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INTERREGIONAL MOBILITY OF RUSSIAN RESEARCHERS: MOVING FOR A PROMISING JOB

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INTERREGIONAL MOBILITY OF RUSSIAN RESEARCHERS: MOVING FOR A PROMISING JOB[3]

Mobility of highly qualified personnel between countries and regions is closely related to the issue of the effective distribution of human resources and the prospects for the innovative development of the state. The focus of this study is the interregional mobility of Russian researchers: the geographical movements of scientists between different regions (subjects of the Russian Federation). The empirical base of the study is the data obtained in 2016-2017 during the questionnaire survey of 1880 Russian researchers. Two main aspects are analyzed: already accomplished movements of researchers (moving for the educational or working purposes) and the "attitude to mobility" - readiness to move in the future. The features of researchers depending on their mobility pattern are analyzed.

Among the most researchers who had the experience of moving in the past (both for education and work purposes) develops the "attitude to mobility". In the future, they are more willing to consider various options for moving both "for interest" (to participate in an important large-scale project), and "for money" (to get the job with acceptable level of remuneration). There exists a category of Russian researchers who are ready to move "anywhere": both abroad and within Russia, to large and to small cities.

Researchers who are not ready to move to the place that they consider as a small town in a remote region, are concerned about the prospects for professional growth, difficulties for the family, a different lifestyle, change of professional and personal social circle. These aspects should be taken into account in the development of various programs and measures aimed to stimulate internal academic mobility in Russia.

JEL Classification: I23, J61, O15

Keywords: academic mobility, human capital, researchers, scientific career, mobility patterns, readiness to move

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Introduction

Mobility is an integral feature of highly qualified specialists' career path, including those employed in research and development (R&D) [Musselin, 2004; Auriol, 2010; Bröckling, 2015; Markova et al, 2016; Scellato, 2017]. Terms that are used to describe this phenomenon and evaluate the results of the mobility ("brain drain", "brain gain", "brain circulation") are often heavily politicized, because of their connection with the topic of the distribution of human capital and, as a consequence, the innovative development of certain regions [Dezhina, 2014; Scott, 2015]. Besides the international mobility of highly qualified specialists, their movement within the country is also important. Internal - interregional and intraregional - migration functions in a similar way as international one: the centers of attraction can be identified and the core-periphery relations directly affect scientific and innovative development of specific regions [Faggian et al., 2013; Rumyantsev, 2014].

Academic migration as a separate object of analysis has its own specifics. Although the "economic" motivation is still an important component of migration planning, it is often not a decisive factor. Scientists are interested in field-specific research institutions and laboratories, access to modern equipment, the possibility to find co-thinking colleagues and to collaborate with prominent specialists or a well-known scientific school, the opportunity to test and improve own skills and competence in other research teams [Martin-Rovet, 2003; Chepurenko, 2015; Saint-Blancat, 2018]. Moreover, the local academic networking is of great importance for the mobility decision-making [Jons, 2009]. It is important to differ researchers who consider mobility as non-returnable moving, because they do not see any perspectives for professional development in original region or country [Selmer, Lauring, 2013; Lee, Kuzhabekova, 2018], and researchers who see it as a tool to gain demanded professional experience elsewhere and later improve own career chances in the place of origin [Musselin, 2004; Shmatko et al., 2016].

In Russia there is a highly-centralized settlement pattern, featuring a high concentration of resources in the capital region and millionaire cities with significant differences in the quality of scientific and educational services between the regions and the center, enormous distances and high transportation costs. All these factors have a negative impact on the equality of the distribution of knowledge flows. Russian scientists are located primarily in large cities and there is inequality in the distribution of academic specialists between regions that affects the regions' development [Dezhina, 2015; Dyachenko, 2017].

Russian scientific policy faces several crucial questions: how to make it possible to create and develop world-class scientific and educational centers in the regions, how to encourage leading Russian scientists to cooperate with regional research laboratories, and what support

measures for internal Russian academic mobility are more effective [Gokhberg et al., 2011; National project "Science", 2018]. An important goal for Russian scientific policy is to support the interregional mobility of scientists, since the development of certain regions depends directly on the concentration of highly qualified specialists. In the national project "Science" one of the stated objectives is to "support not less than 1000 young promising researchers by 2024 within the framework of stimulation the internal Russian academic mobility, taking into account the tasks of spatial development of the Russian Federation and the advanced development of the high priority territories"[4].

The topical research questions are: a) how large are the interregional mobility flows and what most common patterns they follow; b) if there exists an alternative to the centripetal tendencies: in what directions researchers are ready to move.

This research questions dealing with the interregional migration of Russian researchers are examined within the framework of the project "Monitoring survey of Highly Qualified R&D Personnel". The focus of this paper involves the geographical movement of scientists between federal subjects of Russia (interregional mobility) and their willingness to move in the future. The research objectives include the following:

- specify and describe the most common patterns of interregional mobility of researchers between federal subjects of Russia;
- analyze the "attitude to mobility" and the interrelation between the mobility experience and the declared willingness to move in the future;
- identify researchers who are ready to move to another city for the work purposes and their motivation;
- build a profile of the Russian scientist who is ready to move to the place that he considers as a small towns in a remote region;
- define the factors hindering interregional mobility of Russian scientists.

