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# CURRENT TRENDS IN MOSCOW SETTLEMENT PATTERN DEVELOPMENT: A MULTISCALE APPROACH

**ABSTRACT.** The article studies current trends in Moscow population in context of socio-economic polarization strengthening between the capital city and other regions of the country. The study applies multiscale approach covering Moscow influence on Central Russia and other regions, interaction with the Moscow oblast and the level of internal population distribution within Moscow and particular settlements and villages in New Moscow territories. The gap in development is significantly noticeable for expanding Moscow and Moscow oblast against the background of depopulation in Central Russia regions and cities. Within the boundaries of Moscow the continuing model of extensive spatial growth of population has led to the most rapid growth of its periphery zone. Areas similar to bedroom communities in Old Moscow are forming in the municipalities of New Moscow located along the Moscow ring road (MKAD) and main radial highways, while large part of the new territories remain a typical countryside with villages and summer residents. Analysis of New Moscow suburban areas reveals the actual land use mosaics obscured by the official delimitation of Moscow and Moscow oblast and the formal division of population into urban and rural.

**KEY WORDS:** population, Moscow, Moscow region, Central Russia

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## INTRODUCTION

Contrasts between major cities and the rest of the territory are a typical feature of Russia. No wonder the words of the poet Afanasy Fet, written 150 years ago, have not lost their relevance: "People in the capitals, who are accustomed to huge, incessant capital flows, have no desire to understand how the whole immense terrain, without distinction of classes, for months lives without a penny" (Fet 1871). In

the late Soviet times, there were attempts to smoothen these contrasts by locating industrial enterprises in small towns and improving wages and living conditions in small settlements. However, this was only partly successful in suburbs and in the South, and after the market returned at the turn of the millennium, the contrast of the Russian space increased.

Russia, like other countries with a late start of urbanization, experienced the

urban revolution in the twentieth century, turning from a rural and agrarian country into urban and industrial. From 1913 to 2000, the urban population increased almost sevenfold, and the proportion of city dwellers reached 70%. And although in the early 1990s, due to political transformations and the economic crisis, the urban population ceased to grow, in the late 1990s Russia returned to the stage of active urbanization (Nefedova and Treivish 2019). Under the influence of agglomeration effects, the concentration of population and economy in the largest centers leads to increased socio-economic polarization not only between cities and rural areas but also between cities, which manifests itself at various levels in strengthening gradients between cities of different sizes in terms of income, investment in fixed capital, housing development, retail trade turnover, and average life standards.

While a significant number of country's regions and especially regions of Central Russia are characterized by depopulation, Moscow shows a continuous growth (amounted to 965.5 thousand people which only for the period from 2010 to 2018). At the same time, during the last two intercensal periods, current statistics reveal a decline or stabilization of Moscow population, while the censuses show a sharp increase, which is mainly due to undercounting of migrations by current population registration.

## MATERIALS AND METHODS

The purpose of this study is to identify main trends in the population of Moscow and its zone of influence in the twenty-first century, including those of the latest administrative changes of 2012, when the city area was increased almost 2.5 times. This requires research at several levels: from studying the regions of the country and Central Russia and the influence of Moscow on them, through the interaction of Moscow with Moscow oblast to the analysis of the internal structure of population distribution in Moscow, and down to individual settlements and

villages in the new territories of Moscow. This investigation is based on the use of official statistics on for subjects of the Russian Federation, cities, municipalities, settlements, as well as cartographic information, data from mobile network operators, and field studies.

Moscow has been studied from various angles in the works of multiple scholars. It was considered as an emerging global city (Kolossoy et al. 2002), other studies focused on the development of its budget and social sphere (Zubarevich 2018), ethnic migration (Vendina 2005; Todd 2018), the impact of migration on housing market (Kashnitsky and Gunko 2016), the transformation of Moscow from the main city into the mega-region (Argenbright 2013), urban planning, place-based protest, and civil society (Argenbright 2016), features of its development policy (Büdenbender and Zupan 2017), and others. Several papers considered problems of its development in Moscow agglomeration and the Central Russia context (Kurichev and Kuricheva 2018; Kuricheva 2017; Makhrova et al. 2017; Brade et al. 2014; Makhrova et al. 2016).

The expansion of the city's territory and the emergence of New Moscow in 2012 caused a surge of interest in Moscow and a rise of works both in Russia and abroad (Cox 2012; How to Build... 2015; Argenbright 2018; Kolosov 2013; Makhrova et al. 2013; Shuper and Em 2013). At the same time, an array of works has been developed that analyzed general patterns of development of post-Soviet cities and growth of spatial heterogeneity as one of the main features of their development (Golubchikov et al. 2014; Golubchikov 2016; Ferencuhova and Gentele 2016). The novelty of this study lies in the fact that it carries out a multiscale analysis of Moscow's development using the population dynamics, an available indicator of socio-economic polarization and space compression processes, in the scale of regions and cities of the whole country (macro level), in one of its most developed parts, Central Russia (meso level), and within the boundaries of the Moscow metropolitan region and within Moscow itself (micro level).

## RESULTS AND DISCUSSION

### 1. Moscow Compared to the Country and Its Regions

In the 2000s, against the background of the depopulation of a significant part of regions, Moscow shows a continuous growth of its demographic potential associated with the significant advancing of social and economic development of the city compared to the rest of the territories, which led to a sharp increase in its attractiveness and rapid population growth. While the population of about 70% of Russia's cities decreased, Moscow continued to grow at a high rate, as a result its share in the country's population increased even more, emphasizing the global trend of greater spatial development heterogeneity. The proportion of the capital in the Russian population in 2018 reached 8.5%, which together with Moscow oblast made 13.6%, while the proportion of St. Petersburg was 3.6% with a stable share of Leningrad oblast (Table 1).

