Shrinking Urban System of the Largest Country: Research Progress and Unsolved Issues

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Abstract—The article is a review of trends of the last decade in the development and study of the urban system of Russia and its largest agglomerations, Moscow, in particular. The features of Russia’s urban network are noted against the global background and key features, shifts in the urban network, including the ongoing concentration of people in major cities and urban agglomerations with the degradation of lower levels of the urban system—small towns and urban-type settlements. The reasons for these processes are associated both with the natural increase/decrease and, in particular, migrations of the population and administrative decisions: the expansion of large cities, elimination of urban-type settlements, etc. The differences between the Russian regions in the number and size of urban settlements are shown, as well as the direction of the drift of demographic centers. A review of studies on urban agglomerations revealed their continuity with Soviet ones. The main conclusions on the dynamics of the development of urban agglomerations correspond to those obtained earlier: the growth of the largest urban agglomerations, primarily, the Moscow and St. Petersburg ones, continues, while the demographic resource for feeding smaller agglomerations is gradually decreasing: they grow more slowly or even decrease in size. Migration remains the key transformation mechanism, largely due to the strongest polarization of the state of the labor market between the centers of urban agglomerations, their belts, and the periphery outside the agglomeration, which initiates large-scale temporary labor and resettlement migrations. Against this background, the Moscow agglomeration stands out ever more significantly, growing into the core of the emerging Central Russian megalopolis. The direct impact of the capital’s labor and housing markets and associated migration spans Central and Southern Russia, while the indirect impact is felt throughout the country. The growth of the share and role of the Moscow agglomeration in the settlement system is determined by a set of factors that have consolidated its image as a “land of opportunity”: capital rent, centralization of economic and political decisions, agglomeration effect, concentration of the best human capital, and polarization of the labor market and career opportunities.

Keywords: Russian cities, urban structure, urban agglomerations, delimitation, commuting, Moscow agglomeration, megalopolis

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INTRODUCTION

Urban studies have been and remain one of the main lines of research in Soviet and Russian socioeconomic geography. The founding fathers of the Soviet regional school attached great importance to the development of cities, but before the Second World War, with the rapid urbanization of the country, attention to them was clearly insufficient (Makhrova, 2015). In the 1940s, this and the weakness of the entire population geography were pointed out by leading Soviet economic geographer N.N. Baransky. He wrote: “Cities are, so to say, the command staff of the country, organizing it in all respects—economically, politically, administratively, and culturally. From an economic-geographical point of view, the cities plus the road network form a framework, on which everything else rests, a framework that forms the territory and gives it a certain configuration.”

Classic scholars of the Russian geourban school O.A. Konstantinov, R.M. Kabo, I.M. Maergoiz, B.S. Khorev, G.M. Lappo, E.N. Pertsi, and many others, laid the theoretical foundations and developed methods for studying cities, their networks, functions, layout, and location. These approaches and methods are still used, highlighting this national school as independent, in particular, due to the original concepts of the framework of settlements and the economic and geographical positions of cities.
Russia remains one of the most urbanized large countries. According to various estimates, about 3/4 of the country’s population lives in cities: 74.4% according to the UN1 and 74.7% according to the most recent Federal State Statistics Service (Rosstat) estimates. This indicator has not grown much since the 2010 census (73.7%), nor has the total number of cities (1117 at the beginning of 2021 versus 1100 in 2010); however, the internal structure of the urban system continues to evolve. Significant changes can be seen in the development of larger settlement structures: urban agglomerations, which play an increasing role in Russia’s socioeconomic development.

The objective of this review is highlight the key features of the urban network and urban agglomerations and trends in their change through the prism of studies conducted in the last decade, including those carried out by the authors of the article. Particular attention is paid to identifying the causes and nature of ongoing growth of the Moscow agglomeration, the largest in the country. The processes taking place in it actively influence the transformation of the all-Russian settlement network, form the main migration flows, and have an organizing effect on the socioeconomic development of the entire country or at least its European part. Emphasis on these problems determines the selection of three main sections in the article devoted to the evolution and current state of the country’s urban network, key trends in the development of urban agglomerations, and the special role of the Moscow agglomeration.

**EVOLUTION AND CURRENT STATE OF THE RUSSIAN URBAN SYSTEM**

Two groups stand out among the features of the country’s urban system and shifts, namely (1) more stable ones that evolved under the influence of powerful long-term factors; (2) those determined by current circumstances and events. Acting in one or in different directions, together they influence both basic structures inherent in urban systems: the urban proper, primarily hierarchical, and spatial, which is even more important for geography.

The features and trends of the first group have been identified by many studies both for the Soviet and post-Soviet periods (Gorod ... 2001; Dmitriev et al., 1988; Hill and Gaddy, 2003; Iyer, 2003; Lappo, 1997, 2012; Treivish, 2009; Voprosy ..., 2013; etc.). Research and data profiles can be found in urban sections of some extensive reviews (Russia ..., 2005; SSSR–SNG–Rossiya ..., 2001). These features and trends include:

- large-city character of settlement pattern, dominance, and often hypertrophy of the main (primate) cities;
- relative weakness of smaller urban settlements;
- general sparseness and geographical asymmetry of the urban network, but not extremal against the global background;
- urban network expansion along the west–east and north–south axes (compared to other northern countries) and sharp contrasts along the center–periphery axis.

