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Rural Areas Population' Migration Factors in the European Part of the Russian Arctic

Ulyana E.
YAKUSHEVA
Northern (Arctic) Federal University named after M.V. Lomonosov
Arkhangelsk, Russian Federation
e-mail: u.yakusheva@narfu.ru
ORCID: 0000-0002-0807-7796; ResearcherID: ABF-1200-2020

Anton M.
MAKSIMOV
N. Laverov Federal Center for Integrated Arctic Research of the Ural Branch of the Russian Academy of Sciences
Arkhangelsk, Russian Federation
e-mail: amm15nov@yandex.ru
ORCID: 0000-0003-0959-2949; ResearcherID: HHZ-6393-2022

Mariya V.
MALYGINA
Northern (Arctic) Federal University named after M.V. Lomonosov
Arkhangelsk, Russian Federation
e-mail: m.arteeva@narfu.ru
ORCID: 0009-0003-3400-0404

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Abstract. The study of migration remains relevant, despite the presence of a wide range of papers by authors from Russia and other countries on the subject. The features of migration processes, in particular migration factors, in rural areas of the Arctic zone of the Russian Federation are of the greatest interest due to the current accumulation of sufficient amount of data for analysis. The article considers seven municipalities of the European part of the Russian Arctic and empirically determines statistically significant migration factors through correlation analysis. Data on 15 indicators were collected from 2008 to 2021. We reveal that the most significant migration factors are the development of education, the situation regarding transport links, food and financial security of the population, and housing provision. At the same time, the combination of statistically significant factors is unique for each individual municipal entity. The thesis, widespread in the migration theory, about the greater influence of economic factors on the dynamics of migration was only partially confirmed in the case of the rural areas under consideration. It was found that individual indicators, such as agricultural production and employment, generally do not affect migration decline (increase), and the established relationship with such an indicator as wage level cannot be interpreted unambiguously. With the growth of labor incomes, the outflow of rural residents from their native areas reduces, but does not disappear completely. In turn, the increase in nominal wages is to a large extent a reflection of the inflationary effect; therefore, it cannot be an effective mechanism for retaining the rural population.

Key words: human migration, migration factors, Arctic zone of the Russian Federation, municipality, rural area.

Acknowledgment

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Introduction

Migration issues have always occupied a central place in the system of managing the region's human potential. Thus, in 2018, the Concept of State Migration Policy of the Russian Federation for 2019–2025[1] was approved to define the foundations and guidelines in this area, where migration growth is considered as one of the tools to compensate for natural loss and "a source of labor resources". Economic and social factors are emphasized as the main migration factors, which determines the policy toward migrants. Moreover, the document "Fundamentals of the State Policy of Regional Development of the Russian Federation until 2025"[2] highlights the improvement of regulatory mechanisms through the stimulation of interregional migration in accordance with the needs of each region and the preservation of labor resources in the country as one of the objectives of the proclaimed course. Thus, the study of migration processes in general and migration of labor resources in particular remains relevant in the context of labor

[1] On the Concept of State Migration Policy of the Russian Federation for 2019–2025: Presidential Decree 622, dated October 31, 2018. Collection of Legislation of the Russian Federation 45, Art. 6917, dated November 5, 2018.

[2] On Approval of the Fundamentals of the State Policy of Regional Development of the Russian Federation until 2025: Presidential Decree 13, dated January 16, 2017. *Official Internet portal of legal information*. Available at: http://publication.pravo.gov.ru/Document/View/0001201701160039 (accessed: July 13, 2023).

force retention in a particular territory. This issue is most acute for municipalities within the Arctic zone of the Russian Federation (hereinafter – AZRF), where population outflow has been observed over the previous 20 years (Fauzer, Smirnov, 2020). Moreover, the process of leaving AZFR is seen as feature of municipalities, especially their rural part (Nefedova, Mkrtchyan, 2017). All these facts allow asserting that population outflow from the AZRF rural areas has the most pronounced and critical importance in the process of their development.

In this article we analyze the relationship between net migration growth / loss and various parameters reflecting the dynamics of socio-economic condition of a number of rural municipal districts[3] belonging to the territories of the European part of the AZRF. These districts are part of three neighboring constitute entities of Russia: 1) Arkhangelsk Oblast – Leshukonsky, Mezensky, Onezhsky, Pinezhsky, and Primorsky districts; 2) Nenets Autonomous Okrug – Zapolyarny District; 3) Komi Republic – Ust-Tsilemsky District[4].

The share of rural population *(Fig. 1)* in the selected municipalities ranges from 30 to 100%, and the average in the aggregate is 77%, with a slight decrease in the share of rural population in Onezhsky Municipal District[5] and an increase in Mezensky Municipal District[6].

In most of the municipalities under consideration (except Primorsky District), population is decreasing due to natural causes and migration loss *(Fig. 2)*.

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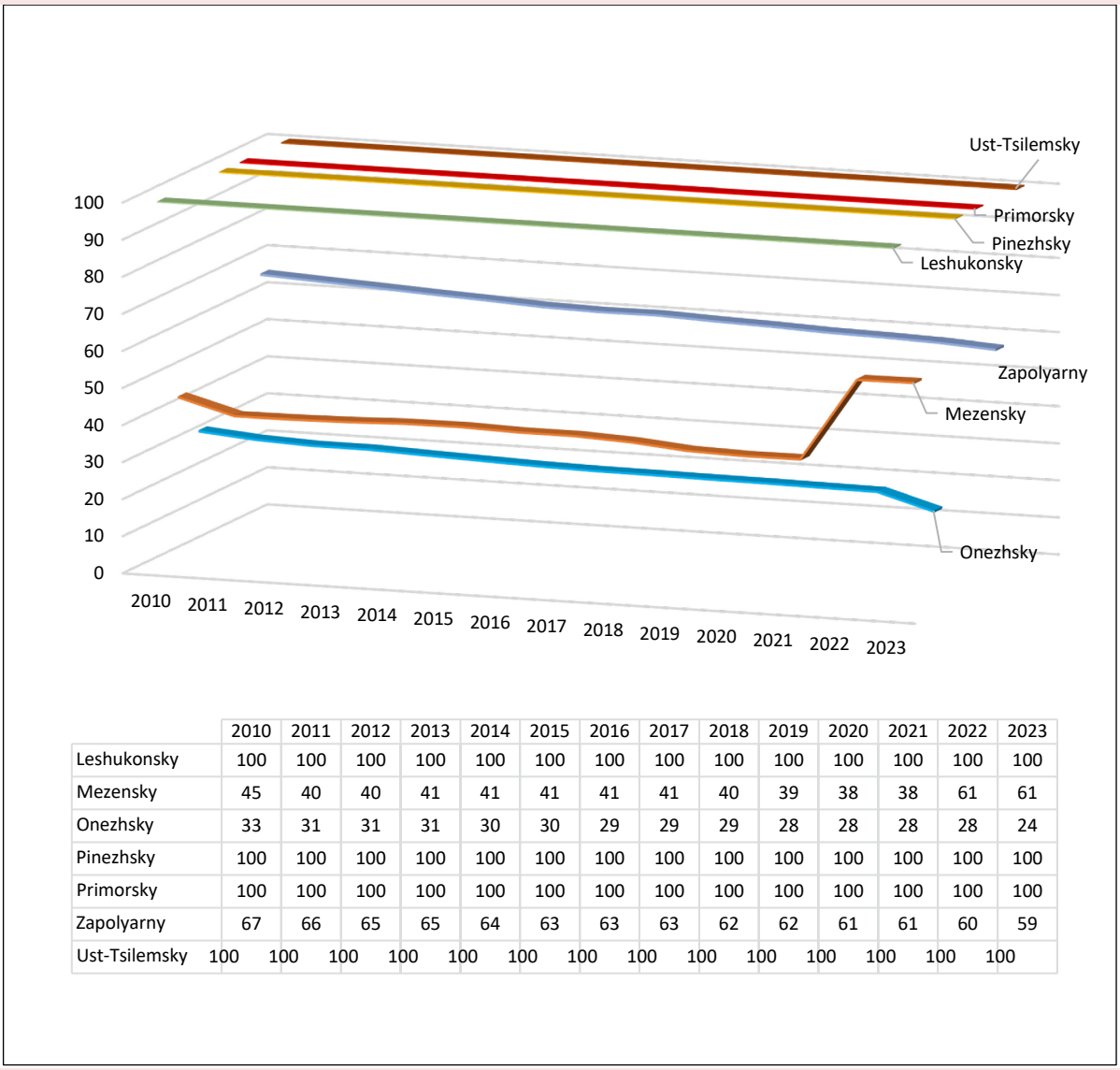
[3] Some municipal districts were transformed into municipal okrugs, but the change of their status does not affect the study. Moreover, the dynamic series are presented only for municipal districts, so the term "municipal district" or "district" will be used, implying also the territory within the boundaries of the current municipal okrug.