In the 2010s, the population growth rates in Moscow slowed down, especially towards the end of the period under review, when the capital began to give way not only to some of the North Caucasus republics but also to several other territories attractive to migrations (Tyumen and Moscow oblasts,

St. Petersburg, Khanty-Mansi Autonomous okrug, and Krasnodar krai), by 2018 falling outside the top twenty regions with the fastest growing population. The main contribution to the increasing population of the city is made by migration, although its rate is falling. In general, the 2002–2017 period was characterized by a natural decrease in population, although in recent years the natural growth coefficient increased, reaching 1.1 per 1000 people in 2017. Nevertheless, the capital continues to lag behind both the national republics with an incomplete demographic transition and the regions with a younger population age structure (Tyumen oblast and its oil and gas okrugs) (Fig. 1).

### 2. Moscow in Central Russia

As a capital, Moscow occupies a unique position, mustering resources of the whole country and producing economic, social, and political innovations, which initially spread to neighboring areas (Zubarevich 2018). Moscow oblast, thanks to its advantageous position near the capital, and Moscow itself make up the territory of maximum population growth within Central Russia (within the borders of the Central Federal District). In fact, apart from these two regions, which form the Moscow Capital Region, population growth in 2002–2018 in the district was only due to relatively prosperous Belgorod oblast. The absolute

**Table 1. Population dynamics of Moscow and Moscow oblast**

Territory	Population (thousand people)			Share in the total population of Russia, %		
	2000	2010	2018	2000	2010	2018
Moscow	8537	11541	12507	5.9	8.1	8.5
Moscow oblast	6464	7106	7503	4.4	5.0	5.1
Moscow and Moscow oblast	15001	18647	20010	10.3	13.1	13.6
St. Petersburg	4661	4899	5352	3.2	3.4	3.6
Leningrad oblast	1687	1719	1814	1.1	1.2	1.2
St. Petersburg and Leningrad oblast	5662	6618	7166	4.3	4.6	4.8

Source: Rosstat data.

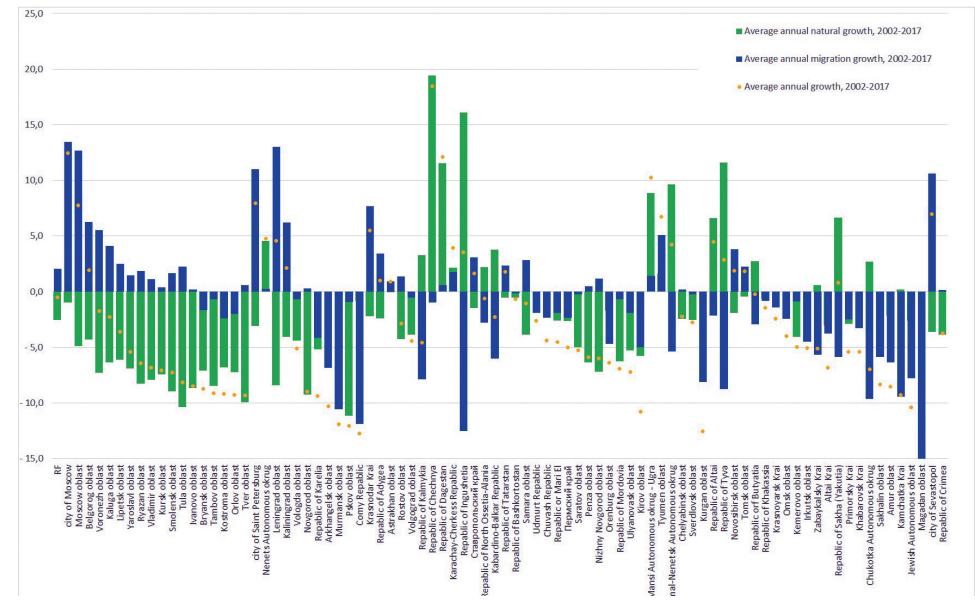


Fig. 1. Population dynamics by regions of the Russian Federation in 2002–2018.

amount of migration inflow to the Moscow Capital Region allowed the district as a whole to compensate not only for natural but also migration loss in several other regions

The comparison to socio-economic indicators between Central Russia regions reveals that along the leadership of Moscow in many respects, the gap between Moscow and the Moscow oblast in 2000–2018 decreased, and the gap between the Moscow oblast and its neighboring regions did not change (Table 2). At the same time, the standard of living of the population in

the regions surrounding Moscow and the Moscow oblast remains below the average level.

The spatial polarization observed within Central Russia, where the higher distance from Moscow implies lower employment, wages, and retail turnover per capita, all of which increase only in the metropolitan agglomerations of neighboring regions, is well reflected in the migration growth rate. The highest population flow was expectedly characteristic of the Moscow region centers (15.3 per 1000 people). In the

Table 2. Comparison of socio-economic indicators for Moscow, Moscow oblast, and adjacent regions, and the Russian Federation 2001 to 2017. (Moscow oblast = 1)

	Personal income			Gross regional product per capita			Retail turnover per capita		
	2001	2010	2017	2001	2010	2017	2001	2010	2017
Moscow oblast	1	1	1	1	1	1	1	1	1
Moscow	4.5	2.0	1.5	5.2	3.0	2.4	5.5	1.7	1.4
Regions adjacent to Moscow oblast	0.7	0.6	0.6	0.9	0.6	0.6	0.6	0.6	0.6
Russian Federation average	1.2	0.8	0.8	1.4	1.0	1.0	1.1	0.8	0.7