The paper is structured as follows. In Section "Literature review" the features of interregional mobility of researchers as a specific category of highly skilled workforce are mentioned. Section "Methodology" provides the information about data collection and the sample. Section "Results and discussion" contains four main parts presenting the existing common patterns of interregional mobility of Russian researchers, characteristics of researchers according to these patterns, the readiness of scientists to consider the moving in the future ("attitude to mobility") and prospects of counterurbanization mobility among Russian scientists (declared readiness to move to the place that the researcher considers as a small town in a remote

[4] Passport of the national project "Science", approved by the Presidium of the Council under the President of the Russian Federation for Strategic Development and National Projects (December 24, 2018 № 16). URL: http://static.government.ru/media/files/vCAoi8zEXRVSuy2Yk7D8hvQbpbUSwO8y.pdf

region). In Section “Conclusions” the stance of Russian researchers toward interregional mobility is summarized and perspectives of policy implementation of results are given.

Literature review

Interregional mobility of highly qualified workforce can be addressed through approaches similar to international migration studies. A number of studies [Sretenova, 2003; Krieger and Maître, 2006; Marx et al., 2015; Dyachenko, 2017] demonstrate that the “brain drain” metaphor is applicable not only to the transition of highly qualified personnel to foreign international markets, but also to domestic centripetal migration processes. The migration “hubs” production in large cities at the regional level is quite similar to the functioning of the countries of global attraction like the United States or the EU [Faggian, McCann, 2009; Faggian et al., 2013]. Mobility of highly qualified professionals directly affect the innovation development of the regions: according to Hunt and Gauthier-Loiselle [2010], an increase in the number of qualified migrants in a certain state of the U.S. by 1% leads to an increase in patent activity in it by 6%.

The topic of the impact of the return migration (from large cities to small towns) of skilled professionals is related to counterurbanization studies in general - for example, White [1990] and Paniagua [2002] emphasize that due to this process there is a possibility to overcome the demographic and economic crises faced by modern small towns and rural settlements. A significant proportion of such migrants have a university degree, high professional skills, and they often have experience in both self-employment and management [Cloke, Thrift, 1990]. Former residents of large cities create complex networks: develop infrastructure, create jobs and engage in educational activities [Keeble, Nachum, 2002]. Small cities can benefit economically and culturally from the return migration of highly skilled professionals, who “take along” their skills and experience [Von Reichert et al, 2014].

The nature and intensity of interregional mobility largely depends on the specifics of the country, on its unique economic and cultural conditions. For example, an average American family moves several times during the life cycle, while Russians are not so into migration [Bröckling, 2015]. Migration is usually carried out only at a young age: in Russia, there is an evident peak of mobility at the age of 15-29 years that is also shifted to the lower limit of this age interval [Karachurina, Mkrtchyan, 2018]. In later work [Vakulenko, Mkrtchyan, 2019], authors explain this finding by the predictable nature of life events and trajectories: young people under 25 undergo the most intensive migration period associated with the beginning of obtaining a university degree or professional education.

Academic mobility and the scientific environment as a professional field have a number of fundamental features. Researchers are considered as specialists that are included in international and interregional migration flows, possessing first of all the highly-valuable knowledge. Motivation of highly skilled professionals' migration is characterized by the priority of non-economic factors, which enable to call it “knowledge migration” rather than “economic migration” [Dickson, 2003]. Financial support for projects is important, but scientists are also interested in the availability of modern research institutions, laboratories, equipment, and the qualification of local experts; of prime importance is the possibility to find a community in which science is respected and the social status of scientists is high [Martin-Rovet, 2003; Saint-Blancat, 2018].

Another peculiarity is the “follower phenomenon”: migration of “star scientists” may affect further relocation of their colleagues and students [Trippl, 2013]. The academic networking and personal contacts is of high importance for academic professionals while carrying out migration. This fact not only determines the choice of destination, but can also trigger the entire migration process [Jons, 2009]. As an alternative to physical movement, there are various formats of scientific networking, when scientific migrants stay interested in their home countries' knowledge production and maintain the communication with former colleagues [Ciumasu, 2010; Blachford, Zhang, 2014].

A major number of researchers’ mobility studies are based on the bibliometrics, analyzing career trajectories and publication activity in different countries and research fields [Laudel, 2003; Cañibano et al., 2011; Dubois et al, 2014; Kato, Ando, 2017; Aman, 2018]. For example, Dyachenko [2017] conducted a comparative study, analyzing Russian and American physicists' publication activity in the Web Of Science database of scientific citation. Author highlights the high degree of concentration of Russian scientists in large cities, primarily in Moscow and St. Petersburg. According to Dyachenko, the system of scientific institutions works most productively in cases of the more equal distribution of human capital between different regions. Now large cities absorb the available scientific resources of the country, which is similar to the internal brain drain model.

Work-related mobility of researchers to leading scientific centers can be considered as “natural” phenomena and is often driven by the “the obligations of presence”, the importance of corporeal presence in particular research institutions for successful networking and being at the frontiers of academic knowledge [Storme et al., 2016]. Particular fields of science, in which direct access to the latest technologies, infrastructure, research laboratories and equipment plays a crucial part (e.g. physics), impose some “mobility obligations” on the researchers, who are forced to move to large cities and scientific centers with high concentration of specialists and

technologies [Ackers, 2005; Matthiessen et al., 2010]. Certain areas of scientific activity may also be tied to large private sector companies that employ academic professionals in research and development (R&D) departments. For example, in Japan 70% of engineering and 60% of medical and chemical laboratories with postdoctoral researchers have a close relationship with the private sector organizations [Misu, Horoiwa, 2016].