[4] The choice of such geographical frameworks of the study, rather than all rural areas of the European part of the AZRF, is conditioned by the following circumstances: 1) the development of these territories took place within approximately the same chronological limits and according to similar models, which distinguishes it from similar processes in the north of Karelia and the Murmansk Oblast; 2) institutionally, Nenets Autonomous Okrug (NAO) is a part of the Arkhangelsk Oblast, and both regions have close relations in the financial and economic, cultural, educational and socio-political spheres; 3) at the same time, Nenets Autonomous Okrug and the Arctic part of the Komi Republic have a similar sectoral profile, which today (against the backdrop of the declining role of the coal industry in the north of the Komi Republic) is based on the oil and gas sector; the spread of reindeer herding is also common; 4) three regions have an extensive land border and most of the border municipalities belong to the AZRF; the Arkhangelsk Oblast is connected with the Komi Republic by the Northern Railway and motor roads, and the construction of a highway linking Usinsk and Naryan-Mar is underway. Thus, the municipal districts selected for analysis form a single macroregion by historical and economic parameters.

[5] Although the urban-rural population ratio in Onega Region formally requires to classify it as a highly urbanized municipality, almost the entire urban population is concentrated in Onega (another urban settlement of the region – Maloshuiskoye – is a small working settlement of railway workers and several adjoining villages). Onega is a district center and at the same time a city of regional significance (the smallest in the region in terms of population), is a typical single-industry town with the town-forming enterprise Onega Sawmills, the production activity of which depends entirely on local forest resources. The presence of the only full-fledged single-industry town with a vast territory with more than a hundred settlements located on it makes Onezhsky District de facto largely rural in terms of the lifestyle of its population. This is also reflected in migration trends, which are the same both for Onega and for the purely rural part of the District: over the period from 2011 to 2022, the migration balance for Onega was consistently negative, with the population decreasing by 22%. According to: Passport of the municipality "Onezhskoye". Database of indicators of municipal entities of the Arkhangelsk Oblast. Federal State Statistics Service. Available at: https://www.gks.ru/scripts/db_inet2/passport/pass.aspx?base=munst11&r=11646101 (accessed: July 13, 2023).

[6] A sharp increase in the share of rural population in Mezensky District is associated with the change in the status of the urban-type settlement Kamenka into Kamenskoye Rural Settlement (share in the population of the region as of January 1, 2022 ≈ 23%). According to: Database of indicators of municipal entities of the Arkhangelsk Oblast. Federal State Statistics Service. Available at: https://www.gks.ru/scripts/db_inet2/passport/munr.aspx?base=munst11 (accessed: July 13, 2023).

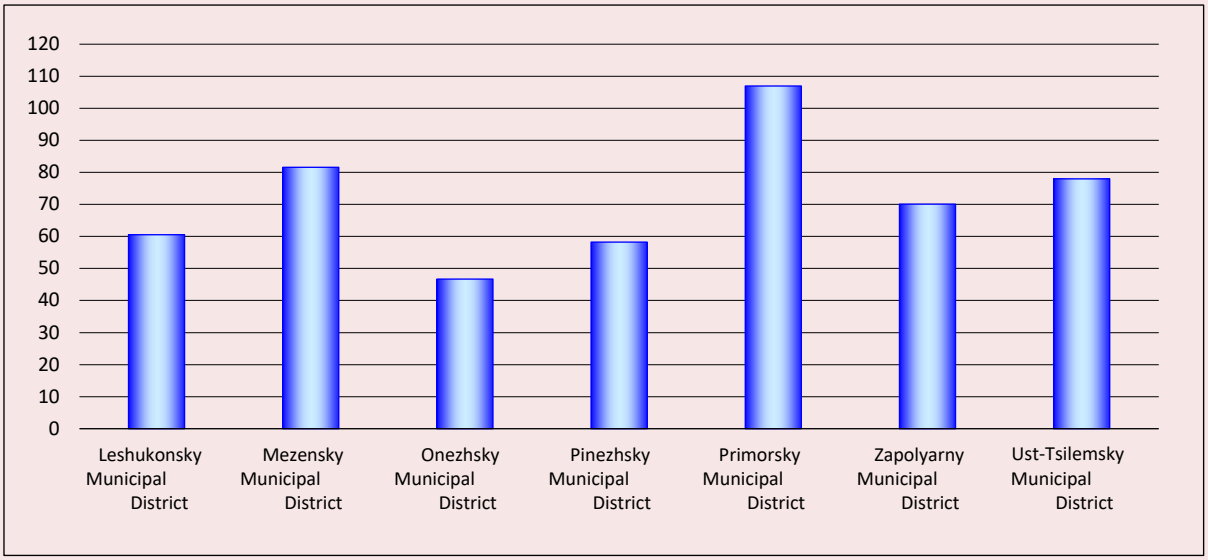
Figure 1. Share of rural population in the total number of inhabitants of municipalities of the European part of the AZRF from 2010 to 2023 (as of January 1), %



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Leshukonsky	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Mezensky	45	40	40	41	41	41	41	41	40	39	38	38	61	61
Onezhsky	33	31	31	31	30	30	29	29	29	28	28	28	28	24
Pinezhsky	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Primorsky	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Zapolyarny	67	66	65	65	64	63	63	63	62	62	61	61	60	59
Ust-Tsilemsky	100	100	100	100	100	100	100	100	100	100	100	100	100	100

According to: Database of indicators of municipal entities of the Arkhangelsk Oblast. Federal State Statistics Service. Available at: https://www.gks.ru/scripts/db_inet2/passport/munr.aspx?base=munst11 (accessed: July 13, 2023); Passport of the municipal formation "Ust-Tsilemsky Municipal District". Database of indicators of municipal entities of the Komi Republic. Federal State Statistics Service. Available at: https://www.gks.ru/scripts/db_inet2/passport/pass.aspx?base=munst87&r=87652000 (accessed: July 13, 2023).

Figure 2. Population decrease (growth) rates in the municipalities of the European part of the AZRF from 2010 to 2023, %



According to: Database of indicators of municipal entities of the Arkhangelsk Oblast. Federal State Statistics Service. Available at: https://www.gks.ru/scripts/db_inet2/passport/munr.aspx?base=munst11 (accessed: July 13, 2023); Passport of the municipal formation "Ust-Tsilemsky Municipal District". Database of indicators of municipal entities of the Komi Republic. Federal State Statistics Service. Available at: https://www.gks.ru/scripts/db_inet2/passport/pass.aspx?base=munst87&r=87652000 (accessed: July 13, 2023).

At the same time, migration movement in the AZRF rural areas can be influenced by both economic factors, such as wages and the availability of jobs, and other factors: the state of social infrastructure, cultural and recreational sphere, transportation accessibility, etc. The aim of our research is to determine the statistical relationship between factors of migration in the mentioned rural areas and to identify the specifics of this relationship for specific municipalities.

