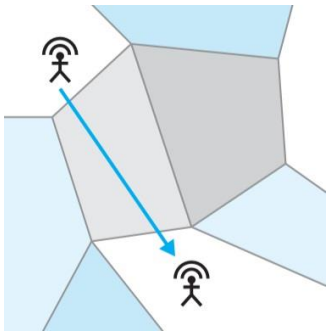


# Comparison of data of mobile operators and Rosstat on the number and distribution of the population in the Moscow Metropolitan region

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# POSSIBLE SOURCES OF INFORMATION ABOUT THE POPULATION AND ITS DYNAMICS



**Traditional statistics**



Census of the population

data on the current account of the population



Departmental statistics



Data from opinion polls

mobile operator data

data about Bank card

transactions social network

data satellite image

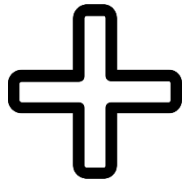
data mobile app data

etc.



**«Big Data»**





## Strengths of both data types



### Rosstat data:

- high coverage of all population groups highly detailed data and its structure (gender, age, education, etc.)
- ability to compare between different territories of the country
- long period of data collection, possibility of analysis based on long time series

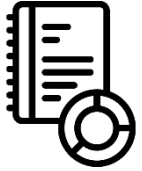


### Mobile phone data:

- high correspondence of reality in time and space
- calibration capability for existing data
- no reference to an administrative division
- applicability to different spatial scales and time slices
- comparability and integration with other spatial information sources
- high penetration rate among all population groups



## Weaknesses of both data types



### Rosstat data:

- double counting of the population in the census, when a person is first counted at the place of permanent registration, and then live census at the place of real residence
- poor accounting of the real place of residence, especially for pensioners, students, and military personnel
- under-reporting of migrants and waste workers



### Mobile phone data:

- non-personalized nature and related problems of accounting for mobile phones registered to other persons (for example, relatives), or people who do not have mobile phones
- under-accounting of SIM-cards of other operators and disabled devices
- technical interference: overlapping signals from neighboring repeaters, causing subscribers to "jump" from cell to cell, not related to real movements in space
- high data cost
- short period of information collection

# Two data types do not match



## Types of districts

Residential municipalities  
of Moscow

Cities of the  
Moscow oblast

Closed city of the  
Moscow oblast

The  
overestimation  
of the  
population

The  
underestimates  
of the  
population

New Moscow

Most municipalities in  
the Moscow oblast

With an approximate match  
population in both types of data

Center and subcenter  
of Moscow

Peripheral areas of the Moscow oblast  
(in the Eastern sector)