The second group is reflected in (Kolomak, 2018; Kuznetsova, 2020; Makhrova, 2015; Vendina et al., 2015; Zubarevich and Sаfронов, 2019; etc.). Here are some examples out of many:

- inclusion of the cities of the Republic of Crimea and Sevastopol in the urban system of the country in 2014,
- shifts associated with redrawing of the administrative boundaries of regions and cities, changes in the status and potential of cities against the backdrop of municipal budgetary reforms and centralization;
- the ongoing erosion of the lower levels of the urban system, in particular, the disappearance of urban-type settlements, the legacy of the Soviet urban structure.

Some phenomena can be attributed to both groups, e.g., depending on human migration in all forms, quickly responding to external impulses (Mezhdu domom ..., 2016; Karachurina and Mkrtychyan, 2021; Karachurina et al., 2020; Mkrtychyan and Florinskaya, 2019). The main migration trends of the post-Soviet period were the reversal of migration flows from the north and east (except for the main hydrocarbon producing areas) to the south and west of the country, the strengthening of their centripetal way in favor of capitals, their suburbs and regional centers, as well as temporary movements, including regular return flows.

Let us consider the main results of these processes, including those for 2010–2020. This period includes the years of population censuses; however, the results of the 2020 All-Russian Population Census, which was postponed to late 2021 due to the COVID-19 pandemic (in hard-to-reach areas, the census was conducted until December 20, 2021), have not been published by the time of writing. Therefore, it is necessary to use the data of the current registration of the population.

Chauncey Harris called the Soviet Union a land of great cities (Harris, 1970). There were more of them than in the USA at the time. Now on the territory of the former USSR, there are 291 large3 cities, while in

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1 World Urbanization Prospects. Department of Economic and Social Affairs, United Nations. 2018. https://population.un.org/wup/Download/Files/WUP2018-F01_Total_Urban_Rural.xls. Accessed January 10, 2022.

2 Statistical Data Showcase. The share of the urban population in the total population as of January 1, 2021. https://show-data.gks.ru/report/278932/. Accessed May 8, 2021.

3 Large cities—100000 inhabitants and more; medium-sized—50000—100000; small—up to 50000.
the US, there are 326. In some other countries, there are also more than in Russia. It should not be misleading that Russia has surpassed the United States in the number of million-plus cities, which has increased by 3 since 2010, reaching 15 versus 10 in the US, but these are cities within their official boundaries. In the USA, in contrast to Russia, they have not changed for a long time despite actual urban sprawl. In the United States, there are 2.9 times more urban areas with populations of 1 mln people.4 Their share in the US population is twice as high, while the million-plus centers share of the total population is lower than in Russia.

The distribution of Russia’s major cities by far does not conform to the rank–size rule: Moscow is 2.35 times larger than St. Petersburg, and within their agglomerations, 2.7–2.8 times. The populations in both capitals are larger than in all the other 13 million-plus cities. Table 1 shows the simplest indicator, the ratio of dominance of the population of the first city over the total of the next three, as well as some other parameters of networks of large cities in selected countries. It is on this basis that Russia leads. Only Indonesia is close to it, and only there and in Japan do the capitals dominate; their separation from other cities is increasing.

The history and density of spatial development affect the indicators in Table 1. In Australia, there are few large cities, but their share in country’s population, average size, and sparseness are the highest, with four times more land per one city than in Russia (in Canada, almost twice as much, but in other large countries, much less). Sydney is ahead of almost equal Melbourne insignificantly. Common properties of the urban systems in younger states with their “pioneer” logic are rapid expansion and a limited number of cities, small ones, in particular, traditionally associated with an agrarian economy. However, better means of communication allow a few large centers to serve large areas (Bretagnolle et al., 2018).

Shifts in Russia’s urban structure (Fig. 1) since 2010 are, first of all, an increase in the population of million-plus cities by 19% due to the expansion of their borders and the number and inflow of migrants, above all to Moscow. On the other hand, the populations of centers with 0.5—1 mln inhabitants decreased, while in size groups 250000—500000 and 100000—250000, the population slightly increased, but due to the addition of 17 cities in Crimea to the Russian system, including 6 large ones, without which the change is barely noticeable. Medium-sized cities, with 50000—100000 inhabitants, have long become a weak link in the structure; there are fewer of these than large ones, and five times fewer than small ones. Medium-sized cities are absent in 35% of regions (out of 82, excluding 3 federal cities–regions), and in 41–42% of cases their total population is smaller than in small cities. Since 2010, five cities have dropped out of the medium-sized group (seven if we exclude Crimea), usually descending to the group of small cities, but this has had little effect on the population dynamics. The average size of all cities in 2021 was 75000 people; in 1989, it reached 90000, and in 2010, it was still a little less.