Theoretical review

In existing studies, the topic of migration is presented quite widely. The works of the previous decade cover fundamental aspects of migration theory (Vishnevskii, 2017; Rybakovskiy, 2017a; Rybakovsky, 2017b; Logan, Shin Hyoung, 2012; Borjas, 2021), migration behavior (Ambrazhevich, 2014), migration of working-age population (Bezborodova, 2010; Komarovskii, 2022), the specifics of internal and external migration (Nefedova, Mkrtchyan, 2017; Mkrtchyan, 2019; Makhrova, 2020; Champion, 2018), the specifics of female migration (Florinskaya, 2022; Tyuryukanova, 2005), attitudes toward migrants in host communities (Burundukova et al., 2017) and many other aspects.

Another block of theoretical developments within the framework of the object under consideration covers the development of rural settlements, in particular the problems and specifics of their development specifically in the European part of the AZRF (Dmitrieva, Buryan, 2011; Ivanov,

Lazhentsev, 2014; Popova, 2014; Konovalova et al., 2022). The authors of the studies come to a general conclusion about the deteriorating demographic situation in the municipalities, insufficient labor resources in the social sphere and a wide variation in the socio-economic profiles of municipalities, which requires an individual approach in the analysis. It is noted that data limitations make it difficult to identify long-term trends for rural settlements. The socio-economic characteristics of the AZRF regions are considered in detail, but the issue of migration and its factors is only superficially discussed.

In this regard, the main focus of our research is aimed at studying the factors of migration processes. Back in the second half of the 20th century, it was shown that migration attitudes in any society are differentiated, since individuals consider migration instrumentally – as a potential way to meet their specific needs determined by their social status (Khomra, 1979). At present, the basic factors of migration include the level of average/median wages, income distribution, inflation rate and other parameters of a particular territorial system, which can act as effective economic incentives for individuals (Ambrazhevich, 2014). Noneconomic migration drivers of persons over 14 years old leaving the Arctic or, on the contrary, coming to its territories were identified by V.V. Fauzer. These include personal and family reasons, as well as university enrollment. It is noteworthy that environmental well-being and natural and climatic conditions practically do not affect the migration process (Fauzer, 2013).

The study of the specifics of migration processes taking place in the northern and Arctic territories in different countries of the world is devoted to the works of many foreign researchers. For instance, general migration trends in the Arctic are studied in the work of T. Heleniak (Heleniak, 2014); P. Bevelander and R. Pendakur dealt with cross-border labor migration in the Arctic countries (Bevelander, Pendakur, 2014); L. Jungsberg, A. Kopusa and their colleagues studied migration trends in connection with the features of labor markets in the raw material regions of the Arctic (Jungsberg et al., 2018). Russia also has a rich experience in studying this issue (works by V.V. Fauzer, A.G. Shelomentsev, E.V. Smirennikova, etc.).

A.G. Shelomentsev with co-authors, based on correlation analysis, revealed the existence of a relationship between migration and such factors as the level of wages, employment, cost and quality of housing, age, and economic activity in the AZRF regions. As a result, the lowest level of influence of these factors was recorded in the Murmansk Oblast, and the highest – in the Republic of Karelia and the Arkhangelsk Oblast. It is important to note that the employment rate affects migration processes depending on the prevailing type of economic activity. In particular, its influence was found in those municipalities where population was employed in manufacturing and construction. Moreover, the authors found a direct relationship between migration and the number of working-age persons (Shelomentsev et al., 2018).

L.V. Voronina and U.E. Yakusheva continued research in this direction and determined the relationship between the outflow of population and the number of those registered with respiratory, endocrine and blood diseases. The current situation indicates that the population with better health is leaving the AZRF predominantly. The correlation was absent only for Chukotka Autonomous Okrug, which is explained by its remoteness from large Russian cities (Voronina, Yakusheva, 2019).

V.V. Fauzer and A.V. Smirnov, based on statistical and cartographic analysis, have identified the main directions of migration of citizens living in the AZRF regions, having drawn up a scheme of population movement. A distinctive but obvious feature is migration to large cities, primarily cities of federal significance. In this case, the migration process goes in stages: from a rural settlement to an urban district, then to a larger city in terms of population and, eventually, to Moscow (Fauzer, Smirnov, 2020).

To a lesser extent, researchers analyze the migration movement in the AZRF at the level of municipalities. E.A. Korchak, considering the Murmansk Oblast, shows that almost half of intraregional migration affects the administrative center – Murmansk, and connects it with the presence of a large number of labor vacancies in it. He also notes that in Apatity, whose population is largely formed by internal migration, only a quarter of high school students, according to the survey results, plan to stay in their hometown, despite the availability of a significant number of jobs in the mining industry. In rural settlements migration trends are characterized by the fact that every second resident moves to a larger municipality (Korchak, 2019). One of the reasons may be the lack of identity with the place of residence: according to the results of surveys, every fourth connects himself with the Murmansk Oblast, while 70% of respondents note the identity with Russia. In this case, the factor of regional/local identity in migration attitudes is practically absent, which indicates equal opportunities for both intra- and interregional migration (Nedoseka, Zhigunova, 2019).

More detailed migration attitudes, but for the applicants of municipalities of the Republic of Karelia, are revealed in the work of A.V. Simakova and I.S. Stepus'. The research shows that in the Arctic regions of the republic young people with a high level of education or experience of living in another region are more inclined to emigrate for education. Moreover, 72% of respondents plan to continue their studies after graduation, and the main reference point is educational organizations of Moscow and Saint Petersburg. The authors explain such attitudes through the "expectation of a better life" (Simakova, Stepus', 2023, p. 258). We should note that the propensity of young population to migrate to other areas is one of the characteristic features of this age period and is observed all over the world (Smith, Sage, 2014; Jiboku, Jiboku, 2022).

D.N. Mokrenskii continued studying the features of migration processes in the AZRF municipalities. The author conducted a comparative analysis of the Arkhangelsk Oblast with the Kostroma and Vologda oblasts, dividing the municipalities into four types depending on the dynamics of migration and changes in natural movement. Most of them were categorized as having negative dynamics of natural population movement. It is noteworthy that municipalities in the Arkhangelsk Oblast are represented in all four types, while in the Vologda Oblast – in three, and in the Kostroma Oblast – in two. This situation indicates the optimal balance of migration processes within the Arkhangelsk Oblast as an integral system (Mokrenskii, Nikolaeva, 2022).

The conclusions of Russian demographers and economists are partly supported by the results of sociological studies based on survey methods. If we look at the most frequently mentioned in recent years reasons that encourage people to move, then the respondents living in the AZRF territories

(and having pronounced migration attitudes), such reasons are high cost of living, low incomes, unsettled areas of residence, poor transport infrastructure, unfavorable climatic conditions and environmental situation (Blinskaya et al., 2020; Gushchina et al., 2019; Fauzer, Lytkina, 2017).

At the same time, not only the scale of the real migration movement may differ greatly from the level of migration attitudes, but also respondents' assessments of certain socio-economic parameters of their place of residence and their relative importance for motivation to move bear the imprint of subjective perceptions, stereotypes of perception and cognitive distortions. That is why the data obtained in the course of sociological surveys have limited potential for determining the key factors of migration and require verification by another method, such as correlation analysis of migration and socio-economic statistics (Shelomentsev et al., 2018).

Despite the attention to migration issues in the Arctic by foreign authors, who are more focused on cross-country comparison and consider the processes from a global perspective, and Russian researchers, the issue of the specifics of migration processes in the AZRF rural areas and their inherent factors promoting influence on migration outflow/growth in the context of municipalities remains unexplored. We join the existing discussion on the factors of migration movement of population, but we focus on the AZRF rural areas. At the same time, the article will additionally verify the opinion widespread among migration specialists that it is economic factors in the narrow sense of the term (economic incentives) that determine the migration movement to the greatest extent, and will reveal whether this thesis is confirmed at the level of local territorial systems.