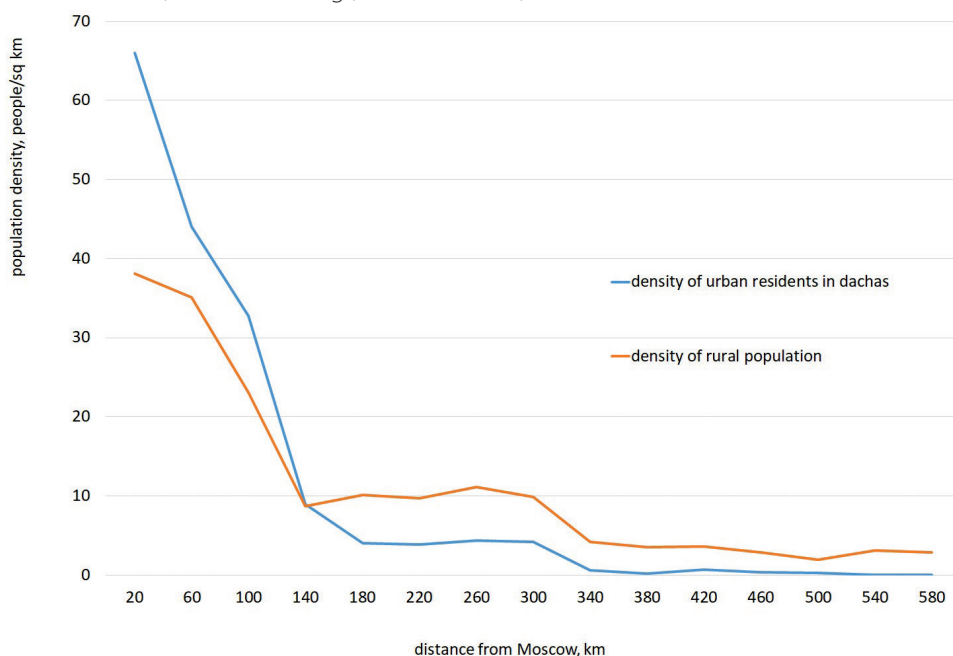
Source: compiled according Rosstat data

agglomerations of the territories adjacent to the Moscow region, this rate decreased almost three-fold (4.5 per 1000 people), and the urban settlements located outside the agglomerations and distant from the capital and the centers of neighboring regions, were already losing population (−1.9 per 1000 people).

Labor migrations are much more widely practiced: commuting and "otkhod" for work in Moscow and Moscow oblast from other regions for on weekly or monthly basis. Many residents of the Moscow oblast work in Moscow, and labor migrants from adjacent regions replace them. With the desire to work in Moscow or closer to capital along with housing prices beyond reach, the population often retains the official registration in their region. The return mobility of population with labor, social and recreational (including dachas) purposes has become the important factor that greatly affects on real population in Moscow and on the surrounding area, including the countryside (Between Home... 2016).

In the framework of Central Russia, typical Russian dachas ("second housing") model of

urban dwellers in countryside is most clearly implemented, embodying the tradition of combining the advantages of urban and rural lifestyle. There many types of dachas: old dachas of the beginning-the middle of the XX century, and garden associations, and the houses bought or inherited by urban dwellers in villages, and the new cottages interspersed in areas of garden and country building or organized in separate settlements (Between Home... 2016). Old dachas are located closer to Moscow. Gardening associations with cheaper housing are concentrated in more remote areas of Moscow oblast and in adjacent regions at the distance of 200-250 km from Moscow. In these regions Muscovites buy rural houses and use them seasonally as dachas. Despite the active growth of cottage settlements around Moscow, mostly common are traditional country and garden villages. Seasonal migration favorably still, determines the specification of suburbanization in the megalopolis. In the Moscow region and adjacent municipal districts of Yaroslavl' oblast the urban population of the country in summer season exceeds the number of rural residents (Fig. 2).



**Fig. 2. The change in the density of rural population and urban gardeners in different distance from Moscow (MKAD), North East sector (Yaroslavl, Ivanovo, Kostroma regions), people/sq.km**

### 3. Moscow and Moscow Oblast

The very first question is about the real population size of Moscow and Moscow oblast. Typical official statistics, for several reasons, and the sharp fluctuations of the population with daily, weekly and seasonal rhythms distort the real picture of the distribution of the resident population throughout the city and its immediate surroundings. Comparison of the total size of the resident population in the statistics and the population size estimates accordance to the data of mobile network operators on a winter weekday night, which are as close as possible to the real population size, give a rather unexpected result. They show that official statistics significantly overstate the population of Moscow but underestimates the figures for Moscow oblast. The population of the capital on a winter weekday night is less than that in the statistics by 1.6 million people, amounting to 10.7 million against 12.5 million people. The population size of Moscow oblast, according to mobile network operators, reaches almost 8.5 million people against the "official" 7.5 million people (Makhrova and Babkin 2018). At the same time, as shown by the data of mobile network operators, even on a winter weekday day, when the real population size of the capital is maximum primarily due to work- and education-related commuters, it is more than 600 thousand people less than shown in the statistics.

Such discrepancies are difficult to explain and may be due to various causes. First, it is the fact that Muscovites share two homes: keeping their capital registration, they also live in their dachas in Moscow oblast, which reduces the capital population and increases that of the oblast (Between Home... 2016). In addition, some Muscovites constantly live in the oblast, solving their housing problem by acquiring cheaper accommodation in Moscow oblast while retaining their registration in Moscow and all the related "capital goods" (supplements to pensions, Moscow health care, etc.). However, sociological polls show that there are quite few of those, about 300 thousand people.

A significant part of the discrepancies in the population estimates of Moscow and Moscow oblast may be associated with errors in the census. Such deviations were detected during the 2002 census when the registered population exceeded the real one. Thus, current statistics showed that in 2002, the capital population was 8.6 million, but the census estimated it at 9.9 million people. Similar discrepancies were also characteristic of the 2010 census when the population increased from 10.6 to 11.4 million people (Mkrtchyan 2011). As a rule, these discrepancies are attributed to undercounting of migrations, which raises doubts about the correctness of the population census methodology.

### 4. Moscow and Its Internal Structure of Settlement

The Russian capital has always been a city with a high population density, where decompression was each time achieved by expanding the boundaries of the city and not as a result of suburbanization processes, as was the case in the agglomeration cores of economically developed countries. On its own, the high population density is not a particular problem. The classic of modern urbanism, J. Jacobs (2011) calls a high population density one of the principles of urban diversity, which is exactly what attracts people to cities. However, comparing the population density of Moscow with other cities considered to be similar to the capital, this indicator is often rated as dangerously high (this was cited as one of the arguments in favor of the last expansion of the city). The size of the city's territory represents a bigger problem. Among other cities, including the largest ones, Moscow stands out for its atypically large size for a city, which makes the authorities to ensure that its territory is accessible by city standards to all residents of the capital, including in loosely populated affiliated territories.