All this does not mean that Russian authors pay no attention to small towns. A separate body of publications is devoted to them (e.g., (Gunko et al., 2021)). Truly, sometimes headlines like "Does Russia Need Small Towns?" (Kutepova, 2012) hint at their dubious future. In the flow of studies, those devoted to several geographical and problematic groups stand out: borderland towns (Vendina, 2019; etc.), Arctic towns (Pilyasov and Putilova, 2020), satellites of large cities, including dormitory suburbs (see the sections on urban agglomerations below), and particularly single-

4 Demographic World Urban Areas. 16th Annual Edition, 2020. http://demographia.com/db-worldua.pdf.

Table 1. Selected indicators of large cities in selected countries, 2021

| Country | Number of cities | Share of country’s population, % | Average city size, thous. people | Leadership ratio, 1/2–4 | Territory per city, thous. km² |
|---------|-----------------|---------------------------------|---------------------------------|------------------------|-----------------------------|
| Russia  | 167             | 52.2                            | 456.6                           | 1.49                   | 102.5                       |
| USA     | 326             | 29.1                            | 301.8                           | 0.94                   | 29.2                        |
| Canada  | 51              | 50.9                            | 382                             | 0.76                   | 195.8                       |
| Brazil  | 229             | 43.6                            | 398.5                           | 0.90                   | 37.2                        |
| China   | 425             | 25.6                            | 872.5                           | 0.66                   | 22.6                        |
| India   | 436             | 14.1                            | 456.0                           | 0.72                   | 7.5                         |
| Indonesia | 134            | 18.9                            | 392.0                           | 1.47                   | 14.2                        |
| Australia | 19             | 67.1                            | 915.5                           | 0.56                   | 404.8                       |
| Japan   | 204             | 60.3                            | 370.6                           | 1.0                    | 1.9                         |

Large cities include cities with 100000 or more inhabitants. Compiled according to data of World Population Review 2021 (https://worldpopulationreview.com) and author’s calculations.
industry, or company towns (Mikryukov, 2015; Uskova et al., 2012; Zamyatina and Pilyasov, 2015).

The number of urban-type settlements has decreased by more than 100, to 1182, and since the days of the USSR, by more than 1000—1.9 times. Most often, they became rural settlements with the consent of the inhabitants and for the benefits deriving therefrom. The average population of urban-type settlements does not reach 6000 people; small towns, 20 000 people. Up to 10 urban-type settlements have actually lost their permanent populations; 11 regions have no such settlements at all. At the same time, in 37 regions of the North, Center, the Volga Region, Urals, and Siberia, there are more urban-type settlements than cities. The leader is the old-industrial Nizhny Novgorod oblast with 54 urban-type settlements.

The urban structures of Russian regions differ in the number of all city centers and in their average size (Fig. 2). Often, these indicators are inversely proportional: the fewer urban centers, frequently due to the liquidation of all or almost all urban-type settlements, the larger their average size, yet regional leaders are not that big, as in Lipetsk oblast, a number of republics in Southern Russia, and Orenburg and Tomsk oblasts. The Altai Republic (one city) and the Nenets Autonomous Okrug (one city and one urban-type settlement) are extreme in terms of the first basis. Udmurtia and Tyumen oblast are leading in terms of the second since having no urban-type settlements and few cities, but rather large centers. In Nizhny Novgorod and Sverdlovsk oblasts, the plurality of urban centers reduces their average size, despite the presence of million-plus cities. This also applies to the Moscow region, which in this case includes Moscow with its 12.7 mln inhabitants and Moscow oblast.

The density of city networks (urban-type settlements excluded), also shown in Fig. 2, is geographically more logical. Kaliningrad oblast, the Moscow region with its four neighbors, and the small southern republics stand out. In the inhabited European zone, 2–3 cities per 10 000 km² are typical, which corresponds to 50–70 km of the average (direct air) nearest neighborhood distance (NND) between them, provided that they are evenly distributed over the territory. In reality, it is less, because some cities are brought together within the limits of agglomerations or simply in pairs for natural and other reasons. For example, the hypothetical NND in the Nizhny Novgorod oblast is 52 km, and the actual one even along winding roads, with the frequent absence of bridges over wide rivers on a straight path, etc., is only 33 km. Moving north and east, the density of cities decreases, and the NND reaches hundreds of kilometers (up to 500).

For cities all over Russia with populations of 100 000 people or greater, the actual, but this time direct, air NND is 123 km, and only 38.5% of the hypothetical distance with a uniform distribution. For comparison, in Australia, with its sparse and highly asymmetric network of large cities, the average NND is actually 341.5 km, but this is 53.7% of the hypothetical distance. In Russia, this indicator varies from 15–16 km in the Moscow region to 1300 km in the Northeast. Along the Trans-Siberian Railway as a latitudinal axis, the “emptiest” is the Trans-Baikal segment between Chita and Svobodny (Amur oblast), where, at a distance of 1600 km, there is not even a single medium-sized city, not to mention a large one.