PhD students and young researchers consider assistance in finding an accommodation to be the most important support measure while moving to another country [Kaisa Puustinen-Hopper, 2004]. However, academic labour market is particularly affected by contractual vulnerability [Ackers, Oliver, 2007]. While the necessity of mobility for career growth exerts enormous pressure on researchers, there is a much lower level of corporate assistance compared to institutional organized support, which is organized for highly qualified specialists invited by large companies and multinational corporations [Ackers, 2005]. For example, academic migrants are rarely assisted in finding an apartment (or other accommodation), as well as their partners are rarely supported in finding a job. In Russia, less than 3% of vacancies for researchers in 2018 assumed the provision of housing[5].

Mobility is common and brings advantages mostly at the beginning of professional career [Deville et al., 2014]. Scientists in particular find themselves under high pressure and demand for international experience at the early career stages [Van de Sande et al, 2005], especially since mobile researchers are also highly valued on the national labour market [Shmatko, Volkova, 2017].

Methodology

The object of this study is the interregional mobility of Russian researchers, both already accomplished (for the purpose of study or work) and potential (willingness to move for a promising job). The study used data from "Monitoring survey of Highly Qualified R&D Personnel"[6]. This Monitoring is the Russian counterpart of the international project "Careers of Doctorate Holders (CDH)" (OECD, Eurostat, UNESCO Institute for Statistics). The methodology of Russian survey is based on recommendations of international CDH project and extended by a set of indicators for complex assessment of the Russian specific.

The data about Russian researchers was collected in 2016-2017 during a dedicated survey by questionnaire. Full formulations of the selected questions analyzed in this paper are provided

[5] Data from the Common information system of competitions for scientific workers positions «ученые-исследователи.рф», section «Analytical and statistical data on hr landscape forming in scientific sector of economy». URL: https://xn----8sbfhdabdwf1afqu5baxe0f2d.xn--p1ai/public/analytic/?year=2018

[6] The research project "Monitoring survey of Highly Qualified R&D Personnel" is realized in the framework of Basic Research Program Higher School of Economics (NRU HSE) in 2010-2019. This working paper is an output of a research project implemented within NRU HSE's Annual Thematic Plan for Basic and Applied Research.

in Annex 1. The total sample comprised 1880 scientists. According to the CDH methodology, the researchers not older than 70 years are surveyed. All data are self-reported. Data was collected through a sampled survey using a multistage stratified sample, with respondent quotas established for age groups, gender, specialization areas, employment sectors, and territories of residence (federal districts); the sample guarantees the representativeness of the population. The respondents comprized researchers employed at R&D divisions of universities, research institutes, engineering services providers, industrial companies, medical centres, and clinics. The survey was conducted in all Russian federal districts in cities, where research institutes and major universities are located, including "naukograd" (science cities). The surveyed researchers were specializing in S&T areas with the best prospects in Russia, in particular information and communication systems, new materials and nanotechnology, the agricultural sector, life sciences, medicine, biotechnology, efficient environment management, energy, transport, and space. The main characteristics of the obtained sample are summarized in Table 1.

Tab. 1. Main characteristics of surveyed Russian researchers, % (N = 1880)

Sex	
Male	59,5
Female	40,5
Age group	
Younger than 29 years old	16,7
30-49 years	44,5
50-70 years	38,7
Type of organization (by current main job)	
Research institutes	34,6
Universities	36,9
Industrial and service sector companies	28,4

The obtained data open up a possibility to analyze both the actual movements of Russian researchers (moving for the educational or working purposes) and the "attitude to mobility" - readiness to move for the participation in an interesting project and/or for a job with an acceptable level of remuneration.

For each researcher it was recorded, in which region(s) of the Russian Federation (subject of the Federation) or the countries(s) he received the main stages of education, as well as in which region(s) his working activities took and are taking place. The main focus of the study is the interregional mobility of Russian researchers. Geographical movements of researchers in the article are primarily understood as moving between regions of the Russian Federation (federal subjects of Russia). Such forms of mobility as obtaining any level of education completely abroad (without simultaneously being a student in an educational institution in Russia) or

working in another country for the long time but then return to Russia are relatively rare in obtained sample.

To study the "attitude to mobility", researchers were asked to assess whether they are ready to move to another city or country, if they are invited to participate in a project of strategic importance for the country or the world as a whole and when the proposed job implied acceptable level of remuneration. For a more detailed study of potential mobility, the researchers specified which exactly relocation options they would be willing to consider. Following options where offered "a small city in a remote region", "another city in the current region", "large cities of Russia, BUT not Moscow and St. Petersburg", "Moscow and St. Petersburg", "neighboring countries" and "far-abroad countries".

Results and discussion

The most common patterns of interregional mobility of Russian researchers

To analyze the actual experience of Russian researchers in interregional mobility, the following key milestones of the biography were selected:

- education (school, university: bachelor's, specialist's, master's);
- doctorate degree – if the researcher has one;
- current job and job changes (up to three previous jobs).

