

# Differentiation Factors of the Debt Situation in Russian Urban Okrugs with over 100 000 Residents in 2015–2020<sup>1</sup>

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**Abstract**—This article analyzes the debt standing of 189 Russian urban okrugs with over 100 000 residents and the factors that define the differences in the debt situation among these urban okrugs. The study was conducted using the municipal debt size and structure indices contained on official websites of local administrative bodies, as well as the data on local fiscal revenue and expenditures from Rosstat's database of municipal bodies. The results of the analysis show that urban okrugs with a larger population suffer from a higher debt burden on their budgets: the worst debt standing is characteristic of million-plus urban okrugs and other major regional centers. At the same time, there is no explicit dependence of the debt indicators on the fiscal situation and the level of economic development. This dependence is violated by the impact of other institutional conditions, including features of the federal and regional fiscal policies, social assistance of large businesses and other reasons. According to the analysis of the purposes of municipal loans to the studied urban okrugs, there are very few cases in which the debt is taken for the implementation of urban development projects. In Russia, the market for municipal bonds, which are a widespread phenomenon abroad, remains undeveloped as well as other new ways of reducing municipal debt burdens. All of this generates a negative forecast of the budget and financial standing of the largest centers for the next several years and again proves the acute need for reconsidering the fiscal and tax policy and the system of distributing powers at the local level.

**Keywords:** municipal debt, municipal borrowing, budget loans, debt burden, local budget, urban development, urban okrugs

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## INTRODUCTION AND PROBLEM STATEMENT

Russian scientific and analytical studies have drawn the attention to the extremely unfavorable fiscal standing of Russia's municipal units several times. The high centralization of tax proceeds in the federal and regional budgets defines an acute shortage of fiscal revenue at the local level. This is the reason that about half of all of the country's municipal units annually round up their fiscal year with a fiscal gap.<sup>2</sup> The amount of local financial resources is insufficient even for the high-quality implementation of municipal powers. All the more so, there are no funds left for forming so-called development budgets (Didenko, 2021) that are defined as a part of fiscal revenue

intended for making investment and capital expenditures on implementing local strategic projects aimed at ensuring economic growth and improving the living standards at the local level.

The shortage of fiscal resources in municipal units is most often eliminated through borrowing. The rules of municipal borrowing are regulated by the Budget Code of the Russian Federation.<sup>3</sup> However, expert interviews with local government bodies conducted by the author as part of the training program for project teams of Russia's 100 largest cities at MSM (Moscow School of Management) Skolkovo in 2020, and statistical observations prove that the accumulation of municipal debt often fails to improve the fiscal standing of the municipalities and, on the contrary, aggravates it and makes the funding of development projects in municipal units even more inaccessible. Together with a significant decrease in the independence of

<sup>1</sup> The article has been substantially revised and expanded by the author for publication in *Regional Research of Russia*.

<sup>2</sup> Local Budget Monitoring Results//Official Website of the Ministry of Finance of Russia. [https://minfin.gov.ru/ru/performance/regions/monitoring\\_results/Monitoring\\_local/results/](https://minfin.gov.ru/ru/performance/regions/monitoring_results/Monitoring_local/results/). Accessed December 6, 2021.

<sup>3</sup> Budget Code of Russia, Federal Law 145-FZ of July 31, 1998. [https://www.consultant.ru/document/cons\\_doc\\_LAW\\_19702/](https://www.consultant.ru/document/cons_doc_LAW_19702/). Accessed September 26, 2021.

local budgets over recent years (Sumskaya, 2016), the level of debt burden has become one of the most significant constraints for the socioeconomic development of municipal units. The problem of high debts is most characteristic of the country's largest urban okrugs by population. They feel a particularly acute shortage of fiscal resources in the context of an intense migration inflow.

The goal of this study was to elaborate the general idea of the debt standing of Russia's 189 urban okrugs with over 100 000 residents in 2015–2020. One important geographical task is to define the scale of the differentiation of debt burden among the urban okrugs and identify the factors that define the observed differences.