The asymmetry of different-sized urban networks is well reflected by the locations and movements of their demographic centers (centers of gravity of their populations calculated for selected size groups). Figure 3 shows these for the last 40 years for the urban and, by comparison, for the entire and rural populations. The latter are calculated not by population centers as reference points, but by the internal centers of regions with their preliminary in the form of separate procedures for vast populous regions, and for small ones, with conditional referencing to the centers of their territories or to administrative centers.
In Soviet times, these three centers, shifting to the east, reached the Belaya River in Bashkiria, south of Ufa. In doing so the urban center was constantly located somewhat to the north, and the rural center, to the south of the general one. However, none of them were able to “ford” the symbolic water barrier, and since 1990 they began to fall back and disperse in different directions. They are separated from the center of the Russian territory (in Krasnoyarsk krai) by more than 2500 km and by about 1000 km from the center of

Fig. 2. Contemporary network of urban settlements in Russia. 
*Calculated and compiled according to Rosstat data (https://rosstat.gov.ru/compendium/document/13282).*

Fig. 3. Drift of selected centers of gravity of Russian population, 1979–2020. 
*Calculated and compiled according to Rosstat data.*

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a settled territory with a population density of at least 1 person/km² (in Omsk oblast).

The population center of large cities ranging in size from 0.5 to 1 mln people lagged slightly behind the center of gravity of the entire urban population, moving east, then west, south and back, but remaining within a limited area near the borders of Tatarstan with Samara oblast and Bashkiria. The centers of million-plus cities are located about 400 km to the west. In the first half of the 20th century, when there were two giants in Russia—St. Petersburg and Moscow—the middle center formed by them was located in Tver oblast. With the expansion of the list of cities of this size, starting with Nizhny Novgorod in 1962, it moved to the eastern outskirts of Nizhny Novgorod oblast and the northwestern outskirts of Chuvashia. The drift was interrupted by the post-Soviet crises: the center backed away, circled, and in the 2010s, a new expansion of the list of million-plus cities, notably at the expense of the most distant Siberian Krasnoyarsk, returned traffic in the Soviet main line, but in practice it did not go further than the center of those times.

Thus, the larger Russian cities, the further to the west or northwest the centers of their demographic masses are located. In this sense, Russia is somewhat reminiscent of the United States. The center of the US million-plus cities, according to our calculations, followed the path of the entire population mass (according to the US Census Bureau), lagging behind it in the 20th century, then ahead to the southwest, towards Texas. The drift of the center of India’s million-plus urban agglomerations was also gradual, while in China, the transition to a market economy caused, as in Russia, the collapse of the course of such a center (for more details, see (Treivish, 2021)). The centers of the leading cities of these two countries, in fact, reflected a sharp change in their economic regimes.

RUSSIAN URBAN AGGLOMERATIONS: KEY RESEARCH AND DEVELOPMENT TRENDS

In economic geography, studies of Russian urban agglomerations in the last decade can be divided into several main groups.

The first is devoted to methodological and practical issues of identifying and delimiting urban agglomerations (hereinafter, UA). Since in Russia, unlike most other highly urbanized countries, there is still no officially established methodology for determining the composition of UA (Antonov, 2020), this issue remains paramount for researchers. Relevant studies on the whole are carried out on two vectors: (1) modernization of methods developed in the Soviet era and their adaptation to modern conditions (e.g., (Glazychev and Starodubrovskaya, 2008)); (2) attempts to apply new methods of delimiting UA implemented in other countries (Bolshakov, 2018; Monastyrskaya and Peslyak, 2019; Raisikh, 2020a, 2020b). Basic methods with predominance of the so-called functional settlement approach were developed long ago (Listengurt, 1975; Polyan, 2014; Polyan et al., 1988). Given the lack of statistical information about relationships within an identified UA, including commuter flows, these methods were forced to use simplified models based on calculated transport accessibility isochrons.

In the 21st century, such a reduced approach no longer meets the requirements of territorial planning, in particular, given the growing mobility of the population and its continued concentration in the country’s largest UA (Antonov and Makhrova, 2019). In addition, new data on functional relationships within UA have appeared (Antonov, 2016; Makhrova et al., 2016), which, although with limitations, have become available to researchers. Nevertheless, most recent works on identifying the composition of large UA and analysis of their development and functioning are still based on developments of the Soviet era (Antonov and Makhrova, 2019; Chugunova, 2014; Fedorova and Ponomareva, 2014; Glazychev and Starodubrovskaya, 2008; Iglovskaya, 2014; Kashin et al., 2017; Lappo et al., 2007, 2010; Sergeeva and Burul’, 2014; Sokolov, 2015; Ulyaeva, 2016). Attempts to introduce elements of a morphological approach into the functional approach (based on the continuity of settlement pattern, construction development, and infrastructure), which is very popular and has been introduced into official foreign methods of delimiting UA (Antonov, 2020; Izhguzina, 2014), are typified by authors of the urban planning and architectural community (Monastyrskaya and Peslyak, 2019), but they cannot be deemed very successful. Without abandoning the basic outlines of UA modeled on transport accessibility isochrons, they offer iterative procedures for refining the composition of UA based on the criteria of continuity and connectivity of built-up areas, population density, and analysis of commuting.