**Residential municipalities of Moscow**



**Cities of the Moscow oblast**

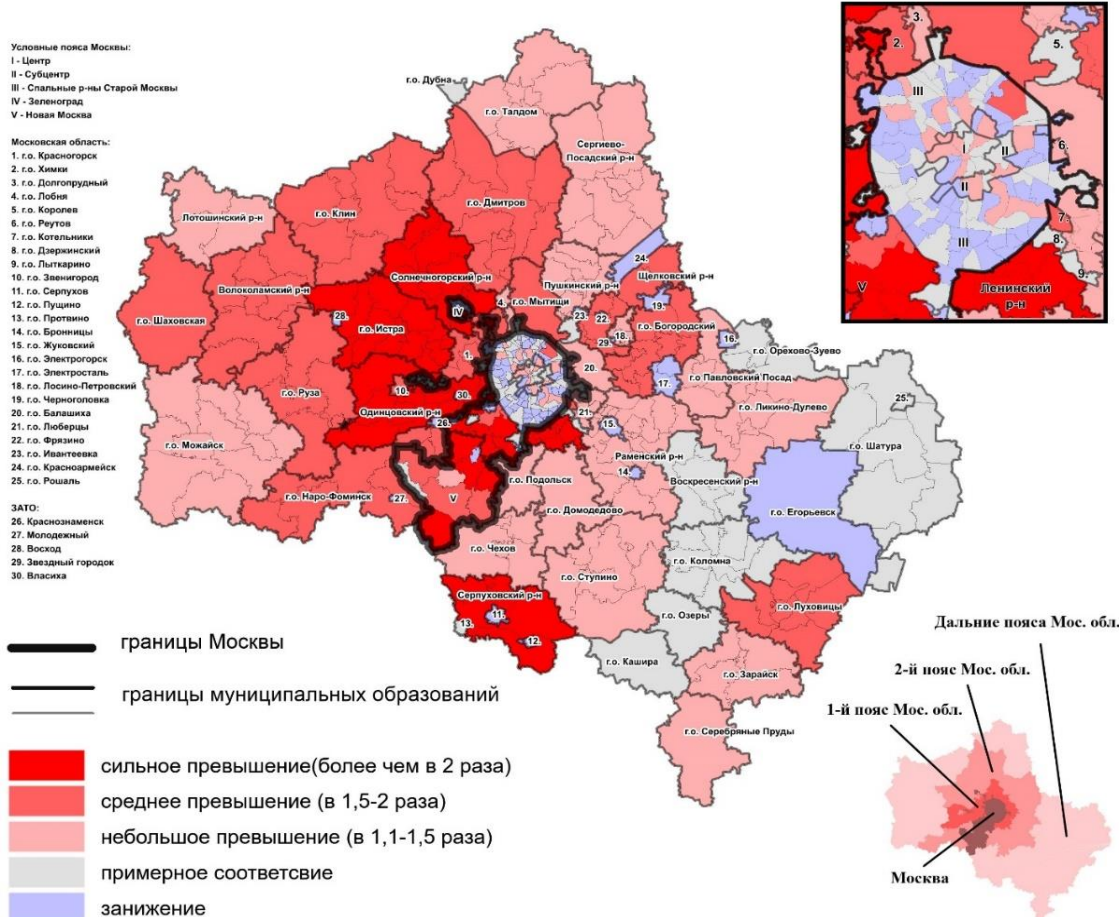


**Closed city of the Moscow oblast**

# The overestimation of the population

The main features of the area, affecting the relationship between the two data sets:

- Accommodation in the second (dacha) housing of part of the citizens registered here.
- Disadvantages of population censuses that serve as "reference points" for subsequent current accounting.
- A large number of residents registered at their place of residence (often changing their location, which is not accounted for by official statistics).





New Moscow



Most municipalities in the Moscow oblast

# The underestimates of the population

The main features of the area, affecting the relationship between the two data sets:

- Active housing construction.
- Purchase of housing in the Moscow region or in New Moscow without re-registration.
- A significant number of unregistered residents (including illegal migrants).
- Permanent residence of some Muscovites in their dacha.
- The spread of "semi-commuting".

Условные пояса Москвы:

