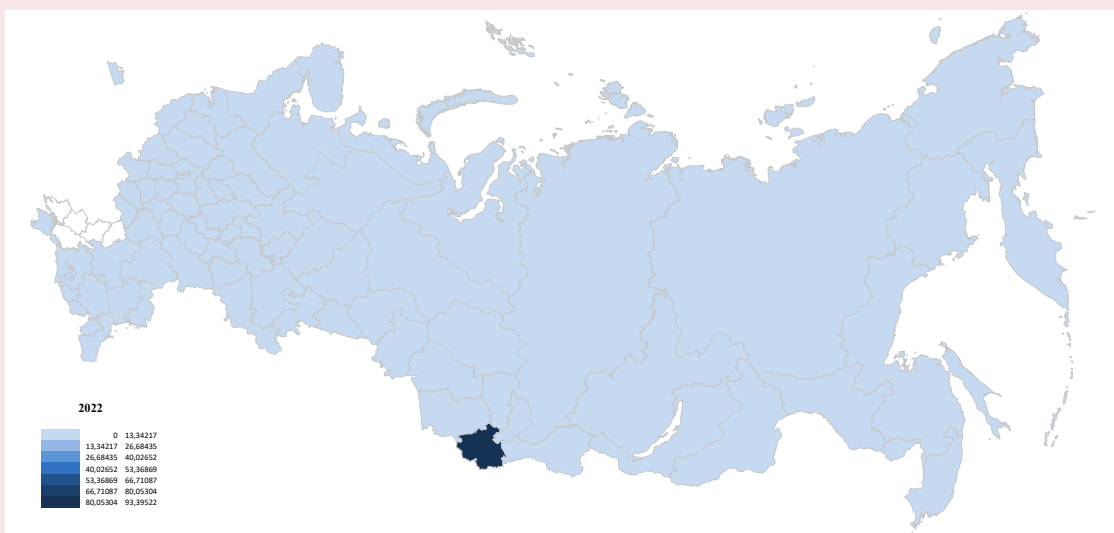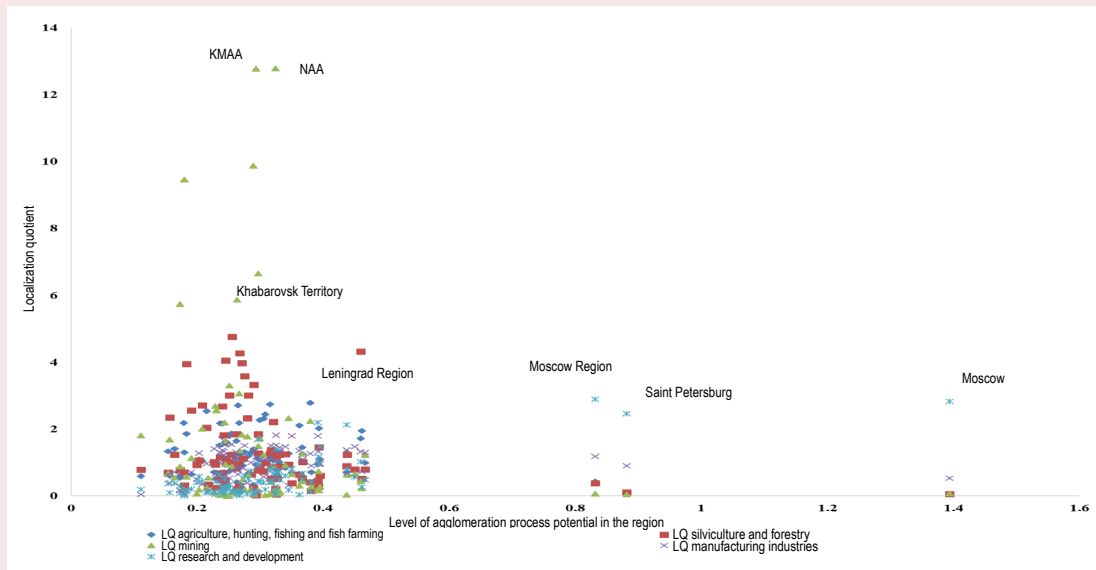

According to: EMISS data. Available at: https://rosstat.gov.ru/emiss (accessed: September 15, 2024).

of the location quotient by the type of activity "research and development" were obtained for the Omsk Region (LQ – 2.7), Moscow (LQ – 2.6), the Moscow Region (LQ – 2.4), the Nizhny Novgorod Region (LQ – 2.15), Saint Petersburg (LQ – 2.1).

Figures 9–10 show the matrices "level of agglomeration process potential in the region – location quotient of certain types of economic activities" in the regions of the Russian Federation in 2017, 2022.

Figure 9. Matrix "level of agglomeration process potential in the region – location quotient of certain types of economic activities" in the regions of the Russian Federation in 2017

According to: EMISS data. Available at: https://rosstat.gov.ru/emiss (accessed: September 15, 2024).