A weak point is still the possibility of applying such a technique only on an individual basis, when the initial data are actually acquired manually, by extremely labor- and cost intensive methods—field observations, sociological surveys, etc., which makes delimitation impossible for all large UA in Russia. In addition, in all the above recent studies, the problem associated with the size of the elementary territorial statistical unit for which the main body of information is available is an upper level of municipal structure (municipal district, municipal okrug, urban municipal okrug). Access to data at the level of individual settlements is urgently needed, but there are fewer of them in Russia in each passing year.

Under these conditions, an alternative approach has been proposed (Raisikh, 2020b), which combines elements of morphological analysis and functional modeling. It involves abandoning isochrons and using a gravity model that predicts the maximum radius of a monocentric UA based on its population. The differ-
ence between this methodology and previous ones, where gravity models were also proposed (Pivovarova, 2002; Sokolov, 2015), is that the indicators describing the decrease in level of interaction or increase in the “friction of space” (Smirnyagin, 2016) are not set by the willful decision of the authors, but by regression analysis for agglomeration formations from other countries. Another important difference between the methodology is that the UA includes not just municipalities that fall within the maximum radius, but “urbanized areas,” which are calculated based on the morphological criterion of continuity of construction development. A distinctive feature of the study (Raisikh, 2020b) is that its author, unlike many others, did not stop at speculative conclusions about the possibility of applying his methodology, but he was able in practice to delimit the largest UA of Russia using it.

Whatever universal methodology is used to delimit UA in Russia, the meaningful conclusions about their dynamics are similar (Antonov and Makhrova, 2019; Raisikh, 2020b). In the time after the 2010 census, the pulling of the population into the main UA and depopulation of interagglomeration spaces accelerated against a slight increase in the population of the entire country due to international migration. With the rapid growth of the largest UA (Moscow, St. Petersburg, Yekaterinburg, etc.), some UA are losing their populations (Novokuznetsk) or maintaining it at the same level, including via administrative-territorial transformations. Most Russian agglomerations have low levels of development indicators (Antonov and Makhrova, 2019; Puzanov and Popov, 2017), with center dominating both in population and economic activity. The ongoing process of population concentration in the center of European Russia has allowed some authors to talk about the formation of a Central or Central Russian megalopolis (Makhrova et al., 2012b; Makhrova et al., 2016), but this is not yet universally acknowledged and included in the current research agenda.

The second group of UA studies cover internal patterns and features of their functioning, primarily economic ties. A key place is given to studying population pulsations (for more details, see Makhrova et al. in this issue), the labor market, and labor commuting, which form the basis of population pulsations and are used as one of the criteria for the delimitation procedure. The state of local labor markets, differences in job security and wage levels, as key factors generating permanent and labor migration, are also at the focus of research (Antonov, 2017).

To determine the intensity and direction of labor migration, Russian authors use two main approaches: (1) balance/calculation methods (Antonov, 2019, 2021; Makhrova, 2014; Shitova and Shitov, 2016); and (2) direct observations (Antonov, 2016; Babkin, 2020; Makhrova and Babkin, 2019; Makhrova and Bochkarev, 2017, 2018; Makhrova and Kirilov, 2015). The first approach draws up a balance between the number of the economically active or able-bodied population and jobs according to the tax service, pension fund, and employers. The second approach uses rather scarce official data on the labor mobility of the population (2010 All-Russian Population Census and Rosstat labor force sample surveys), as well as on movements of mobile phone users, which make it possible to specify the nature of commuting within a UA. Such studies are still few in number due to limited information (offered on a commercial basis and therefore inaccessible to most researchers) and mainly concern the Moscow agglomeration.

Particular issues of the state of labor markets in Russian cities (Kuznetsova, 2003; Mikryukov, 2015; Mkrtchyan and Florinskaya, 2016) and urban agglomerations (Averkieva et al., 2015; Bedrina et al., 2018; Bugaev, 2015; Fedorova and Popomareva, 2014; Iglovskaya, 2014; Kozlova and Makarova, 2016; Popov, 2018) have been frequently considered recently. There were few generalizing works on the entire urban system (Antonov, 2019; Mezhdu domom ..., 2016; Treivish and Nefedova, 2010) and major UA (Antonov, 2021) due to an insufficient information base and the labor-intensity involved in processing it.