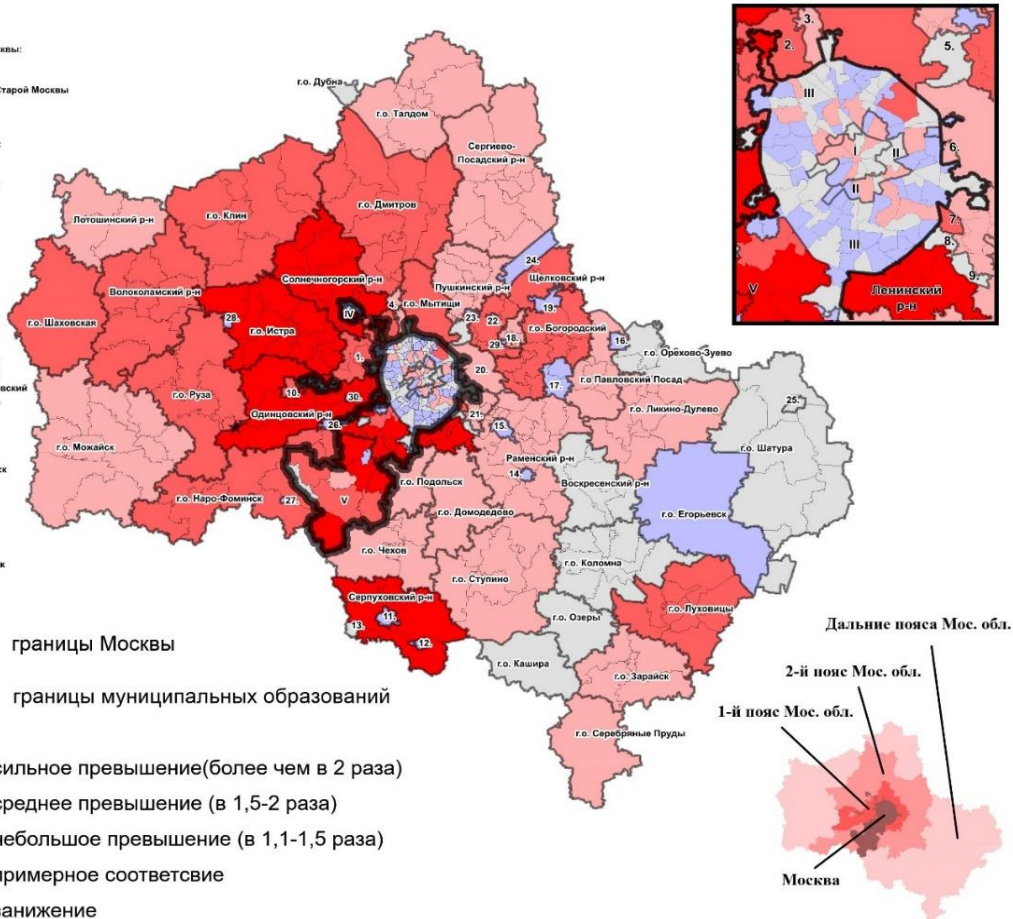
- I - Центр
- II - Субцентр
- III - Спальные р-ны Старой Москвы
- IV - Зеленоград
- V - Новая Москва

Московская область:

- 1. г.о. Красногорск
- 2. г.о. Химки
- 3. г.о. Долгопрудный
- 4. г.о. Лобня
- 5. г.о. Королев
- 6. г.о. Реутов
- 7. г.о. Котельники
- 8. г.о. Дзержинский
- 9. г.о. Мытищи
- 10. г.о. Звенигород
- 11. г.о. Серпухов
- 12. г.о. Пушкино
- 13. г.о. Протвино
- 14. г.о. Бронницы
- 15. г.о. Жуковский
- 16. г.о. Электргорск
- 17. г.о. Электросталь
- 18. г.о. Лосино-Петровский
- 19. г.о. Черноголовка
- 20. г.о. Балашиха
- 21. г.о. Люберцы
- 22. г.о. Фрязино
- 23. г.о. Раменское
- 24. г.о. Красноармейск
- 25. г.о. Рошаль

ЗАТО:

- 26. Краснознаменск
- 27. Молодежный
- 28. Восход
- 29. Звездный городок
- 30. Власика







Center and subcenter of Moscow



Peripheral areas of the Moscow oblast (in the Eastern sector)

With an approximate match population in both types of data

The main features of the area, affecting the relationship between the two data sets:

For the center and subcenter of Moscow:

- Significant scale of night employment (due to the large number of offices).
- A large number of hotels.

For the Eastern periphery of the Moscow region:

- Low involvement of the population in pendulum migrations, the spread of "semi-commuting"
- Less than for other sectors of the region, the spread of suburban suburban development

Условные пояса Москвы:  
 I - Центр  
 II - Субцентр  
 III - Спальные р-ны Старой Москвы  
 IV - Зеленоград  
 V - Новая Москва