The name of the region of the Russian Federation or the country in which each of these milestones took place was compared with the listed region of the current main job. As a result, all mobility experience of the researcher since leaving the school was tracked. It was also identified the group of researchers, who have never moved from their region for either educational or working purposes.

The personal history of the Russian researcher often does not imply geographical mobility. Moving at any stage of life (as a student or as a qualified specialist) is not typical for Russian researchers: 71.2% of respondents were obtained all levels of education (starting from school), worked previously and are currently working within one federal subjects of Russian Federation. In further analysis, they constitute the group of non-mobile researchers.

Based on the analysis of mobility trajectories of those researchers who had experience of moving for the educational or employment purposes, 4 most typical patterns of interregional mobility were identified. They were named "moving once for all after school" (the researcher left home region forever after school graduation), "returning home" (returning back to the home region after obtaining higher education or a doctoral degree elsewhere), "moving once at the career start" (the researcher moved once after university graduation) and "migration between regions for job purposes". Detailed description of the 4 mobility patterns is given in Table 2.

Tab. 2. Most typical patterns of interregional mobility of Russian researchers

Mobility pattern	Description	Share of the total sample (%)
Moving once for all after school	The researcher moved only once when leaving home region after school, then received higher education (and if available – a doctorate degree) in another federal subject of Russian federation and remained to work there.	12.0
Returning home	The researcher moved after school, then received higher education in another federal subject of Russian Federation, but then returned to the original region; OR After university, the researcher obtained a doctoral degree in another region (most often-Moscow and St. Petersburg), while working in the same region where secondary or higher education was received.	3.8
Moving once at the career start	The researcher changed the region once after graduation (or after obtaining a doctoral degree). So the researcher became highly-qualified specialists in one federal subjects of Russian Federation, then moved and all his employment took place in the new region.	7.9
Migration between regions for job purposes	All researchers (regardless of the region of education) who had one or more previous jobs in a federal subject or country other than the one of current main job.	5.0

The mobility of Russian researchers is far more often related to education rather than work. The most typical life trajectory is moving once after school for higher education in another region, where a researcher further stays (about 12% of the sample). There are more researchers whose region of higher education coincides with the region of current job, than researchers who moved after university graduation. The parallel with an academic inbreeding [Horta, Yudkevich, 2016] can be drawn - after graduation the researchers remain either in the same organization where they studied, or in organizations in the same region. Only 5% of Russian researchers had previous jobs in countries or regions other than in region of their current main job.

In further analysis, the obtained data set was divided into 5 groups: four groups of researchers in accordance with their interregional mobility patterns and the non-mobile researchers as a fifth group. Non-mobile respondents formed a control group, with which we compare the characteristics of researchers, who moved at least once in their biography.

Profile characteristics of the researchers according to their mobility patterns

Moving once for all after school, as well as moving at the career start after graduation – these two mobility patterns are common among both men and women (Table 3). After starting the research career, women move to other regions much less frequently than men. In a group of

researchers who have worked in several regions and countries during their lifetime, the proportion of women is lower than in all other groups, including 12.2 percentage points lower than among non-mobile (29.8 and 42.0%, respectively). The "returning home" mobility pattern is also less typical for women.

Tab. 3. Demographic characteristics of the researchers by their mobility patterns, %

Group according to the experience of interregional mobility	Size of the group (% of the total sample)	Sex		Age group		
		Male	Female	Younger than 29 year old	30-49 years	50-70 years
Non-mobile	71.2	58.0	42.0	16.4	45.8	37.8
Groups by mobility patterns						
Moving once for all after school	12.0	62.4	37.6	17.7	42.5	39.8
Returning home	3.8	**68.1**	**31.9**	**2.8**	**29.2**	**68.1**
Moving once at the career start	7.9	57.0	43.0	15.4	**35.6**	**47.9**
Migration between regions for job purposes	5.0	**70.2**	**29.8**	**27.7**	47.9	**24.5**

* Colored cells with numbers highlighted in bold mean that the value of the indicator among mobile researchers differs by more than 5% from the similar indicator in the group of non-mobile respondents.

The age distribution among the non-mobile and researchers with mobility pattern "moving once for all after school" is almost the same. For many older researchers, their only relocation is long in the past. Among those who moved after university graduation or doctoral degree, as well as among "returning home"-scientists occurs a significantly high proportion of researchers in older ages (over 50 years). This may be due to the historical generational aspect, where the relocation of the graduates was caused by Soviet post-university distribution system[7] and the impossibility to stay in a particular region after graduation. Active interregional job mobility is more typical for the youngest researchers and middle-aged researchers.

The international mobility of Russian researchers is mainly associated with their education and work in home country. Even among the non-mobile (those who received all levels of education and get all jobs within the federal subjects of Russian Federation and has never moved) 9.8% had stage(s) in the biography when they studied or worked abroad for three months or more. Among researchers with other mobility patterns, this proportion is higher: 12.8% for those who left domestic region permanently after school, 12.1% - for those who moved after university graduation, and almost 4 times higher – among those who migrated between regions

[7] Job by distribution was a Soviet practice of obligatory job placement after university graduation.

for job purposes (36.2%). Researchers with "returning home" mobility pattern almost never go abroad – internationally mobile researchers are rare among them (less than 5%).