Research methods

The conducted research includes two stages: 1) analysis of socio-economic indicators of the AZRF rural areas and 2) identification of statistically significant factors affecting rural population migration. Statistical analysis is based on the consideration of time series of average accrued wages, employment of the population as a whole and by type of activity for 2022, migration growth (loss) for the seven previously designated municipal districts in order to identify the main trends for 2010–2021. The analysis period is justified by the availability of data within the selected territorial units. The second stage of the study assessed the impact of various factors on the migration movement in the selected municipalities.

The migration balance was chosen as an indicator reflecting the migratory movement because it results in multidirectional migration flows (growth and loss) and from this point of view is the most comprehensive indicator (Rybakovskiy, 2017a). We also proceed from the fact that this or that indicator of socio-economic development, if it is a factor of migratory movement in a particular area, other things being equal, affects the migration behavior of individuals in the same way – it acts as either an incentive to leave or an incentive to stay (come). Thus, the migration balance takes into account the effect of the studied factor on both the inflow and outflow from the territory at the same time, which makes it a convenient indicator for searching for correlations between population migration and the dynamics of socio-economic parameters of a particular territorial system.

Figure 3 presents the system of migration factors (their groupings) and indicators reflecting them. We selected the factors and indicators reflecting them based on the availability of data for a period of 10 years or more to obtain reliable

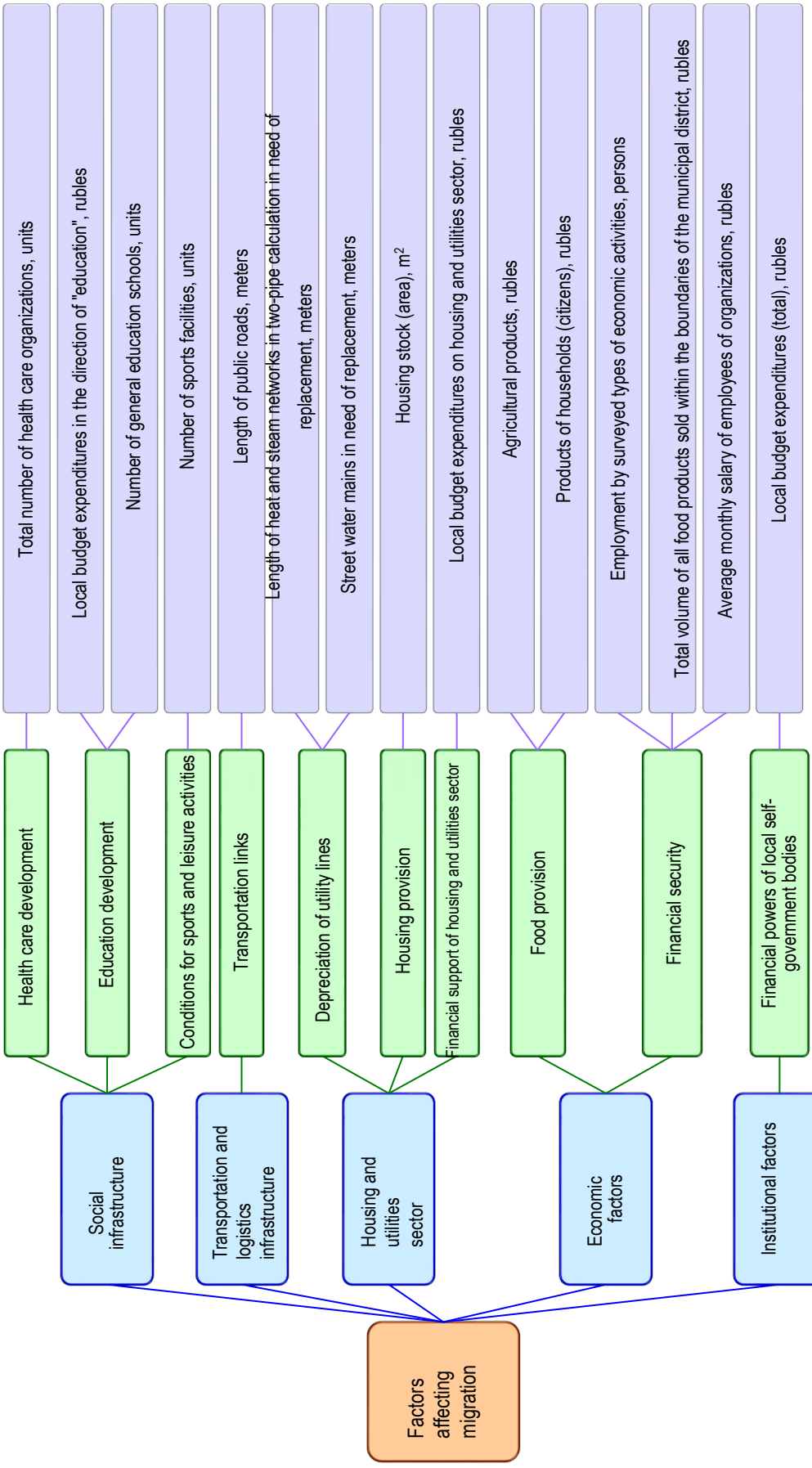


Figure 3. System of groups of migration movement factors in the AZRF municipalities

Source: own compilation based on (Ambrazhevich, 2014; Rybakovskii, 2017a; Rybakovskii, 2017b; Fauzer, 2013; Shelomentsev et al., 2018).

results, as well as taking into account their relevance to conventional ideas in the theory of migration factors. As a result, we selected 15 indicators for 10 factors, categorized into 5 groups:

1) local budget expenditures (in total) reflect the factor of financial powers of local self-government bodies, which along with local legislation (which as a migration factor cannot be quantified and therefore is not applicable in statistical analysis) is the institutional framework of "life activity" of rural territories;

2) total number of health care organizations is an indicator of the "health care development" factor;

3) number of general education schools is an indicator of the "education development" factor; local budget expenditures in the "education" direction also reflect education development, but with an emphasis on management impact; often, with the participation of the head of the municipality, a cooperation agreement is concluded between the municipality and a private company, under which the budget receives financial resources to address social problems;

4) number of sports facilities reflects the factor of conditions for sports leisure (simultaneously fulfills several socially significant functions – maintenance of healthy lifestyle, familiarization with norms of physical culture, active recreation);

5) length of public roads characterizes the "transport communication" factor (refusal to take into account railway, water and air communication is due to the fact that there are no quantitative data on them that are systematically collected and unified for different municipalities in the public domain);

6) length of heat and steam networks in two-pipe calculation in need of replacement and the street water supply network in need of replacement reveal the factor of wear and tear of utilities;

7) housing stock (area) characterizes the factor of housing provision;

8) local budget expenditures in the direction of "housing and utilities sector" – a factor of financial support of housing and utilities sector: municipality's participation in various projects, state programs, receipt of targeted revenues to the budget is the authorities' activity result in relation to the solution of any problem, reflects their interest in the development of housing and utilities sector;

9) agricultural products and production of households (citizens) represent a factor of food security;

10) employment in the surveyed types of economic activities, average monthly wages of employees of organizations and the total volume of all food products sold within the boundaries of the municipal area are three related indicators reflecting the factor of financial security. Factors 9 and 10 are referred to the group of "Economic factors".