### REVIEW OF EARLIER STUDIES

Despite its acuteness, the problem of municipal debt in Russia remains virtually ignored by researchers.

Despite the fact that Russian experts in regional and municipal finance have conducted many studies in the domain of municipal budgets (Leksin and Shvetsov, 2001; Local ..., 2009; Problems ..., 2005; Sumskaya, 2016; Yagovkina and Nedopivtseva, 2017; etc.), including urban okrug budgets (Kuznetsova, 2018, 2020; Wealth ..., 2017), authors analyze the fiscal standing of municipal units only by fiscal revenue and expenditures and their structure and not by municipal debt figures.

The few Russian studies devoted specifically to municipal debt are confined to analyzing the data on the consolidated volume of municipal debt either in the country as a whole (Brik and Plokhotnikova, 2020; Mamedov and Avksentiev, 2014) or by federal districts (Sarkisyan et al., 2019), based on data from the Ministry of Finance of the Russian Federation, or the debt situation in individual municipal units, most often urban okrugs with regional capitals. For example, there were such studies for Kazan (Gafurova, 2012), Volgograd (Dyakova and Perekrestova, 2008), Tomsk (Yartseva, 2014), Smolensk (Ivankova et al., 2019), Oryol (Komarevtseva, 2017), and other such cities.

An analysis of debt indicators based on the example of more than one urban district in Russia was made only by a group of researchers from the Vologda Research Center of the Russian Academy of Sciences, including M.A. Pechenskaya-Polishchuk and A.I. Povarova. However, their works are also characterized by a narrow sample of municipal units selected for studying debt indicators. The researchers from Vologda compiled a comparative analysis of the debt standing of two urban okrugs of Vologda oblast' (Povarova, 2015) and eight urban okrugs-regional capitals of the Northwestern Federal District in the 2010s (Pechenskaya, 2020; Pechenskaya-Polishchuk, 2021). The important conclusions made by those

authors are that in the early 2010s the reduction in the standard tax revenue assignments to local budgets and the accompanying reduction in the fiscal independence of the studied urban municipalities were attended by more than a two-fold increase in their debt that was comparable to the volume of tax and nontax fiscal revenues, while the debt service costs increased by more than 10-fold.

The responsibility for tracking the situation with the municipal debt across the country rests with the Ministry of Finance of the Russian Federation. The Ministry publishes the debt statistics on a monthly basis only as a sum for the country's regions, without dividing the aggregate debt by separate municipal units.<sup>4</sup> The only regularly published survey of the debt situation of municipal units is the short section "Local Budget Obligations" in the Ministry of Finance's annual reports on monitoring the performance of local budgets.<sup>5</sup> In these monitoring works, however, the municipal debt data are presented only as short summaries and only totally for all of the country's municipal units.

The information on the state and behavior of the aggregate national municipal debt is published by the Analytical Credit Rating Agency<sup>6</sup> and the Budget publishing house<sup>7</sup> as analytical comments on and research surveys of the debt burden of the Russian federal subjects; however, these are not regular publications: the sections covering the situation with the debt burden of local budgets are only rarely included in the analysis of the fiscal situation in a specific region.

Foreign researchers have by now accumulated considerable experience in studying the debt standing of lower territorial units, although the topic of municipal debt has been actively studied in foreign works only since the 1990s. The first works appeared in the United States (Cropf and Wendel, 1998) and Spain (Benito and Bastida, 2004; Fernández and Jiménez, 2002), where the municipal debt problems had become most acute by the end of the 20th century. By now, the debt standing at the local level has already been studied in many countries. For example, several works on the topic have been written by scientists in

<sup>4</sup> Consolidated Budgets of Federal Subjects and Budgets of Extra-budgetary Territorial National Funds. Federal Treasury. <https://roskazna.gov.ru/ispolnenie-byudzhetrov/konsolidirovannye-byudzhety-subektov/1019/>. Accessed March 17, 2021.