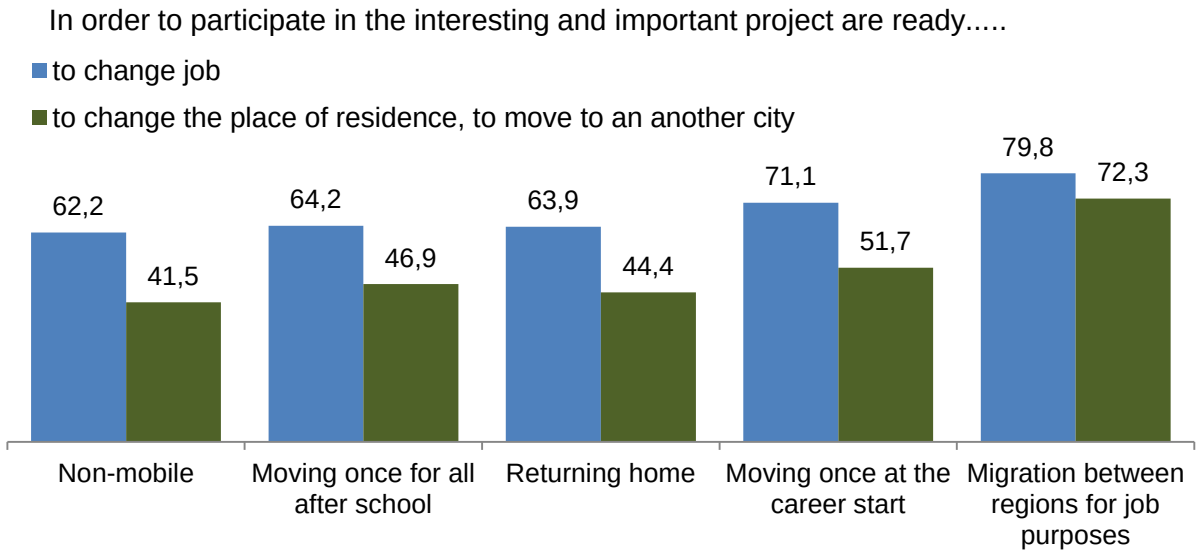
The experience of moving between Russian regions has a positive impact on the intensity of participation in short-term formats of international scientific cooperation. Only among the researcher with "moving once at the career start" mobility pattern the share of those who have not participated in any form of international cooperation over the past 3 years is comparable to non-mobile. Even researchers with "returning home" mobility pattern are included in international cooperation more often, but mostly only in one form - participation in international conferences, seminars and other scientific events in Russia.

"Attitude to mobility": the willingness to move in the future

The survey data allows to analyze not only the already accomplished movements of researchers between regions, but also to identify their willingness to move in the future: where they are ready to move to and under what conditions.

Job mobility by itself is not typical for Russian researchers: only a quarter (25.4%) of all surveyed scientists thought about changing position in the near future. The "attitude to mobility" becomes more noticeable if the researcher is asked not about an abstract desire to change job in the near future, but about the hypothetical situation of receiving an offer to participate in a certain important project. For the sake of participation in the project of strategic importance for the country or the world in general even among non-mobile researchers 62.2% would be ready to change their occupation and 41.5% would be willing to change their place of residence (Figure 1).

Fig. 1. Readiness for labour mobility in order to participate in the project of strategic importance for the country or the world, by mobility patterns, %



Those who already had experience of living in other regions (whether for educational or occupational purposes) have higher levels of readiness to move (except for researchers with "returning home" mobility pattern). Therefore, the experience of actual moves has a positive impact on the readiness for future labour mobility.

It is important not only to investigate whether researchers are ready to move, but also what kind of relocation options they are willing to consider. Table 4 shows the level of readiness among Russian researchers to consider certain options for moving in case they are offered a position in another city with a suitable wage, depending on their mobility pattern.

Tab. 4. Share of researchers who are willing to consider the different moving options, by their mobility patterns, %

Moving options	Non-mobile	Mobility patterns			
		Moving once for all after school	Returning home	Moving once at the career start	Migration between regions for job purposes
a small city in a remote region	17.3	**23.9**	**11.1**	21.5	**31.9**
another city in the current region	29.2	**36.7**	25.0	**40.9**	**47.9**
large cities of Russia, BUT not Moscow and St. Petersburg	37.6	**49.6**	37.5	**43.6**	**51.1**
Moscow and St. Petersburg	49.6	**58.8**	**41.7**	**57.0**	**69.1**
neighboring countries	25.2	**32.7**	**15.3**	**30.9**	**46.8**
far-abroad countries	31.8	**39.8**	**18.1**	34.9	**56.4**

* Colored cells with numbers highlighted in bold mean that the value of the indicator among mobile researchers differs by more than 5% from the similar indicator in the group of non-mobile respondents.

Those researchers who already have mobility experience are more likely to move in the future in order to get the job with acceptable level of remuneration. The only exception are those who returned to their home region after completing their education. Their willingness to move is even lower than among non-mobile researchers, and they are committed to staying in their home region.

Researchers who are ready to move in the future mostly have a general "attitude to mobility" rather than a desire to move in a particular direction. There exists a cohort of Russian scientists who are ready to move to both small and large cities and to other countries if they are offered suitable employment conditions. All variables reflecting the willingness to consider the

different moving options are significantly and positively related both for the whole sample (Table 5) and for all 5 groups (built according to mobility experience).