We carry out the search for the strength and direction of the relationship between migration loss and the indicators presented above by means of correlation analysis. The analysis period for the indicators of Leshukonsky, Mezensky, Pinezhsky, Primorsky districts is from 2008 to 2021, except for the indicators "Employment by the surveyed types of economic activities", "Average monthly wages of employees of organizations" and "Total volume of all food products" – from 2009 to 2021. For Ust-Tsilemsky District, all data are taken from 2008 to 2021, except for the indicator "Total volume of all food products" (2009–2021). For Onezhsky District, the assessment was made from 2010 to 2021. For Zapolyarny District, the time period from 2010 to 2021 was also used, except for the

Table 1. Chaddock scale

Correlation index value	Characteristics of bond strength
0.1–0.3	Weak
0.3–0.5	Moderate
0.5–0.7	Notable
0.7–0.9	High (strong)
0.9–0.99	Rather high (rather strong)
Source: own compilation based on (Chaddock, 1925).	

indicators "Agricultural products" and "Household (citizens) products", for which the data were taken from 2012 to 2021. The sources of information were the databases of indicators of municipal entities of the Federal State Statistics Service of the Arkhangelsk Oblast and Nenets Autonomous Okrug and the Komi Republic Department[7], reports of the heads of municipal entities' administrations on the performance and activities of the municipal entity administration, reports of municipal entities' heads on the achieved values of indicators to assess the performance of local self-government bodies of urban districts and municipalities.

We used the Spearman correlation coefficient to assess the presence of a relationship, its strength and direction, due to the small number of values in our sample (less than 30). The null hypothesis, H0: there is no relationship between the variable "Migration balance" and the variables presented in Figure 3. The significance level is $p \leq 0.05$. To assess the strength of the relationship, we use the Chaddock scale *(Tab. 1)*.

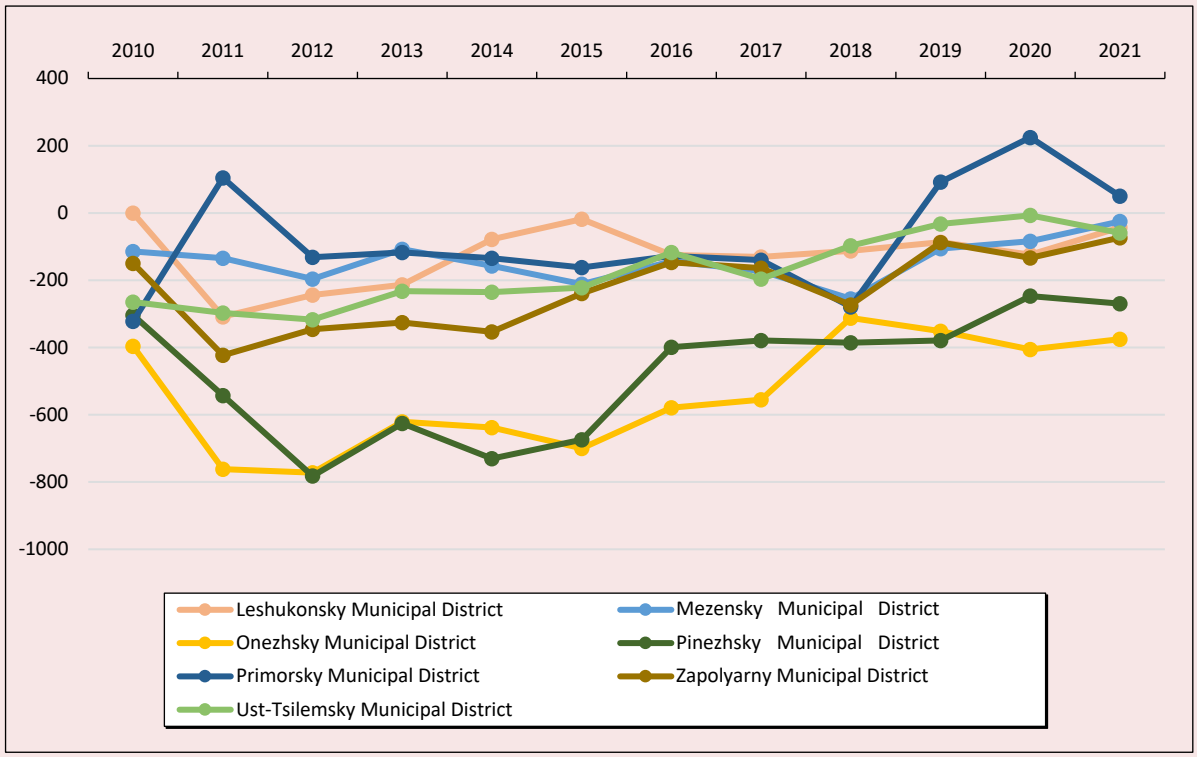
We categorized the obtained correlation coefficients within the framework of ABC-analysis into three groups depending on the frequency of occurrence and strength: characteristic for the whole territory (there are 80% of coincidences between municipalities within the selected indicator), widespread (from 79 to 30% of coincidences), specific (there are less than 29% of coincidences).

Results and discussion

In the course of analysis of a number of indicators characterizing the socio-economic situation in the surveyed municipal districts (Annex), we identified the following main trends: the absence of noticeable employment dynamics in almost all districts (except for Mezensky District); upward dynamics of nominal wages due to the impact of inflation; the structure of employment in various districts differs markedly, but the common feature is the predominance of employment in different types of budgetary institutions (from almost half of all employed and above); in the nonbudgetary sector, the main employers are organizations providing transportation, storage and communication services, resource generating and resource supplying organizations (in the public utilities system), as well as agricultural and forestry enterprises (especially many employed in these sectors in Pinezhsky District); Onezhsky District is the only one with a high number of employed in these sectors.

[7] Database of indicators of municipal entities of the Arkhangelsk Oblast. Federal State Statistics Service. Available at: https://www.gks.ru/scripts/db_inet2/passport/munr.aspx?base=munst11 (accessed: July 13, 2023); Passport of the municipal formation "Ust-Tsilemsky Municipal District". Database of indicators of municipal entities of the Komi Republic. Federal State Statistics Service. Available at: https://www.gks.ru/scripts/db_inet2/passport/pass.aspx?base=munst87&r=87652000 (accessed: July 13, 2023).

Figure 4. Dynamics of migration balance (in the context of the AZRF municipalities), 2010–2021, people



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We should separately note the results of the analysis of migration movement as the most fully reflecting the ongoing changes in the object of research. The analysis of dynamic series *(Fig. 4)* revealed that practically all municipal districts are experiencing migration loss. The exception is Primorsky District, where population growth is recorded in 2019–2021. Among the remaining municipalities, there are clear anti-leaders in terms of population outflow: Onezhsky and Pinezhsky districts have the highest annual migration attrition rates for the entire period under review. High values of the population attrition rate were also observed in the first half of the 2010s in Zapolyarny District of Nenets Autonomous Okrug. The data eloquently testify to the trend toward the "shrinking" of settlements and the low degree of viability of rural areas in the European part of the AZRF.

The conducted correlation analysis showed that the factors of influence on migration vary quite a lot depending on the municipality *(Tab. 2)*, which confirms the conclusions of L.V. Konovalova and her colleagues regarding the general analysis of socio-economic indicators (Konovalova et al., 2022). For instance, in Leshukonsky District, the migration movement is influenced to a greater extent by the provision of housing and health care services.