In the 2010s, as in previous decades, the population of the capital was increasing and so was the population size of all administrative districts of the city, although the dynamics of this growth was uneven (Table 3). In recent years, the composition of the three leading

okrugs in terms of population size has not changed: these are the Southern, Eastern and South-Western okrugs, the population of each exceeding or approaching 1.5 million people. The population of another five okrugs of the capital is also higher than 1 million: almost all of their territory is located within the Moscow Ring Road, representing a fairly densely built-up area. For a long time, Zelenogradsky okrug (previously the city of Zelenograd) located 20 km away from the ring road, which was created as a Soviet

analog of Silicon Valley, is characterized by the smallest population density and the highest growth rates. After another large-scale expansion of the city in 2012, which occurs about every 25 years, two okrugs of New Moscow have the smallest population size with the highest growth rates.

The latest expansion of Moscow's territory has led to significant changes in the population distribution within the district zones<sup>1</sup>. While the specific weight of the Moscow districts

<sup>1</sup> For a detailed analysis of changes in the distribution population proportions in the context of administrative districts of the city, six zones of districts were distinguished: central (all districts of the Central Administrative okrug); sub-central (12 districts that are first-order neighbors of central districts, that is, districts that share borders with central districts); middle (third- and fourth-order neighbors of central districts); peripheral (depending on the territorial size of districts and their configuration, these are one or three "layers" of the districts located on the inner side of the Moscow Ring Road); the near outer zone (districts beyond the Moscow Ring Road until the borders of the Small Concrete Ring); and the far outer zone (districts beyond the borders of the Small Concrete Ring).

**Table 3. Population distribution in administrative okrugs of Moscow**

Administrative okrugs	Population, thousand people		Share in population, %		Population size change over 2016–2018, %
	2016	2018	2016	2018	
Central	768.3 (9)	775.9 (9)	6.2	6.2	101.0
Northern	1158.5 (7)	1176.6 (7)	9.4	9.4	101.6
North-Eastern	1413.7 (4)	1424.9 (4)	11.5	11.4	100.8
Eastern	1505.8 (2)	1515.9 (2)	12.2	12.1	100.7
South-Eastern	1380.7 (5)	1405.7 (5)	11.2	11.2	101.8
South-Western	1426.2 (3)	1437.2 (3)	11.6	11.5	100.8
Southern	1774.4 (1)	1785.3 (1)	14.4	14.3	100.6
Western	1362.7 (6)	1382.5 (6)	11.1	11.1	101.5
North-Western	988.4 (8)	1001.3 (8)	8.0	8.0	101.3
Zelenogradsky	237.9 (10)	243.1 (10)	1.9	1.9	102.2
Novomoskovsky	200.1 (11)	234.2 (11)	1.6	1.9	117.0
Troitsky	113.4 (12)	124.7 (12)	0.9	1.0	110.0
Moscow as a whole	12330.1	12506.5	100.0	100.0	101.1

\*parentheses indicate the position of the okrug on the corresponding date.

Source: Mosgorstat official data.



located on the inner side of the Moscow Ring Road (MKAD) is decreasing at different rates, the share of the near outer zone increased, which is represented by districts beyond the ring road. Due to active housing development the population is growing rapidly, having grown over the past three years by almost 90 thousand (Table 4). However, the density of residents remains to be low here, second only to municipalities of the far outer zone (all within the borders of Troitsky okrug), which, despite their capital status, resemble the typical periphery of Moscow oblast (Fig. 3). These are the districts that concentrate the primary resource for prospective housing development and the related increase in the amount and proportion of the population in the future. However, the proportion of the population of all the zones varies very little, which indicates steady major proportions in the population distribution of Moscow.

Important changes in the population distribution, which are not reflected by statistics, are associated with the emerging trends of greater social segregation along the west-east direction, which are superimposed on the inherited center-peripheral differences. The overall differences between

the center and the periphery, as well as the west and east, are relatively stable, but as the modern geography of prestige is forming and the processes of social-spatial polarization are growing, districts of the central and western okrugs become more prestigious, and most districts of the North-Eastern, Eastern and Southern okrugs are more and more clearly positioned as non-prestigious with marginal population (Vendina 2005). The attractiveness of the Eastern okrugs, as well as Southern okrug, is significantly reduced by the fact that they increasingly concentrate migrants, including non-Russian ethnicities from the former republics of Central Asia and Transcaucasia (Vendina 2005; Immigrants 2009).

Moscow, as well as other major capitals of the world, is characterized by a significant excess of the population concentrated here during the daytime over the resident population<sup>2</sup>. At the same time, due to the seasonal nature of Russian suburbanization and the dacha migration during the warm season, a specific feature of Moscow consists of significant population size differences associated with the effect of seasonal and weekly rhythms in the life of the population. A winter weekday