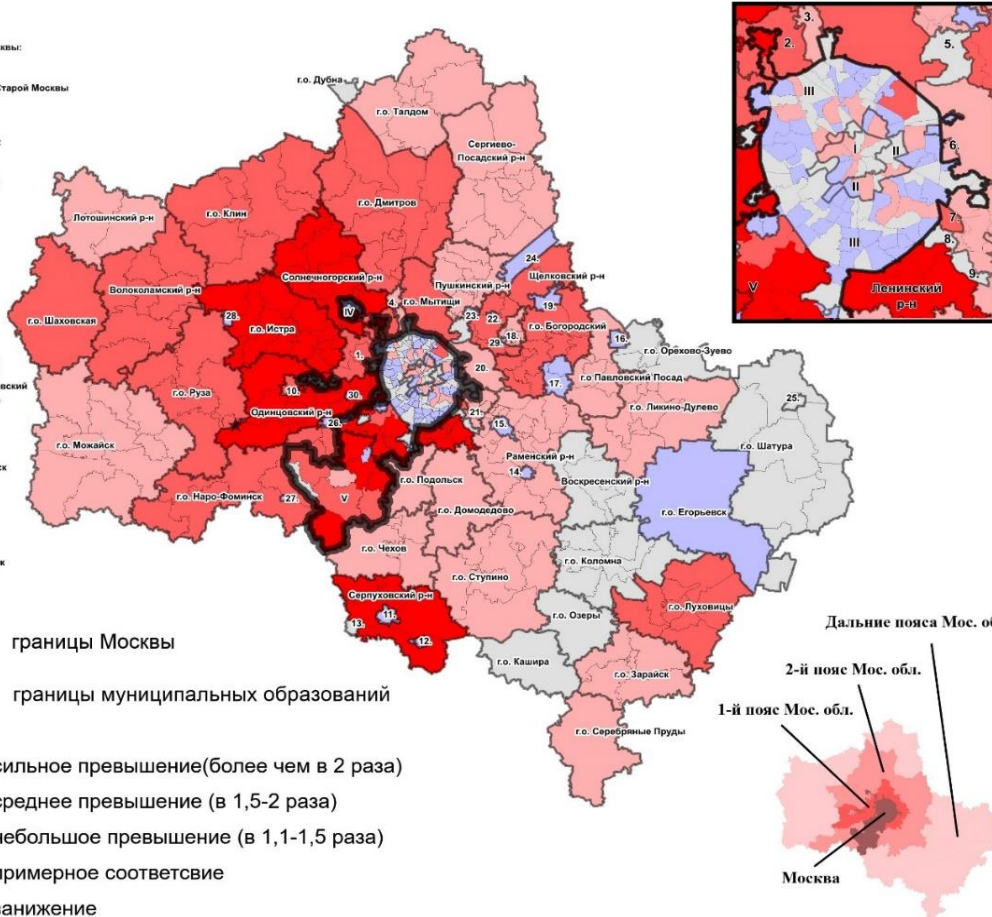
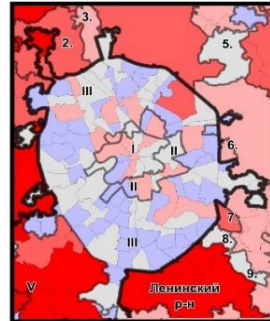
Московская область:  
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 22. г.о. Фрязино  
 23. г.о. Раменское  
 24. г.о. Красноармейск  
 25. г.о. Рошаль

ЗАТО:  
 26. Краснознаменск  
 27. Молодежный  
 28. Восход  
 29. Звездный городок  
 30. Власика

— границы Москвы

— границы муниципальных образований

сильное превышение (более чем в 2 раза)  
 среднее превышение (в 1,5-2 раза)  
 небольшое превышение (в 1,1-1,5 раза)  
 примерное соответствие  
 занижение







# Conclusions

- ❑ The emergence of a new source of population data - data from mobile operators that is comparable to Rosstat in terms of coverage-makes it relevant to analyze these two data sets.
- ❑ The use of mobile data is appropriate as an alternative source of information for demographic statistics.
- ❑ Official statistics significantly underestimate the population of the Moscow region and slightly overestimate the population of Moscow, and in General underestimates 2.2 million people living in both regions.
- ❑ In addition, official statistics, due to their inertia, are unable to provide reliable information about the population of municipalities where active housing construction is underway (New Moscow, some municipalities of the Moscow region and Old Moscow outside the Moscow ring road), taking into account 2-4 times fewer residents than actually live in these territories.
- ❑ Rosstat data does not take into account the seasonal population and residents living in second homes or dacha, as well as unregistered migrants. We can say that "invisible " categories of the population in official statistics are shown in the data of mobile operators, and for "visible" groups, it is possible to determine their actual residence.

**Thanks for your attention**

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