Key research findings point to a dramatic differentiation of cities based on size. In small towns, the process of downsizing corporate employment (at large and medium-sized enterprises, in budgetary organizations) is more intense than in large cities and regional centers. The provision of jobs increases linearly with the increasing population of the city, except for the group of smallest cities—up to 25,000 people. The regional labor markets of most federal subjects are dominated by their centers, where the availability of jobs is much higher than in the rest of the territory (Fig. 4). The shrinkage of local labor markets in small towns and rural areas leads to reproduction of the socioeconomic gradient and increased spatial mobility (both commuting and other temporary labor migrations, as well as permanent migrations) within regions. Usually there are signs of divergence—strengthening of differences between territories along the basic differentiating axes: city—village and large city—small town. At the same time, national labor market indicators in 2010−2019 (sometimes called “hospital averages”) seem relatively stable and successful due to averaging of the values across regions and the natural departure of a significant amount of labor resources to the cate-

5 See also: Bogorov, V., Novikov, A., and Serova, E., Self-knowledge of the city. Archeology of the periphery. 2013. Project Meganom. Moscow. http://issuu.com/mosurbanforum/docs/d UF_380−405_data. Accessed May 8, 2021; Yumaguzin, V., Migrants’ flows will be tracked by SIM cards. Scientific and educational portal IQ HSE University. 2016. https://iq.hse.ru/news/182477190.html. Accessed August 10, 2021.
gory of nonworking pensioners, which reduces competition in the labor market.

THE ROLE OF THE MOSCOW URBAN AGGLOMERATION IN RUSSIA’S SETTLEMENT SYSTEM

Speaking of the geography of Russian cities in recent years, one cannot avoid the question of Moscow’s role in the country’s settlement system. Why has it become so relevant in the last decade, and why has the study of the metropolitan region (Moscow and most of Moscow oblast have long merged into a single agglomeration) become one of the important areas in geographical research of Russian cities as a whole?

Let us begin with some basic facts important for understanding the essence of the ongoing processes. The population of the Moscow region has grown, according to official statistics, from 15.6 mln people in 1990 to 20.4 mln people in 2020, the share of the capital region in the population of the country increased from 10.6 to 14.0%. The annual migration increase in the Moscow agglomeration reaches 250,000 people. For 1991–2020 the net migration inflow to the Moscow agglomeration amounted to 6.4 mln people, ensuring the growth of its population by 4.8 mln people. Over the same 30 years, the total population of the remaining 14 Russian million-plus cities grew by only 1.3 mln people, or by 6.6% (often due to administrative expansion of the city borders). As a result, by 2021, the population of the Moscow UA has become almost equal to the total population of other million-plus cities.

At the turn of the 2010s, up to 60% of net migration within Russia settled in Moscow and the Moscow oblast (Zubarevich, 2012b). Against the stagnation or decline in the country’s population, this redistribution is very acutely felt in the hinterlands, which loses up to 500,000 people per year (Mkrtchyan, 2020a). Despite some reduction in the gap between Moscow and the country’s average income and wage indicators since 2000, it has remained significant, by 2020, by 2.0 and 2.1 times, respectively. This determines not only large-scale migration to the Moscow region for permanent residence, but also the phenomenon of otkhodnichestvo—temporary migration to work (Mezhdu domom ..., 2016). According to the estimates of a labor force sample survey of Rosstat, the pool of such
temporary migrants in the Moscow region reaches 1.6 mln people, and the zone of gravity for Moscow of temporary labor migrants covers the entire central and southern parts of the European territory of Russia (Antonov, 2016), where 60% of its population lives.

The qualitative growth of Moscow’s role in the national settlement system has also found its political expression. It is no coincidence that the 2010s began with the first project in a number of decades to rebuild Moscow—a decision to dramatically expand its territory and include the so-called New Moscow within the city limits. The declared goals of the project included moving away from the monocentric model of development of the Moscow agglomeration, closed to the historical center of the city, creating a new spatial vector of urban development by transferring federal bodies to new southwestern territories of the capital (Argenbright, 2011; Maklrova et al., 2012b). In practice, the opposite scenario is being implemented: consolidation of the monocentric growth model of the Moscow urban agglomeration with the sprawl of continuous development zones beyond the Moscow Ring Road (MKAD) into the least urbanized southwestern sector of Moscow oblast prior to expansion of the capital, and with the creation of a special legal development regime that removes local communities from influencing decisions (Kurichev and Kuricheva, 2020). By the end of the 2010s, the trend of drawing the population of Russia to Moscow was supported by the decision on the so-called renovation—a large-scale project for the demolition of residential buildings put up in the 1950s and 1960s, which has little in common with renovation in the proper sense of the word. The complex work with obsolete housing formats is being replaced by the complete demolition of old buildings and the construction of new housing blocks with a much higher density (15 or more stories above instead of 5–7) in the vacated territory in the political and economic interests of the Moscow and federal governments (Gunko et al., 2018; Zupan et al., 2021).

How did the researchers comprehend this new role of the Moscow agglomeration?

First of all, a number of studies assessed the actual parameters of migration interaction of the Moscow UA with other Russian regions. The quality of public statistics does prevents us from obtaining reliable data even on such indicators as the annual migration increase in the populations of Moscow and Moscow oblast. Scientists are forced to evaluate it on their own (Mkrtchyan, 2011, 2020b), as well as the differentiation in the activity of buyers from different Russian regions and cities in the primary housing market of the Moscow agglomeration based on sampling data (Kurichev and Kuricheva, 2018a, 2019).