Tab. 5. Correlation coefficients between variables reflecting the willingness to consider the different moving options (Spearman's rank correlation)

Moving options	a small city in a remote region	another city in the current region	large cities of Russia, BUT not Moscow and St. Petersburg	Moscow and St. Petersburg	neighboring countries	far-abroad countries
a small city in a remote region	1	0.622**	0.531**	0.331**	0.473**	0.365**
another city in the current region		1	0.625**	0.455**	0.455**	0.357**
large cities of Russia, BUT not Moscow and St. Petersburg			1	0.591**	0.548**	0.473**
Moscow and St. Petersburg				1	0.508**	0.532**
neighboring countries					1	0.699**
far-abroad countries						1
**. The correlation is significant at 0.01 (two-sided).						

To understand this “attitude to mobility” it is important to consider the motives potentially associated with the willingness to change the place of residence in order to get a promising job. Researchers were asked to assess to what extent they value the various opportunities that a person receives when choosing a job. These opportunities reflect the motives of the research activities. 14 different motives were proposed, a four-point scale was used for evaluation (1-opportunity is not important at all, 4 – opportunity is very important). In order to identify the most important groups of motives affecting “attitude to mobility” in the future, an exploratory factor analysis was conducted. The components were selected using the Kaiser criterion; the Varimax rotation method was used to calculate the inverted coefficient matrix; coefficients above 0.4 were selected. The factor loads matrix after rotation is provided in Appendix 2. The 4 main components were obtained, total variance explained by this components = 57,3%. On the basis of motives representing the components, the meaningful interpretation of each factor was made. The information about the factors is provided in Table 6.

Table 6. Factors representing the work-related motivation of researchers

Factor	% of Variance Explained	Motives representing the factors (listed according to their factor loads in descending order)
Factor 1 – Opportunity to realize own professional potential	30,85	– pursue and develop own ideas for the sake of extending knowledge; – implement own ideas in practice; – solve large scale, important questions in the specific research field; – realize professional potential (knowledge, experience, abilities);
Factor 2 – Social standing	10,40	– feel stability and confidence in life; – have a decent wage; – achieve recognition, good social standing; – have an interesting environment, social circle; – work together with like-minded people;
Factor 3 – Opportunity to work in different organizations and countries	8,98	– participate in international projects as part of current professional activities in Russia; – get opportunity to work in a foreign university, research center, clinic etc.; – have additional job, combine positions;
Factor 4 – Professional and personal freedom	7,09	– regulate own work and work schedule by yourself; – live a life in accordance with own interests besides the work.

Further, by using correlation analysis, it was found out which groups of motives are associated with the readiness to change the place of residence to get the job with acceptable level of remuneration (separately for certain directions of interregional mobility within Russia). The results are provided in Table 7.

Tab. 7. Correlation coefficients between the willingness to consider the different moving options and factors reflecting job motivation (Spearman's rank correlation)

Moving options	Factor 1 – Opportunity to realize own professional potential	Factor 2 – Social standing	Factor 3 – Opportunity to work in different organizations and countries	Factor 4 – Professional and personal freedom
a small city in a remote region	**0,112****	-0,024	**0,060***	-0,005
another city in the current region	**0,066****	0,001	**0,071****	-0,032
large cities of Russia, BUT not Moscow and St. Petersburg	**0,113****	0,011	**0,106****	-0,016
Moscow and St. Petersburg	**0,112****	-0,016	**0,149****	-0,001
**. The correlation is significant at 0.01 (two-sided). *. The correlation is significant at 0.05 (two-sided).				

The researchers who are ready to move for a promising job are those who highly value the opportunity to realize own professional potential and to get professional experience in

different organizations and countries. These two factors are significantly and positively related with all variables reflecting the willingness to consider the different moving options. On the contrary, high value of social standing or professional and personal freedom does not directly affect the Russian researcher's "attitude to mobility".

Attitude to counterurbanization mobility among Russian researchers

Of special interest are the data on the potential counterurbanization mobility (downward mobility in the urban settlement hierarchy): willingness to move to a small town in a remote region. It is necessary to mention the limitations related to this question: it is not entirely clear which city the respondents will consider small and which region is remote, for example, for the Irkutsk' residents: "remote" with respect to the federal center or to their current location. However, by comparing different characteristics of those who are ready to move to a small town and those who do not consider such an option, we have the opportunity to expand our understanding of the prospects of a more balanced distribution of high-qualified researchers across the country and their engagement in the regional scientific and educational centers' development.

Among all surveyed researchers, 18.9% are ready to consider the option of moving to a small town in a remote region for work purposes. It is possible to summarize the main characteristics of such scientists: they are more likely to be young men (up to 29 years old) without children, and those who have already changed jobs at least once for the last 10 years. The higher share of ready-to-move researchers is in engineering and industrial organizations in the field of transport and computer systems or life sciences and medicine. The potential movers more likely hold positions without managerial functions, have at least one other part-time job and do not have a doctoral degree.