Table 2. Correlations between migration balance and independent variables (at $p \leq 0.05$ – highlighted in color)

Indicator	Coefficients	Municipal district						
		Leshukonsky	Mezensky	Onezhsky	Pinezhsky	Primorsky	Zapolyarny	Ust-Tsilemsky
Number of sports facilities	Spearman correlation	0.467	-0.471	0.669	-0.157	0.126	0.686	0.792
	Significance (2-sided)	0.093	0.089	0.017	0.593	0.669	0.014	0.001
Total number of health care organizations	Spearman correlation	-0.607	-0.405	0.509	-0.098	-0.060	0.100	0.274
	Significance (2-sided)	0.021	0.151	0.091	0.739	0.838	0.757	0.344
Length of public roads	Spearman correlation	0.580	-0.172	0.168	-0.071	-.029	-0.655	0.860
	Significance (2-sided)	0.030	0.557	0.602	0.809	0.923	0.021	0.000
Number of general education schools	Spearman correlation	.	-0.045	-0.553	-0.043	-0.280	-0.658	-0.833
	Significance (2-sided)	.	0.879	0.062	0.885	0.332	0.020	0.000
Agricultural products	Spearman correlation	0.341	-0.442	-0.762	0.031	-0.116	0.612	-0.125
	Significance (2-sided)	0.233	0.114	0.004	0.917	0.692	0.060	0.670
Products of households (citizens)	Spearman correlation	0.385	-0.534	-0.748	0.055	0.125	0.612	-0.653
	Significance (2-sided)	0.175	0.049	0.005	0.852	0.670	0.060	0.011
Length of heat and steam networks in two-pipe calculation in need of replacement	Spearman correlation	0.144	-0.046	-0.594	0.565	0.143	-0.336	-0.499
	Significance (2-sided)	0.623	0.875	0.042	0.035	0.626	0.286	0.069
Street water mains in need of replacement	Spearman correlation	- 0.230	0.086	-0.368	0.473	0.231	-0.481	-0.116
	Significance (2-sided)	0.429	0.771	0.240	0.088	0.427	0.113	0.692

End of Table 2

Indicator	Coefficients	Municipal district						
		Leshukonsky	Mezensky	Onezhsky	Pinezhsky	Primorsky	Zapolyarny	Ust-Tsilemsky
All housing stock (area)	Spearman correlation	-0.777	-0.205	0.718	-0.873	0.182	0.769	0.881
	Significance (2-sided)	0.001	0.482	0.009	0.000	0.533	0.003	0.000
Local budget expenditures, total	Spearman correlation	0.473	0.196	0.483	-0.011	0.244	-0.580	0.758
	Significance (2-sided)	0.088	0.503	0.112	0.970	0.401	0.048	0.003
Local budget expenditures in the housing and utilities sector	Spearman correlation	-0.297	0.288	-0.713	-0.191	-0.029	-0.329	-0.020
	Significance (2-sided)	0.303	0.318	0.009	0.512	0.923	0.297	0.946
Local budget expenditures in the direction of "education"	Spearman correlation	0.596	0.116	0.601	0.007	-0.200	-0.790	0.754
	Significance (2-sided)	0.000	0.692	0.039	0.982	0.493	0.002	0.002
Employment by surveyed types of economic activity	Spearman correlation	-0.231	-0.456	-0.035	0.253	0.121	-0.357	-0.837
	Significance (2-sided)	0.448	0.117	0.914	0.404	0.694	0.255	0.000
Average monthly salary of employees of organizations	Spearman correlation	0.654	0.242	0.636	0.363	0.242	0.692	0.908
	Significance (2-sided)	0.015	0.426	0.026	0.223	0.426	0.013	0.000
Total volume of all food products sold within the boundaries of the municipal district	Spearman correlation	0.654	0.242	0.636	0.363	0.258	0.713	0.500
	Significance (2-sided)	0.015	0.426	0.026	0.223	0.394	0.009	0.082

Source: own compilation.

In Mezensky District, there is a negative correlation between the migration balance and the volume of agricultural products produced by households – the decrease in the outflow of population by the end of the 2010s, after its relatively high values throughout most of the decade, was accompanied by a decrease in the production of household farms. The reason for this seemingly paradoxical fact lies in the accumulated effect of the loss of working-age population: for many years, the district residents who could be actively engaged in homestead farming left, which ultimately affected the gross output, and a noticeable decrease in the scale of emigration in recent years could not compensate for these losses (population of the district continues declining, although not at such a significant rate).

The above is also true for Onezhsky District, however, in this district the migration movement, in addition to its connection with the dynamics of agricultural production, has a strong statistically significant relationship with the state of housing and communal services: the slowdown in migration loss is positively correlated with the growth of the housing stock and negatively – with budget expenditures on housing and utilities sector. In the latter case, the decrease in budget expenditures indicates the absence of critical problems in this sphere, which would require an increase in monetary "injections". In such a situation, the state of housing and communal services ceases to be a factor "pushing" the population out of the district.

For Ust-Tsilemsky District, the factors shaping the migration outflow or increase were financial and food security, "development" of education (the process of school closures accompanying the decrease in the number of school-age children) and changes in the length of the road network (positive correlation). T.E. Dmitrieva and M.S. Bur'yan singled out the factor of transportation as one of the most important in the formation of the health care system of the Komi Republic, as it predetermines the waiting time for medical care in particular and the ability to provide a certain level of quality of life in general (Dmitrieva, Bur'yan, 2011).

It is noteworthy that for Primorsky District there is no significant correlation between the migration balance and any other indicator under consideration. The explanation for this is the proximity of most rural areas of the district to the urban agglomeration – the regional center (Arkhangelsk) and large cities located near it (Severodvinsk and Novodvinsk). A part of the residents refuses to move to a large city within the region for permanent residence (contrary to the opinion of V.V. Fauzer and A.V. Smirnov outlined the pattern of migration behavior), and stay in the region due to the availability of organized fast transport communication with this city. Moreover, during the COVID-19 pandemic, migration growth was observed in rural municipalities within the district, which are relatively close to the Arkhangelsk agglomeration and are connected with it by developed transport communications. This is a sign of the emerging process of ruralization (desurbanization), especially if we take into account that a number of rural areas within the district (municipalities "Katuninskoye", "Uemskoye", "Primorskoye", "Lisestrovskoye", Talagi settlement, etc.) are actually becoming a kind of "suburbia" of the regional center.

In general, the results of correlation analysis allow asserting that the significant factors of rural population migration movement represent a unique combination in each individual municipality.

Further analysis was aimed at finding regularities based on the assumption that the characteristics of the districts, such as geographical location relative to the regional center and neighboring RF

constituent entities, as well as transport connectivity with other municipalities, the state and features of the local economy, and the general demographic situation, should determine the dependence of migration attitudes on quite specific environmental factors (socio-economic, infrastructural, and institutional), and thus the number and composition of migrant workers and their families.

Accordingly, we can distinguish, first, Primorsky District of the Arkhangelsk Oblast, which is contrasting to all the others: compact settlement in the mouth and upper reaches of the Northern Dvina river, the density of settlement increases as rural areas approach the agglomeration, generally developed transport and logistics infrastructure, relatively high standard of living and close economic ties with the regional center. We have noted above that due to these features a) migration balance in Primorsky District does not correlate with any of our selected indicators, b) migration outflow from the district to the city is generally low, in some years there was a slight increase.

Second, our sample includes a group of rural districts that can be labeled as peripheral or border districts: Leshukonsky, Mezensky, Onezhsky, Pinezhsky and Ust-Tsilemsky. They are located far away from the key transport routes of their region, border (or are close to) the territories of neighboring regions, are characterized by low population density[8] and low population concentration, local economy is based on the exploitation of extensive forest resources and, to a lesser extent, traditional branches of agriculture[9]. However, there is no homogeneity in the number and composition of factors influencing the migration movement of population in this group: Pinezhsky and Mezensky districts demonstrate statistically significant correlations with two and one indicator respectively (weak influence of environmental factors), for Leshukonsky District their number is six (medium influence), and in the case of Onezhsky and Ust-Tsilemsky districts we have nine indicators correlating with migration loss in them (strong influence). At the same time, it is impossible to identify indicators common for all districts and well correlated with the migration balance. Despite their mutual geographical remoteness, Onezhsky and Ust-Tsilemsky districts have quite a lot in common: five out of nine correlations coincide (see Tab. 2). Three of them are related to the indicators mentioned above as the most frequently occurring ones in the whole sample and, therefore, do not characterize the specifics of these two districts. Among the really interesting correspondences we can point out that the slowdown in the outflow from Onezhsky and Ust-Tsilemsky districts in the late 2010s – early 2020s, which is also confirmed by the findings on the growth of the share of working-age population in Ust-Tsilemsky municipality (Popova, 2014), is equally accompanied by a decrease in household agricultural production. As we have noted above, this is due to the cumulative effect of gradual growth in the number of retired working-age residents over several previous years. This feature brings these two districts closer to Mezensky District.