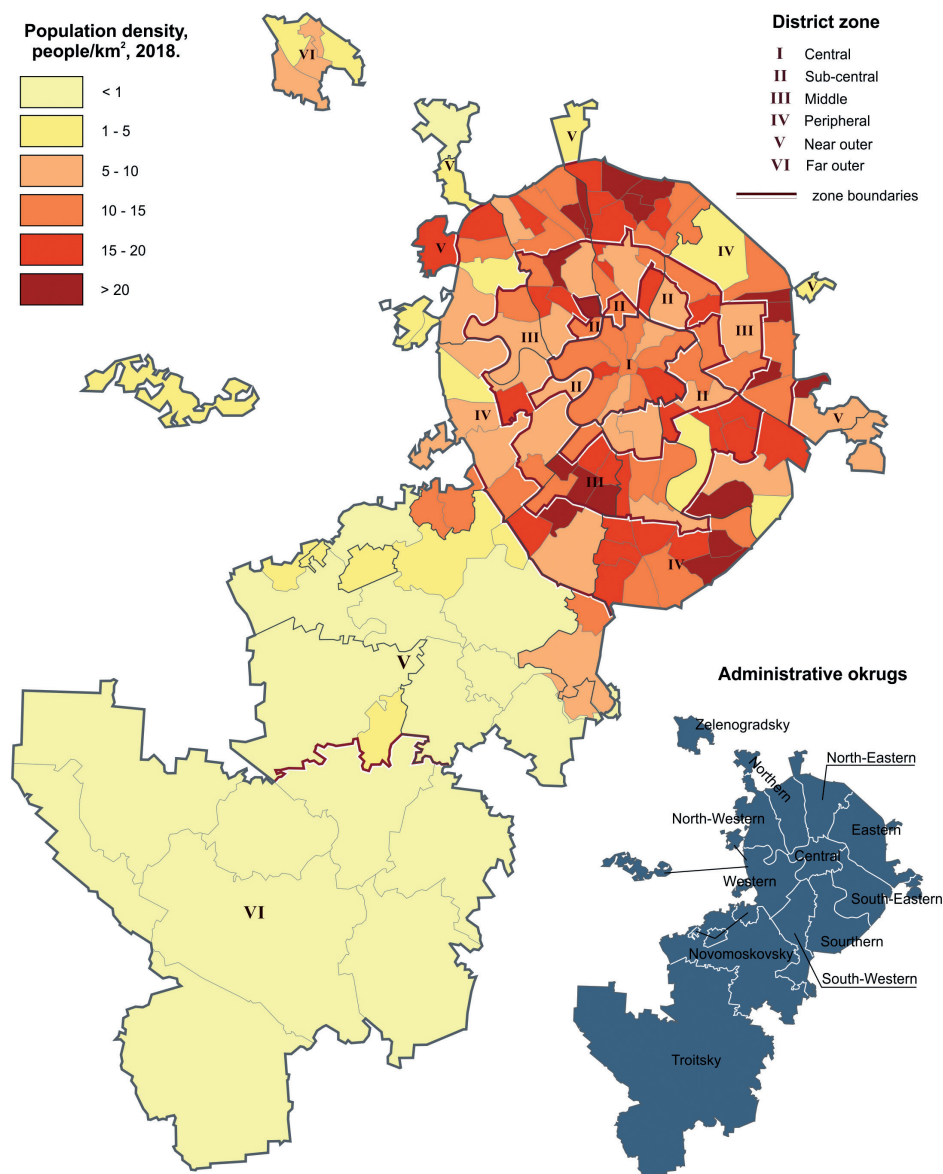
<sup>2</sup> The daytime population of Moscow, like any other megapolis, consists of residents and additional population, where the latter includes people coming from towns and districts of Moscow Oblast and neighboring regions with work-related, cultural and everyday goals, as well as temporary population (tourists, visitors to the city, transit passengers, patients of various medical institutions, etc.).

**Table 4. Change of population size, share, and density by zones of Moscow districts**

District zone	Population, thousand people		Share in total population, %		Population density, people/km <sup>2</sup>	
	2016	2018	2016	2018	2016	2018
Central	734.1 (5)	775.9 (5)	7.5 (4)	7.5 (5)	11543 (2)	11715 (2)
sub-central	906.9 (4)	957.6 (4)	7.6 (3)	7.6 (4)	9310 (4)	9830(4)
Middle	3174.4 (2)	3184.9 (2)	25.2 (2)	25.1 (2)	12192 (1)	12233 (1)
Peripheral	5844.6 (1)	5891.3 (1)	46.6 (1)	46.5 (1)	11523 (3)	11615(3)
near outer	1553.2 (3)	1641.4(3)	12.7 (5)	12.9 (3)	2288 (5)	2417(5)
far outer	50.7 (6)	55.4 (6)	0.4 (6)	0.4 (6)	53 (6)	58 (6)
Moscow as a whole	12263.9	12506.5	100.0	100.0	4785	4882

Source: compiled according to Mosgorstat data.





**Fig. 3. Population density of Moscow municipalities, 2018, people/sq.km**

is a period of maximum concentration of the population in Moscow and "pull-up" of the population to the center, while on a summer day off a significant part of the city's population spreads out over dachas. Taking seasonal changes into account, this leads to a 30% difference between a summer day off and a winter weekday. In general, in the summer months, the population of Moscow does not exceed 10 million, "shrinking" by about 15% at the weekend (Makhrova and Babkin 2018).

The daily dynamics is most pronounced in the city center, which concentrates a significant part of the capital's workplaces and shopping, entertainment, and leisure facilities, and the population difference between the daytime maximum and the nighttime minimum on a winter weekday is 2.8 times. This territory is also characterized by pronounced seasonality: the population size on a winter weekday is 2.1 times higher here than on a summer day off.

The sub-central zone, consisting of the Moscow districts adjacent to the Central okrug, is also subject to daily population fluctuations, which are less pronounced despite noticeable decentralization of office and shopping centers: weekly population drops are 1.5 times and seasonal 1.8 times. In the middle zone of Moscow, which serves as a kind of transition between the attractor districts of the center and sub-center dormitory areas on the periphery, daily fluctuations are poorly pronounced, amounting to only 5%. Weekly and seasonal changes play a more significant role, but they reach only 1.2–1.4 times.

In the rest of Moscow's periphery districts within the Moscow Ring Road, daily fluctuations are also only 5%, but the daytime population is less than the night one, that is, the majority of these districts are common dormitory areas. For the districts of Moscow located beyond the ring road (except for New Moscow), the dormitory character determines a significant excess of the nighttime population over the daytime one (by almost 40%). At the same time, the daytime population in some of those districts (Mitino, Vykhino-Zhulebino, Nekrasovka, Yuzhnoye Butovo, Solntsevo, and Novo-Peredelkino) reaches only 60–70% of the nighttime one (Makhrova and Babkin 2018).