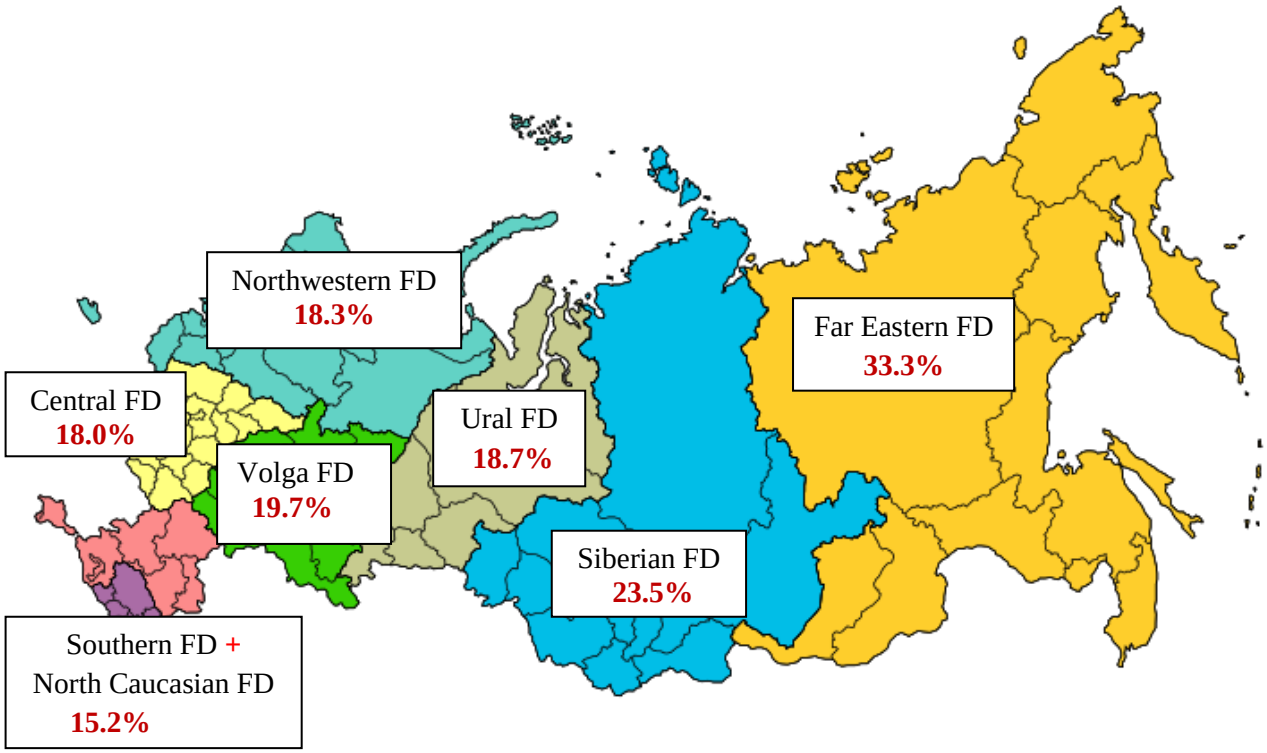
Age is an important factor that determines the possibility of labour mobility. The younger the age group, the higher the readiness to move is. Moving to a small town in a remote region is considered as a possible option by 30.2% of respondents under 29 years old, by 21.7% in the group of 30-49 years old and only by 11.3% of those who are over 50 years old. There is no attitude towards counterurbanization mobility among senior scientists, while young researchers, who are more mobile in general, are also more likely to consider moving to a small town.

University employees are least ready to consider the relocation to the small towns (15.6%), while employees of engineering and industrial organizations (22.9%), as well as of medical organizations (20%) are more likely to be ready for this option. In fact, university employment is often associated with active teaching that is traditionally tied to the walls of an educational institution even despite the rising popularity of online lectures and seminars.

The higher is the position occupied by the researcher, the less is his or her desire to move to a small town. Among managers and vice-managers of organizations there is a relative low readiness to move to a small town in a remote region (13.9%) in comparison with employees without managerial functions (20.1%). That tends to be related to both the financial advantages of a high-ranking position and the strong level of commitment to the development of the organization.

There are scientists from Moscow and St. Petersburg who are ready to move to a small town in a remote region, moreover, among them this share is only slightly lower than the average sample rate (17.4% vs. 18.9%). The highest level of readiness to move to a small town is demonstrated by residents of the Far Eastern Federal District[8], while residents of the Southern and North Caucasus Federal Districts are the least inclined to move (Figure 2).

Fig. 2. Share of researchers who are willing to consider the moving to a small city in a remote region, by the federal district (FD) of current residence, %



The climate is highlighted among the significant factors of both counterurbanization mobility [Mitchell, 2004] and internal migration in general [Vakulenko, Mkrtchyan, 2019]. In the most climate-friendly zones of the Russian Federation, the percentage of those willing to move is the lowest.

[8] The federal districts are groupings of the federal subjects of Russia.

The researchers who are potentially ready-to-move to small towns are also ready to consider various directions of labour migration. There are very few scientists who are willing to move only to a small remote town. One of such respondents mentioned the “interested in solving Russia's problems without the bustle of big cities, which hinders work”. However, the great majority of those who is considering the relocation to a small town in remote region are also ready to move to another town of their current region, to large cities of Russia, and to Moscow and St. Petersburg. A smaller number of researchers also consider the possibility of emigration (moving to neighboring countries or far-abroad countries).

Interregional mobility of scientists is often challenging. About a half (45.3%) of Russian scientists, who are not ready to consider moving to a small remote town, believe that such a moving would create significant difficulties for their families (Figure 3). The second negative factor is the concern of lacking prospects for professional growth, which is the reason why almost one out of four respondents refuses to consider moving (23.3%).