Second, many authors have focused on the institutional factors that determine Moscow’s advantages in the Russian economy. Capital rent is created in high-revenue conditions from the exploitation of natural resources (in particular oil and gas) and strong centralization of administration. As a result, federal authorities and companies (primarily state-owned) concentrate huge funds, and access to these resources in the form of highly paid jobs, lucrative government contracts, etc., is possible exclusively or predominantly in Moscow (Churkina and Zaverskiy, 2017; Zubarevich, 2012a, 2017). The Moscow budget receives large revenues from taxation of profits of major companies actually created in other regions, which allows the implementation of expensive projects for the development of urban infrastructure and improvement. This confirms the position, long known to science (Anthony and Crenshaw, 2014; Galiani and Kim, 2011; Karayalcin and Ulubaşoğlu, 2020; Wallace, 2013), according to which, in conditions of authoritarianism, centralization of power, and low quality of institutions, the capital acquires special benefits (capital rent) through access to politically allocated resources and lobbying tools.

Moscow’s advantages over other Russian cities are not limited to political and economic factors. The country’s largest city also has objective strengths in the form of an agglomeration effect. Its main components are learning, coordination, and matching effects (Behrens and Robert-Nicoud, 2014) — better matching between heterogeneous supply and demand in a large market (primarily the labor market). In the Moscow agglomeration, they manifest themselves to the maximum extent compared to other Russian cities. There are very few studies that empirically assess the magnitude of the agglomeration effect in Russian cities, and their results are contradictory (Lavrenchenko et al., 2019; Mikhailova et al., 2016; Melnikova, 2019, 2020). Another factor that consolidates Moscow’s advantages is the sorting effect—the long-term migration of the most gifted young people to the capital for university and postgraduate studies, which in recent decades has apparently reached its peak intensity (Karachurina and Mkrtchyan, 2017; Kashnitsky et al., 2016). Unfortunately, there are no studies yet that attempt to separate the contribution of the agglomeration effect, capital rent, and sorting effects into the income gap between Moscow and other regions.

The next group consists of studies that explore the national settlement system as a whole using the Glaeser–Gottlieb spatial equilibrium model (Glaeser

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6 New Moscow includes territories southwest of the MKAD up to the border with Kaluga oblast.

7 See also: Trutnev, E.K., Is New Moscow outside the law? Project Russia, no. 67, February–March 2013. https://archi.ru /press/russia/46414/novaya-moskva-vne-zakona. Accessed January 10, 2022.

8 The headquarters of 219 of Russia’s 400 largest companies are concentrated in Moscow, and another 20 are located in Moscow oblast (Expert RA rating 2020 based on results of 2019). Together, these companies generate 76% of revenues and 68% of net income from the top 400 companies.
and Gottlieb, 2009). It assumes that in conditions of free internal migration, workers of equal qualifications in all cities of the country should receive equal effective income, estimated by adjusting nominal income for the cost of the consumer basket, housing costs, and non-financial factors of a city’s attractiveness (amenities—features of natural, climatic and cultural conditions). If the effective incomes deviate from equilibrium, then there are incentives for migration, and those, in turn, offset these deviations. Studies of spatial equilibrium in Russia (Berger et al., 2008; Oshchevkov, 2015) show that prevailing prices in the labor and housing markets partially compensate for differences in social and environmental conditions after taking into account the characteristics of workers, professions, industry and economic conditions, as well as housing characteristics. However, this compensation is far from complete, so that the effective income and quality of life differ significantly by Russian regions even after taking into account these parameters. In contrast to nominal incomes, the obtained effective income estimates correlate well with the net migration to Russian regions. However, migration flows in Russia as a whole are considered, primarily “western drift”—migration from the northern and eastern regions (Arctic, Siberia, Far East) to the southern and western, including “Warm Russia”; Krasnodar krai; Voronezh, Rostov, and Belgorod oblasts; and Crimea (Rozinskaya and Rozinskiy, 2019). Migrations to the Moscow region only sporadically caught to the researchers’ attention (Mkrtchyan, 2015). If we switch from static data for a certain year to analysis of processes, then a number of questions arise. How does a steady inflow of migrants into the Moscow UA fit into the spatial balance concept? Why has spatial balance not been achieved in the 30 post-Soviet years? And what still limits the level of migration flow? These questions have not been answered exhaustively.

To understand the long-term patterns of migration processes, it is necessary to take into account not only economic factors, but also the value orientations of citizens and images of the future associated with a particular place. When deciding to move to a certain city or region, people not only maximize its utility (effective income, quality of life), as in the spatial equilibrium model, they also choose a life strategy, evaluating the chances for themselves and their children. The image of Moscow as a “land of opportunity” has been enshrined in Russian culture since the days of imperial Russia (the famous formula “To Moscow! To Moscow!” from A.P. Chekhov’s play Three Sisters) and, moreover, Soviet culture (e.g., the film Moscow Does Not Believe in Tears) plays a significant role in this choice, reinforcing the differences in economic and political opportunities. The notion of a “metropolis,” which creates normative life practices, and a “province” is reproduced in modern Russian public discourse and mass consciousness (Trubina, 2013, 2015; Vendina, 2018). The practices of “internal colonization” (Etkind, 2013) that existed in imperial and Soviet Russia continue to be reproduced in the post-Soviet period, both at the level of discourse (Radina and Koskina, 2017) and city government (Zupan et al., 2021).