### 5. New Moscow and Its Interaction with Old Moscow and Moscow Oblast

In 2012, the expansion of Moscow by 2.5 times at the expense of sparsely populated territories in the south-south-west of Moscow oblast split the Moscow suburbs up to the borders of Kaluga oblast. Two hundred fifty thousand people in the least populated areas of the Leninsky, Podolsky and Naro-Fominsky districts are now part of New Moscow. Three towns, two urban-type settlements, 234 villages, 52 settlements, and 652 gardeners' and dacha partnerships of residents of Moscow and towns of Moscow oblast were transferred to Moscow. Now the Moscow territory statistics report more than 150 thousand rural residents, which in principle contradicts the very concept of a city. For example, St. Petersburg, despite the presence of suburbs within the city limits, has no rural population.

The official concepts for the development of the vast southern territories of New Moscow have changed several times over the past five years. The previously proposed projects for construction of ministries and business and specialized centers in New Moscow have not been implemented. The supposed development similar to Korotishchi (almost merged cities of Korolev, Mytishchi, and Pushkino in Moscow oblast) also could not be realized due to the vast territory of New Moscow and the relative weakness of its cities (How to Build... 2015). And although federal officials abandoned initial plan of moving to the southern territories of New Moscow, the changes that have taken place in these territories over six years are great. The population of New Moscow has almost doubled, and about 11 million square meters of real estate has been developed here (New Moscow 2017).

Towns in the territory of New Moscow grew exceptionally fast from 2012 to 2018: Moskovsky, from 20.3 to 53.4 thousand people; Shcherbinka, from 35.3 to 51 thousand people; Troitsk, from 44 to 60.9 thousand people. The rural population was increasing slower, which indicates the ongoing processes of concentration in urban areas. However, this applies only to the resident population and its official registration. Huge discrepancies between official data and the real population, as evidenced by various sources, indicate a significant proportion of labor migrants in the capital region, as well as those Muscovites who live in dachas in the territory of New Moscow.

The expansion of Moscow did not change the trend for the Moscow oblast's population concentration closer to the Moscow Ring Road<sup>3</sup>. The population size was growing in different directions, mainly due to migration growth, and remained the largest in the first and second zones of remoteness from the Moscow Ring Road (Fig. 4). At the same time, the migration increase in Moscow oblast's districts adjacent to New Moscow in the first zone<sup>4</sup> did not exceed the average for this entire zone. However, after the expansion of Moscow, districts and city okrugs of the second and third zones of Moscow oblast in

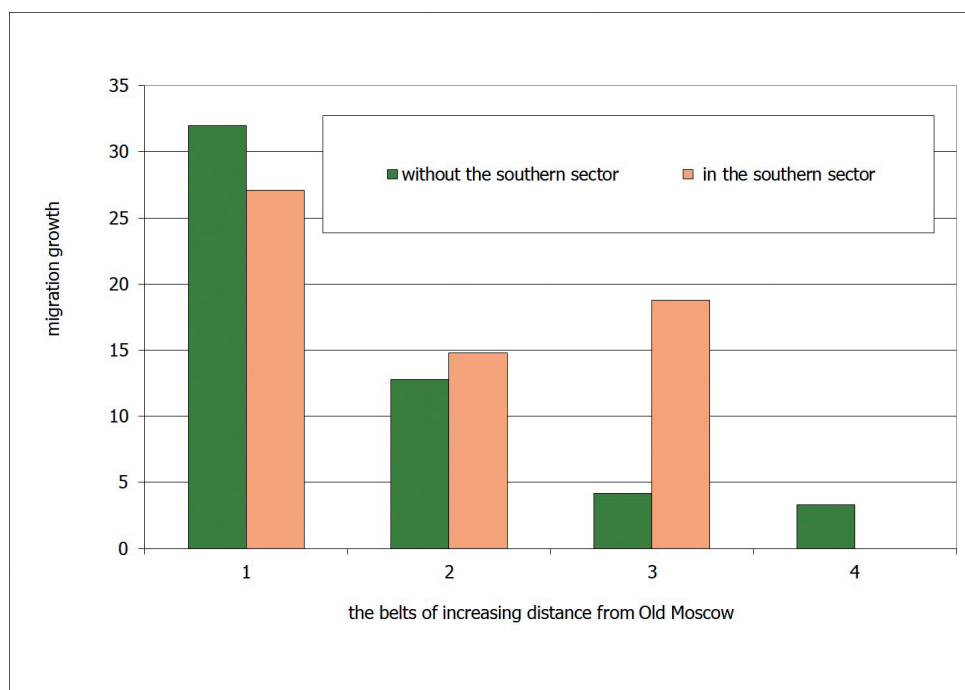
the south and south-west began to attract many more migrants (Nefedova 2018). The fact that migrants even outside the southern sector were still rushing to the zone closest to Moscow indicates that the spread of Moscow's territory continues in all directions even after the accession of new territories. At the same time, in the south and south-west of Moscow oblast, this spread beyond the Moscow Ring Road turned out to be greater.

Construction of residential buildings in the territory of Moscow oblast was also more active around New Moscow. The construction business, which became one of the main

stimulus for expanding the capital's territory, involved not only the nearest territories joined to Moscow but also Moscow oblast's territories adjacent to New Moscow, becoming a driver of increasing migration to suburbs of the capital (Kurichev and Kuricheva 2018). As a result, the attractiveness of the southwestern sections of Moscow oblast turned out to be about the same and even greater closer to the Moscow Ring Road, as compared to the newly joined territories of New Moscow. This is due to the relatively cheaper real estate outside of Moscow, complete infrastructure in cities and rural settlements, as well as in some cases better accessibility of the capital's

<sup>3</sup> To identify and analyze the internal differentiation of Moscow Oblast, the previously applied grouping of municipalities into four zones in terms of their distance from the Moscow Ring Road is used. The first (closest) zone includes districts and urban okrugs bordering Moscow, the second (middle) zone includes municipalities that are second-order neighbors of Moscow, and the third zone includes third-order neighbors. The radius of the first zone generally reaches 20–30 km, with the only exception of Odintsovsky District, which is very prominent to the west. The second zone is 20–60 km away from the Moscow Ring Road, and the third zone is 60–100 km away. The far fourth zone includes western and eastern margins of the oblast, which do not form a continuous ring. In 2016, more than 70% of the population of Moscow Oblast lived in the first and second zones, where 6% of the first zone territory accounted for 34% of the population.