Finally, Zapolyarny District of Nenets Autonomous Okrug, which actually covers the entire territory of Okrug minus the territory of the city of Naryan-Mar, stands apart. The district is characterized by a large territory, low population density, poor transport connectivity both with neighboring territories and internally; harsh

[8] Onezhsky District is an exception due to the town of Onega, population of which is twice as large as the rest of the region's population. However, if we limit ourselves to rural settlements of Onezhsky District, the total number of their residents is comparable to the population of other regions in this group.

[9] In Mezensky District there is diamond mining and a mining and processing plant, but those employed in this production work on a rotational basis, live locally and do not influence the migration pattern in the district.

climate, lack of arable land and forest resources. The number of indicators that have a significant correlation with the migration balance is eight. Seven of them coincide with Ust-Tsilemsky District. However, differences in the strength and direction of correlation for most of them do not allow drawing a conclusion about the real proximity of the composition of the factors of migration movement for these two districts, although there are certainly some similarities.

In the context of the conducted correlation analysis, the factors of migration movement for the whole set of municipal entities under consideration are grouped by ABC-analysis as follows:

– neighborhood-specific factors: none identified;

– common factors: development of education, state of transportation, food and financial security, housing;

– specific factors: health care development, state of utilities and financial powers of municipal authorities.

At the same time, it is worth noting that in the group of "common factors" the following indicators are most often associated with the migration balance: changes in the area of housing stock, dynamics of municipal expenditures on education and average monthly salaries. At the same time, the role of housing provision as a factor affecting migration movement has a different impact: from one district to another, the migration balance increases when the total area of housing increases or decreases. Similar conclusions about the impact of housing provision on migration were obtained by the authors' team headed by A.G. Shelomentsev, but the trend of interrelation among all the regions included in the AZRF was highlighted only for the Arkhangelsk Oblast (Shelomentsev et al., 2018). However, the weak correlation between the factor "wear and tear of utility lines" and the migration balance revealed by us suggests its insignificance when making a decision by an individual, which contradicts the thesis put forward by L.V. Konovalova about the direct connection between migration outflow and uncomfortable living conditions (Konovalova et al., 2022).

The direct correlation between wages and migration balance is explained by the fact that the remaining residents are employed in acceptably paid positions (the minimum wage among all districts for 2021 was 48 thousand rubles), and population with lower incomes migrates mainly, which is also confirmed by the results of socio-economic analysis of the Komi Republic (Popova, 2014). And the positive correlation between the migration outflow and the growth of budget expenditures on education is explained by inflation and the delayed effect of attracting financial resources due to long decision-making.

Conclusion

The study analyzed the dynamics of the migration movement in seven rural municipal districts that make up the territory of the AZRF for the period from 2010 to 2022. Correlation analysis revealed statistically significant above-average relationship between the dynamics of the migration balance in the studied districts and individual indicators from among those we used for the empirical determination of migration factors. In particular, the most significant factors were the development of education, the state of transportation, food and financial security, and housing. However, none of the listed factors demonstrated action in all seven districts.

At the same time, the research results show that the number and composition of statistically significant factors are rather unique for each individual municipality, reflecting its feature, and

any convincing typology of rural areas based on the factors of migration movement (at least within our sample) is difficult.

The thesis put forward at the beginning of the article about the greater influence of economic factors (employment, wages, retail prices, household production, etc.) on the dynamics of migration compared to the factors of the social sphere, transport infrastructure and public utilities in the case of the surveyed rural areas was only partially confirmed. Moreover, it turned out that some indicators, such as agricultural production and employment in general, have no impact on migration loss (growth), while such a significant indicator as the level of wages in more than half of the districts shows a positive correlation with the migration balance: as wages increase, the outflow of population decreases. One should not rule out the explanation of this relationship as a reaction of people to the rising cost of living – nominal wages increase following inflation, while their real purchasing power may lag behind, which "pushes" the most mobile part of local residents out of their native district. As a result, the indicators considered by the authors were divided into "typical for all districts", "common factors", and "specific factors" according to the frequency of their manifestation.

The obtained results of the research on the influence of certain factors on the migration movement within the municipalities of the European part of the AZRF can be used in the adjustment of both regional and municipal policies, in particular through socio-economic strategies, regional projects "Demography", municipal programs such as "Integrated development of rural areas", "Municipal finance management" and others.

The limitation of the study was the small sample size for the analyzed indicators due to the incompleteness of data from open sources caused by the features of statistical accounting at the municipal level. The effect of this limitation, as well as the small number of districts selected for the research, is the impossibility to generalize the results obtained. The conclusions presented in the article are valid for the local cases considered, but some regularities, which are in good agreement with certain conventional provisions in modern migration theory, can serve as a point of reference for larger-scale research projects.

The authors consider the accumulation and analytical generalization of the results of local studies of rural migration in the Arctic conducted earlier by other scientists and the expansion of the research geography of the migration movement at the level of municipal districts and counties to be a promising direction for further scientific research.