<sup>5</sup> Local Budget Monitoring Results//Official Website of the Ministry of Finance of Russia. [https://minfin.gov.ru/ru/performance/regions/monitoring\\_results/Monitoring\\_local/results/](https://minfin.gov.ru/ru/performance/regions/monitoring_results/Monitoring_local/results/). Accessed December 6, 2021.

<sup>6</sup> Debt in the Long Run: What to Do with Record-Breaking Growth of Regional Debt Burden? Survey of Debt Burden Dynamics in Russian Federal Subjects, Official Website of Analytical Credit Rating Agency ACRA. <https://www.acra-ratings.ru/research/2331>. Accessed March 17, 2021.

<sup>7</sup> Regional Revenue Growth Ensure Debt Reduction. Analysis by ACRA. Бюджет.ру. [http://bujet.ru/article/399750.php?sphrase\\_id=10236898](http://bujet.ru/article/399750.php?sphrase_id=10236898). Accessed March 17, 2021.

Portugal (Ribeiro et al., 2019), the Czech Republic (Sedmíhradská and Šimíková, 2007), Switzerland (Feld et al., 2011), Poland (Wichowska, 2019) and other countries. The most widespread line of the local debt studies abroad is the assessment of the influence of different groups of factors (social, economic, institutional, political) on the debt burden of municipal units by quantitative analysis methods. However, the results of these studies have not yet allowed elaboration of a common opinion about which factors influence local debt more than others.

The lack of Russian studies of the debt standing of municipal units in comparison with their foreign counterparts is determined by the extreme inaccessibility of municipal debt statistics in Russia.

## MATERIALS AND METHODS

Russian municipal units have no statutory obligation to publish information about their debt indicators in the public domain. For this reason, the information on municipal borrowing by municipal units is not published in any database of municipal budget indicators and in many cases is not published on the portals of local administrations either. It is possible to collect information about municipal debt only by the “manual” information search using unique sources for each municipal unit, including:

- extracts from municipal debt books;
- reports on municipal debt;
- “Budget for Citizens” reports;
- explanatory notes for the reports on the performance of urban okrug budgets;
- municipal borrowing programs of urban okrugs;
- municipal budget forecasts;
- “Open Budget” portals of municipal unities and federal subjects of the Russian Federation;
- reports of municipal control and audit chambers, and other sources.

The debt data in these sources are incomplete and have many omissions for individual years. All of these features make the collection of data on municipal debt extremely labor-intensive.

To implement the tasks set in the study for 189 Russian urban okrugs (UOs<sup>8</sup>) with over 100 000 residents as of January 1, 2021, the authors collected an array of indices of the amount and structure of municipal debt for 2015–2020 despite the enumerated limitations. Urban okrugs have been chosen as the sole object for study due to the relative simplicity of the fiscal system of this type of municipal units in comparison with municipal districts. The absence of the second level of local government (urban and rural settlements) and, accordingly, the hierarchical two-tier fiscal structure

within the boundaries of urban okrugs largely simplifies the collection and analysis of fiscal data.

Municipal debt data were collected on the basis of information as of the end of the fiscal year (i.e., as of January 1 of the following year): for example, to estimate the municipal debt accumulated for 2015, the data as of January 1, 2016 were used, and so on.

To assess the debt standing of the studied UOs, not only the data on their municipal debt were collected but also the statistics on their fiscal revenue and expenses, including the data on their municipal debt service expenditures. The main source of these data was the municipal budget performance data from the Municipal Units Database (MUDB).<sup>9</sup> In the case of errors and omissions in the budget data in the MUDB, statistical information was supplemented from the reports on the budget performance of urban okrugs, as well as “Budget for citizens” reports posted on the official portals of the municipalities.

The Budget Code of Russia defines two key indices for assessing the debt sustainability of municipal units:

(1) The relationship between municipal debt to tax and nontax revenue of local budget (debt burden), %<sup>10</sup> (according to the Budget Code of Russia, this ratio must not exceed 100%).