Fig. 3. Reasons not to consider moving to a small city in a remote region, %

The question allowed multiple choice of answers, so the sum exceeds 100%.

In addition to family relationships, it is also necessary to keep in touch with friends and colleagues. In today's world, the development of information technologies has enabled people to maintain relationships over considerable distances. Nevertheless, a significant proportion of respondents are confident that moving will cause a necessary change in their social circle. Physical proximity remains a significant factor affecting personal and professional communication.

Conclusion

Most Russian researchers have never experienced interregional mobility: almost three-quarters (71.2%) of them studied, then started and continued their career without moving anywhere from their region (subject of the Federation). Cases of moving mainly occur in young age, at the stage of obtaining education or immediately after it. The most common pattern of interregional mobility among Russian researchers (about 12% of the sample) is "moving once for all after school", when the future scientist leaves his domestic region immediately after school and then carries out all educational and work activities in another region. After starting a professional career, even researchers with experience of educational mobility tend to be loyal to one organization and not change it for years. Scientific career, which involves several moves during the working life, is relatively rare and typical primarily for young men.

Researchers who are ready to move in the future for a suitable employment conditions mostly have a general "attitude to mobility": the readiness to move to both small and large cities and to other countries are positively related. The readiness to move for a promising job is affected by motives, which are primarily associated with opportunity to realize own professional potential and to get professional experience in different organizations and countries.

In Russia persists the tendency of centripetal urbanization: young people try to move to larger cities because of better educational and career prospects. However, among all surveyed researchers almost one in five (18.9%) is ready to consider the option of moving to a small town in a remote region for work purposes. It should be noted that we are dealing with a declarative readiness; it can hardly be considered that the contrurbanization flow of academic staff in Russia is really intense. Researchers are concerned about difficulties for the family, the prospects of professional growth, a different lifestyle, and the change of personal and professional circle of communication. These aspects should be taken into account in the development of various programs and measures aimed at the development of regional research and educational centers and to stimulate internal academic mobility.

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Appendix 1. Formulations of the selected questions used to measure current and future interregional mobility of Russian researchers

For each educational stage that you have successfully completed, specify the region of Russia or country where you completed this stage. For Moscow and St. Petersburg, write down the name of the city.

Educational stage	Region of Russia / country
a. secondary education (school)	1. country: _____ 2. region of Russia: _____
c. higher education (specialist, bachelor)	1. country: _____ 2. region of Russia: _____
e. Master's Degree	1. country: _____ 2. region of Russia: _____
g. Graduate school	1. country: _____ 2. region of Russia: _____
j. Habilitation	1. country: _____ 2. region of Russia: _____

In what region of Russia or country did you have your previous job(s)? Specify the region of Russia or country. For Moscow and St. Petersburg, write down the name of the city.

Job	Region of Russia / country	Did not have previous job
Previous job 1	1. country: _____ 2. region of Russia: _____	
Previous job 2	1. country: _____ 2. region of Russia: _____	3
Previous job 3	1. country: _____ 2. region of Russia: _____	3

When people are looking for a job, moving to a new place is often one of the defining conditions. Imagine that you are now looking for a job, and you are offered a job in another city with an acceptable level of remuneration. Would you consider the following moving options? If you are not ready to consider, specify the main reasons for this decision.

Moving options:		1. Ready to consider this option 0. NOT ready to consider this option	1. there will be no prospects for professional growth 2. it's hard to get used to a different lifestyle 3. not enough knowledge, experience to work in a new place 4. moving will create too much difficulties for the family 5. psychologically difficult to change the circle of professional communication 6. psychologically diffcult to change personal circle of contacts 7. other reason (*please specify*)
a	a small city in a remote region	1 ↓ 0 →	1 2 3 4 5 6 7
b	another city in the current region	1 ↓ 0 →	1 2 3 4 5 6 7
c	large cities of Russia, BUT not Moscow and St. Petersburg	1 ↓ 0 →	1 2 3 4 5 6 7
d	Moscow and St. Petersburg	1 ↓ 0 →	1 2 3 4 5 6 7
e	neighboring countries	1 ↓ 0 →	1 2 3 4 5 6 7
f	far-abroad countries	1 ↓ 0 →	1 2 3 4 5 6 7

Appendix 2. Factor loads matrix for work-related motives

Rotated component matrix [a]

	Component			
	1	2	3	4
Realize professional potential (knowledge, experience, abilities)	0.666			
Regulate own work and work schedule by yourself				0.828
Have a decent wage		0.732		
Solve large scale, important questions in the specific research field	0.684			
Feel stability and confidence in life		0.792		
Pursue and develop own ideas for the sake of extending knowledge	0.800			
Implement own ideas in practice	0.734			
Live a life in accordance with own interests besides the work		0.488		0.542
Work together with like-minded people		0.454		
Get opportunity to work in a foreign university, research center, clinic etc.			0.733	
Achieve recognition, good social standing		0.525	0.478	
Have additional job, combine positions			0.687	
Participate in international projects as part of current professional activities in Russia			0.740	
Have an interesting environment, social circle		0.457		

Factor identification method: principle components analysis.
Rotation method: Varimax with Kaiser normalization.
a. Rotation converged in 6 iterations.

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