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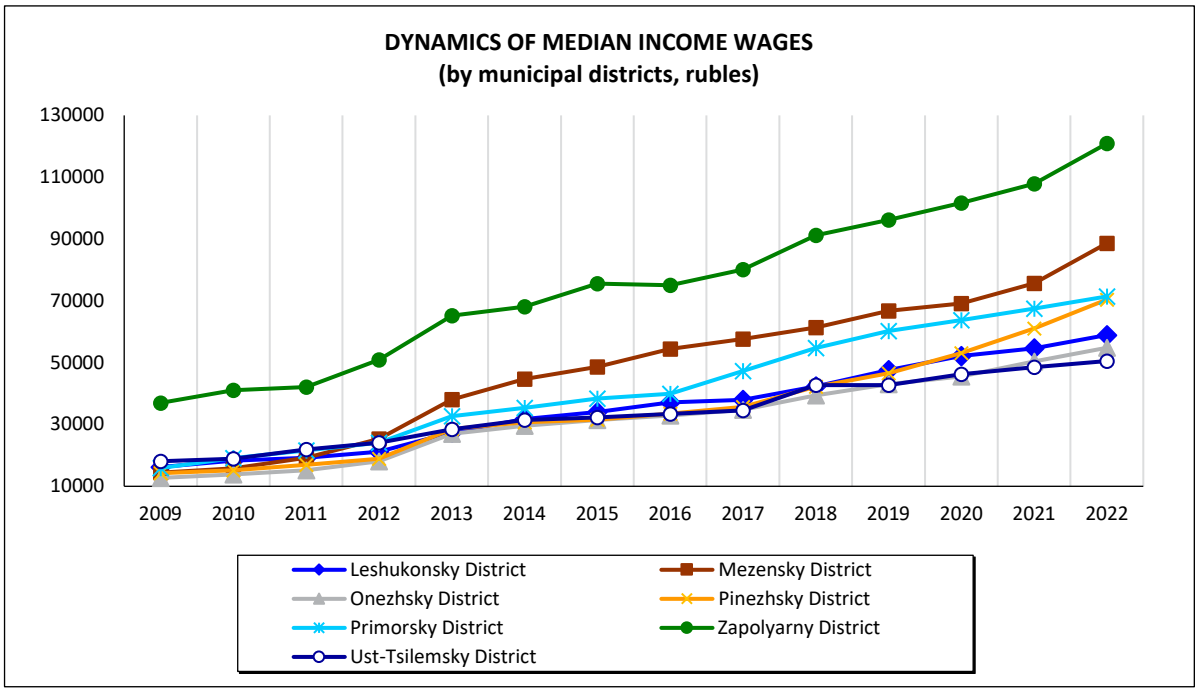
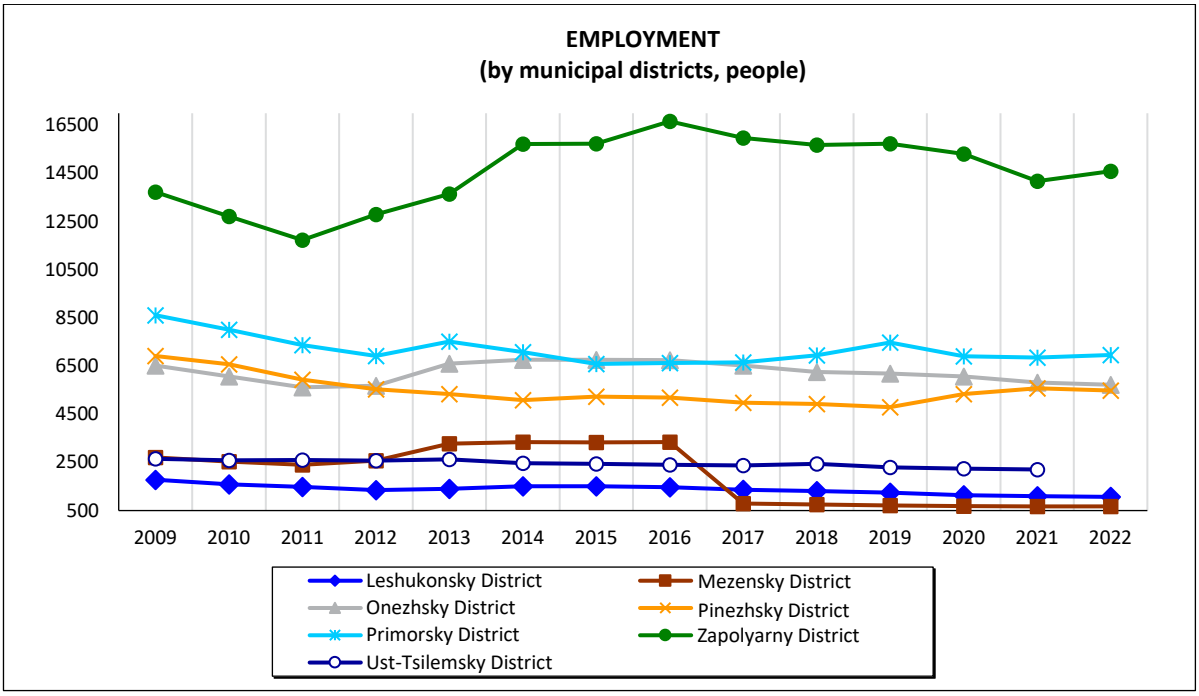
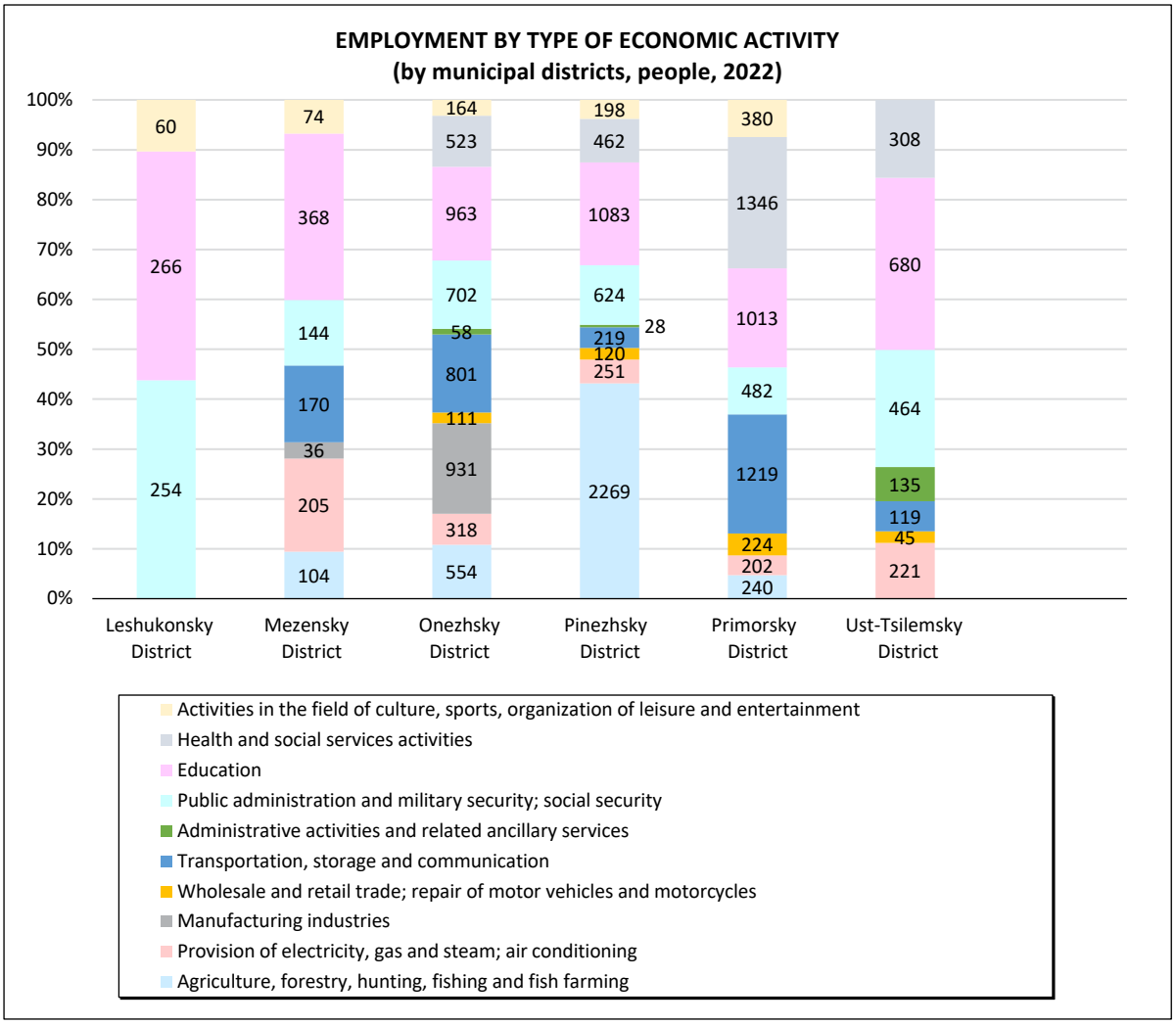
Appendix

Indicators of the socio-economic situation in rural settlements in the European part of the AZRF







According to: Database of indicators of municipal entities of the Arkhangelsk Oblast. Federal State Statistics Service. Available at: https://www.gks.ru/scripts/db_inet2/passport/munr.aspx?base=munst11 (accessed: September 13, 2023).

Information about the Authors

Ulyana E. Yakusheva – Candidate of Sciences (Economics), Senior Researcher, associate professor of department, Northern (Arctic) Federal University named after M.V. Lomonosov (54, building 1, Northern Dvina Embankment, Arkhangelsk, 163002, Russian Federation; e-mail: u.yakusheva@narfu.ru)

Anton M. Maksimov – Candidate of Sciences (Politics), Associate Professor, Senior Researcher, N. Laverov Federal Center for Integrated Arctic Research of the Ural Branch of the Russian Academy of Sciences (20, Nikolsky Avenue, Arkhangelsk, 163020, Russian Federation; e-mail: amm15nov@yandex.ru)

Mariya V. Malygina – Junior Researcher, assistant professor, Northern (Arctic) Federal University named after M.V. Lomonosov (54, building 1, Northern Dvina Embankment, Arkhangelsk, 163002, Russian Federation; e-mail: m.arteeva@narfu.ru)

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