<sup>4</sup> These are Leninsky and Odintsovsky districts; in the second belt, city okrugs Naro-Fominsk, Podolsk, and Domodedovo; in the third zone, Chekhovsky District.



**Fig. 4. Migration growth in Moscow oblast per 1000 inhabitants in 2014–2015 in terms of distance from the old territory of Moscow. Compiled according to Mosoblstat data.**

center from Moscow oblast than from New Moscow.

Before they were removed from the oblast, the territories that comprised New Moscow were built up with multi-storey and low-rise housing. In 2012, the government announced low-rise development as a priority in the new territories of Moscow. However, it became unprofitable to build family houses, townhouses, and cottages on the capital's land, and such housing began to gradually

give way to multi-story residential complexes. At the same time, developers of multi-storey housing became noticeably more active in the areas of Moscow oblast close to the Moscow Ring Road near New Moscow (Figs. 5 and 6). As a result, the vast territory south of the Moscow Ring Road is almost identical in both New Moscow and Moscow oblast, representing a complex mosaic of multi-storey and one-storey buildings, gardeners' partnerships, fields and forests.



**Fig. 5. New buildings in Novodrozhzhino in Leninsky District of Moscow oblast (Photo by T.G. Nefedova).**



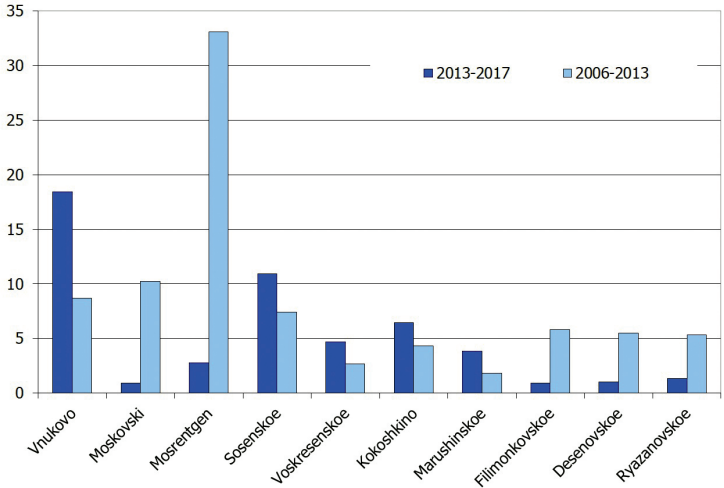
**Fig. 6. New Vatutinki in Desnovsky Settlement of New Moscow (Photo by T.G. Nefedova).**



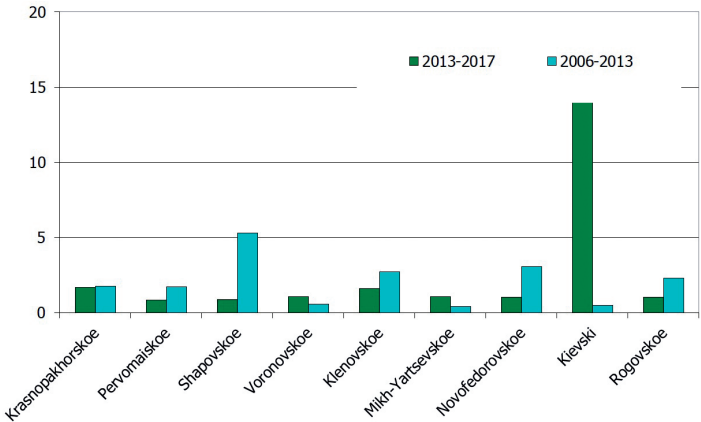
A noticeable increase in the rate of population growth outside the three towns that comprised New Moscow, before and after joining to Moscow, is a typical settlement of Novomoskovsky District (List of Settlements 2018). This is especially true for the Vnukovo settlement, sandwiched between Moscow's enclaves Solntsevo and Vnukovo, as well as of Sosenskoe, which is adjacent to the Moscow Ring Road (Fig. 7). A less pronounced response to the expansion of Moscow was observed for those settlements where new development started before joining Moscow, for example, in the Mosrentgen settlement, which lies right next to

the Moscow Ring Road. Due to such significant transformations very close to the Moscow Ring Road, the new territories of the capital include typical villages.

After the expansion of Moscow, the population growth in Troitsky District outside the town of Troitsk has been much smaller (Fig. 8) than in Novomoskovsky District. In the settlement farthest from the Moscow Ring Road (60 km), Rogovskoe, which borders Kaluga oblast, forests are interspersed with fields, small dacha villages, and gardeners' partnerships, which is not like a city at all. Nevertheless, the population is also growing there,



(A) Novomoskovsky District



(B) Troitsky District

**Fig. 7. A-B. Average annual population growth rates outside the towns of Moskovsky, Troitsk, and Shcherbinka in settlements of New Moscow before and after its formation, %. Compiled according to List of settlements (List of settlements... 2012)**

mainly due to external migrants, who, registering on the outskirts of New Moscow, in fact live and work within or near the Moscow Ring Road.

Thus, against the extremely high population density in the Center of Moscow, the new remote territories of the capital are characterized by typical rural areas with many small villages, dacha settlements, and the prevalence of rural population in these formally urban regions.