Lastly, a number of studies are devoted to spatial transformation of the Moscow UA in conjunction with the national settlement system. The housing market plays a key role here, since it is the need to rent or buy housing that serves as the main barrier to potential migrants to Moscow and other major Russian cities from small and medium-sized cities (Mkrtchyan and Florinskaya, 2019). Rising real estate prices in response to the rising incomes of workers is one of the key mechanisms behind the economic restraint of the migration inflow, so housing policy has a decisive long-term impact on the city’s development trajectory. These mechanisms are universal and well-studied in the US: stringent building restrictions lead to the trajectory of superstar cities (Gyorko et al., 2013; Kemeny and Storper, 2020) with expensive housing, high nominal wages and prices, and weak population growth; soft building regulations accelerate growth of the population and housing stock, but constrains incomes and prices. As shown in the United States, China, and other countries, migrant demand is a significant contributor to the dynamics of local real estate markets (Hsieh and Moretti, 2019; Howard and Lieberson, 2018; Liao et al., 2021).

All these patterns are clearly manifested in the housing market of the Moscow UA, where migrants are responsible for more than 20% of demand (Kurichev and Kuricheva, 2018b, 2019). The scale of housing construction in the agglomeration is up to 10–12 mln m² per year since the mid-2000s, and 270 mln m² for 1991–2020 — most of the housing stock in St. Petersburg or the Russian Far East. It is the main mechanism for constraining the rise in housing prices and stimulating migration inflow to the capital region. The latter is favored by the extensive path of its development and urban sprawl due to the dominance in the construction of large economy-class greenfield projects in the 30 km zone between the Moscow Ring Road and Central Ring Road (Fig. 5). Construction there serves as a key regulator of the migration balance in the Moscow UA and throughout Russia: this construction provides migrants with relatively cheap housing and, at the same time, access to the labor market in the capital (Kurichev and Kuricheva, 2018a, b). This pattern also manifests itself in the suburban areas of other large Russian cities (Karachurina and Mkrtchyan, 2016; Mkrtchyan, 2019).

CONCLUSION

The features of the hierarchical and spatial structure of the Russian urban system inherited from the past have been preserved or have intensified over the
Fig. 5. Spatial transformation of the Moscow agglomeration due to housing construction: types of territories used for construction (a) and types of housing projects (b).
post-Soviet period, including the last decade. This is primarily growth of the concentration of the population in the largest centers discussed by science and the general public, among which Moscow has taken an unassailable place. The flip side of the process was demographic and often economic shrinkage of the lower levels of the system: medium-sized and small cities and urban-type settlements. The transfer of the latter to the rural category, formally slowing down urbanization, in fact has almost no effect on it. These phenomena are driven by a combination of factors, objective and subjective, related to the policy and actions of the authorities.

The geographical projections of these shifts come down to the territorial concentration of the population in capital and regional centers, their urban agglomerations, as well as to stopping the long-term and even centuries-old drift of the centers of the demographic masses to the East or to their turning in the opposite direction. The larger the size category of cities, the further West its network center is localized.

The study of Russian urban agglomerations at the moment runs into the problem of an insufficient information base, which hinders development of this direction. In contrast to foreign countries, where there are developed official statistics on functional relationships within UA available at a low territorial level, in Russia, researchers are still forced to use their own modeling. Under these conditions, there is a certain “conservation” of the entire direction using methods developed in the Soviet era. In addition, a few works based on new original material show the promise of and demand for research on urban agglomeration development.

Russian urban agglomerations in the last decade are transforming within the framework of previously existing trends: concentration of the population in the country’s largest UA continues, spurred by polarization of the socioeconomic space. A special part in this process is played by growth and development of the Moscow agglomeration, the dominance of which in political and economic life is constantly increasing.

By the 2010s, the national role of the Moscow labor and housing markets was clearly defined, which went beyond not only the Moscow agglomeration, but also the Central Russian megalopolis, which includes the centers of the regions closest to Moscow. In Soviet times, Moscow’s influence was held back by the smaller share of its agglomeration in the country’s population, including the urban population, and the ubiquity of urbanization: the “large wave” lifted the “boats” of most cities. After the chaos of multidirectional trends in the transition to a market economy, Moscow’s formed in the 1990s and strengthened in the 2010s its fundamentally new status—not just as the capital and largest city in the country, but a “super urban agglomeration,” the zone of active influence of which includes a significant part of the territory of European Russia, and the indirect influence of local internal processes affects the country as a whole (here we emphasize—not of federal level political and economic decisions adopted in the capital but namely, urban, at first glance, local). Therefore, the issues of spatial transformation of the Moscow agglomeration no longer represent solely the question of how the capital will look, but the organization of life in the country as a whole.

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CONFLICT OF INTEREST
The authors declare no conflict of interest.

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