Figure 10. Matrix "level of agglomeration process potential in the region – location quotient of certain types of economic activities" in the regions of the Russian Federation in 2022
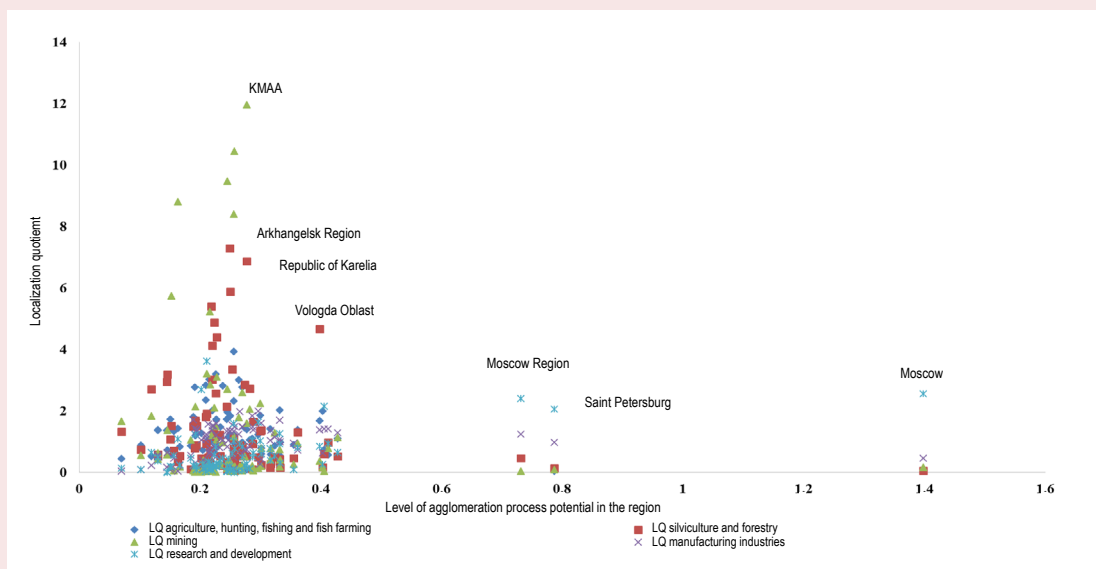
According to: EMISS data. Available at: https://rosstat.gov.ru/emiss (accessed: September 15, 2024).

In the Russian Federation as a whole, the highest level of concentration is determined for the type of economic activity "mining of minerals", followed by "forestry and logging", while the agglomeration process potential index in these subjects is in the range of 0.2–0.3. In the regions – leaders in terms of agglomeration process potential (Moscow, Saint Petersburg, Moscow Region), the maximum values of the location quotient were obtained for the type of economic activity "scientific research and development", the second place was "manufacturing production", i.e. types of economic activities that are not caused by factors concerning the "first nature". According to the data presented in Figures 9–10, we can conclude about the growth of the location quotient in the RF regions in 2022 for the types of activities "forestry and logging", "scientific research and development".

Conclusion

The study presents a methodological toolkit for assessing the potential of agglomeration processes in Russia's regions. Approbation of our methodological toolkit made it possible to analyze the dynamics of the agglomeration process potential of an individual territory, to assess the interaction between the agglomeration process potential of a territory and the level of concentration of certain types of activities in it.

In the regions of the Russian Federation, a high degree of differentiation of agglomeration processes potential in the Central and Northwestern federal districts has been revealed. The rise in the cost of living (prices for real estate, rent of apartments and offices, technical premises) in Moscow provoked the inflow of human potential to the Moscow Region. The population buys real estate in the Moscow Region, while making daily trips to Moscow for work, study, as well as using cultural, medical and sports spheres of the capital region. Intensive agglomeration processes were recorded in the Kaliningrad, Leningrad, Rostov, Nizhny Novgorod, Sverdlovsk, Tyumen, Novosibirsk regions, the Krasnodar and Krasnoyarsk territories, Sevastopol, and the Republic of Tatarstan.

The subjects of the North Caucasus and the Far East have a low potential for agglomeration development; in some years the Chechen Republic and the Republic of Ingushetia have no agglomeration processes.

In the regions – leaders by the level of agglomeration process potential (Moscow, Saint Petersburg, Moscow Region), the maximum values of the location quotient were obtained for the type of economic activity "scientific research and development", the second place – "manufacturing production".

Our proposed methodological tools can be used as a basis for regular monitoring of the regional economy efficiency assessment to obtain information about the nature and dynamics of the potential of agglomeration processes, the possibility of obtaining the effect of the interaction between the agglomeration process of the territory and the level of concentration of certain types of economic activity on it.

The results of the study can be used by regional authorities in the development of strategic planning documents, by a wide range of researchers in the field of spatial economy, as well as by teachers and students as part of training in economic specialties.

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