In addition to rural residents in New Moscow, there are more than 600 gardeners' and dacha partnerships (All-Russian... 2017) of not only Muscovites but also residents of Podolsk and Naro-Fominsk, sometimes with shabby wooden houses without any amenities. Each of these partnerships includes from a few dozen to more than a hundred plots with houses, which in the summer are able to host several hundred people. In general, the population in the summer season increases by hundreds of thousands of people, which is comparable to a population of a dispersed city. They also include numerous dachas in villages, inherited or bought by Muscovites and residents of the oblast.

There is a pronounced seasonal population growth here: in Novomoskovsky District, the closest to Moscow, it is about 30%, reaching almost 90% in the more distant Troitsky District, which brings it closer to certain poorly urbanized rural municipalities of the oblast (Makhrova and Babkin 2018).

The fate of second, dacha housing owners, who now became part of New Moscow, remains unclear. Perhaps some of them will want to get a permanent registration here to secure their rights to the expensive land. Many gardeners' non-commercial partnerships are gradually turning into economy class cottage settlements. A trend of registering elderly parents in these houses has already been observed. But the vast majority of owners continue to live in two houses (Between Home... 2016). The Moscow authorities set the task of transforming houses in gardeners' partnerships into homestead properties of good quality with permanent residence, although very few Muscovites are ready to give up apartments within the Moscow Ring Road. Moreover, this will require not only significant individual investments of citizens, which is far from what everyone can do, but also creating a social infrastructure that is very costly with



**Fig. 8. Forests and fields in Rogovsky Settlement of New Moscow (photo by T.G.Nefedova).**

such a dispersed population and discrete patterns of development.

## CONCLUSIONS

1. The center of Russia, Moscow and its surroundings, is a place of the strongest spatial socio-economic contrasts in the country. At the same time, these contrasts are characteristic not only of the vast territory of the Central Russian megalopolis but also of Moscow itself, especially after the addition of the so-called New Moscow with its poorly developed rural areas lying far from the Moscow Ring Road.

2. Moscow, together with Moscow oblast forming the Moscow metropolitan region, became the main center of gravity in the post-Soviet space, actively increasing its demographic potential and importance both within the country and Central Russia. At the same time, the population dynamics, which serves as an accessible integral indicator of the level of socio-economic development and attractiveness of the territory for the population and business, shows how spatial heterogeneity was increasing during the last two decades.

3. The discrepancy in the development trajectories of Moscow and the surrounding Moscow oblast is particularly noticeable against the background of the depopulation of a significant part of slowly modernizing regions and cities of Central Russia with an inherited industrial burden. The gradient of polarization of the Central Russian megalopolis space between the cities of Moscow oblast and adjacent regions in terms of migration growth reaches three times, while the outflow of population from cities located beyond the boundaries of the megalopolis runs almost two times faster than in cities of the megalopolis, satellites of the capital and centers of neighboring oblasts.

4. The population estimates for Moscow and Moscow oblast, published by official statistics and those made using data from mobile network operators, significantly differ, showing serious distortions of the real picture of the resident population

distribution. The population of Moscow is overestimated, and the population of Moscow oblast is underestimated, which is due to methodological problems of migration accounting and population censuses, as well as strong population fluctuations caused by massive centripetal flows of work-related commuters and centrifugal streams of dacha residents in the summer.

5. Within Moscow itself, the steadily growing population shifts towards the outer zone of the districts that increase at maximum rates, which leads to the decentralization of its internal distribution. At the same time, the newly attached territories are distinguished by a low population density, preserving the inherited features of development. Important changes are associated with increased social segregation of the capital along the west-east and center-periphery directions. Districts of the center and western okrugs are becoming increasingly prestigious. At the same time, most of the peripheral districts of the North-Eastern, Eastern and Southern okrugs are perceived as non-prestigious outskirts with a high level of concentration of non-Russian migrants.

6. Moscow is characterized by pronounced population fluctuations. On a summer day off, its population size is 30% less than on a winter weekday, not exceeding 10 million people in the summer months. Different parts of the city have their own fluctuation rhythms. Central and sub-central districts are dominated by daily fluctuations, while in the municipalities surrounding the city center the amplitude of fluctuations is smaller. The median and peripheral zones are characterized by seasonal fluctuations with an even less pronounced gradient. The outer zone of Moscow's districts outside the Moscow Ring Road is characterized by significant daily fluctuations due to work-related commuters. New Moscow is dominated by weekly and seasonal fluctuations with smoother daily dynamics, while areas of the outer periphery, closer to the borders of Kaluga oblast, have especially pronounced seasonal rhythms due to dacha specialization of these territories.



7. The authorities have always underestimated the unity of the Moscow region, which is mainly occupied by the metropolitan agglomeration. Its unity is defined both by the territorial closeness of Moscow's core and suburbs and by the stable links between them. The general infrastructure, powerful flows of population, capital, and information require this urban formation to be approached as a system or organism, where impacts on some parts inevitably affect the rest. Dissection of this "body" by administrative boundaries does not change the nature of its evolution and functioning. Analysis of non-urban areas within New Moscow shows that with such a mosaic pattern of land use the official division not only into Moscow and Moscow oblast but also into urban and rural populations becomes almost meaningless.

8. Over the past seven years after the new territories were joined to Moscow, there is still a question about the exact position of the boundary of the urban "capital landscape" in New Moscow. Areas that can be redeveloped have been added, and their migration inflow of younger and more active population has increased. But in case of acute land use conflicts, "lack of oxygen" for small business, low qualification of migrant workers, and poor quality of the

infrastructure environment, the metropolitan effect is limited to a small area in settlements of the first and second zones of distance from the Moscow Ring Road and along major highways, where discrete urbanized territories are formed. The transformation of New Moscow into a "garden city" gets delayed. For the time being, New Moscow is mostly represented by typically rural areas with villages, half-ruined agriculture, locals and dacha residents who are not certain about their future, and islands of multi-storey buildings that get denser towards the old territories of Moscow.

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