(2) The share of debt servicing expenditures in the aggregate expenditures of local budget without considering subventions, % (according to the Budget Code of Russia, this share must not exceed 15%).

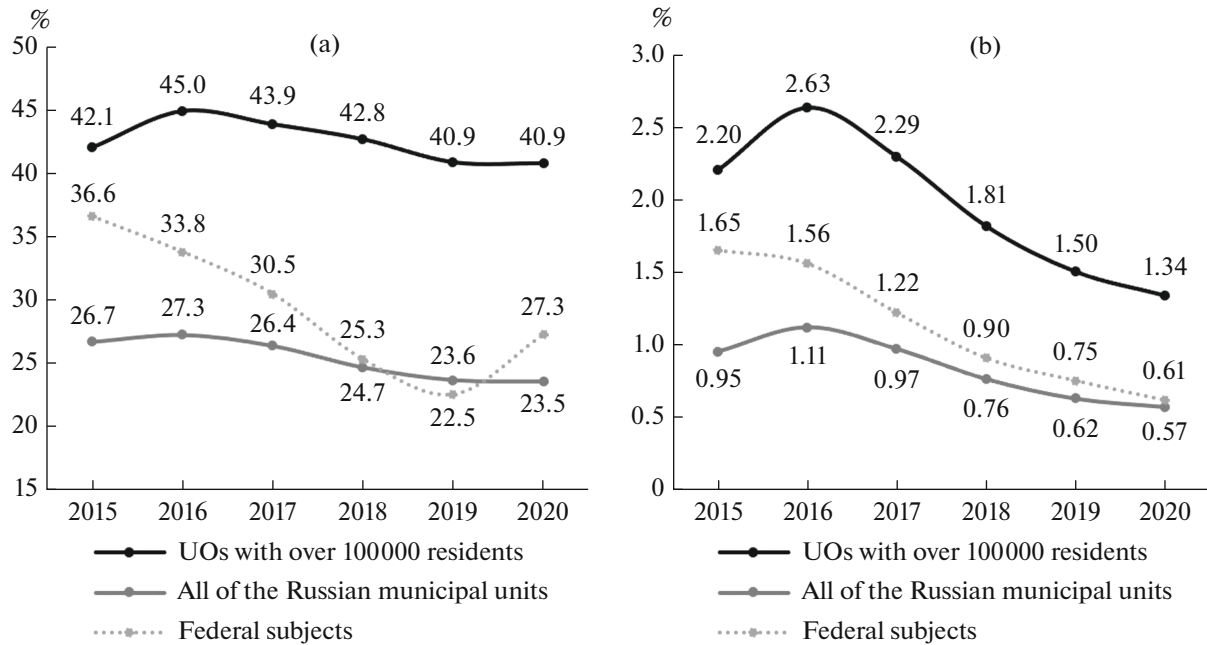
In the analysis presented in this article, the emphasis was placed on assessing the first index. The second index was used only as auxiliary and not considered in detail because the territorial distribution of indices 1 and 2 shows similar results; therefore, the assessment of the territorial differentiation of indicator 2 does not provide additional conclusions (also due to the lack of detailed data on debentures (terms, rates of loans, etc.)).

The criticality of the debt load in urban okrugs was determined based on the proximity in the values of these two indicators to their thresholds specified in the Budget Code (100% for Indicator 1 and 15% for Indicator 2).

<sup>9</sup> Municipal unity database (Rosstat’s MUDB). <http://www.gks.ru/dbscripts/munst/>. Accessed June 15, 2021.

<sup>10</sup> The index fixed in the Budget Code of Russia is somewhat different and designated as the *Municipal Debt Amount Related to the Aggregate Revenue of Respective Budget without Considering Nonreimbursable Payments (Nonreimbursable Payments and/or Tax Revenue Payments according to Additional Norms of Personal Income Tax Transfers)* (see cl. 107<sup>1</sup>, p. 5). However, those data were not considered due to the hard availability of the information on additional PIT transfer norms.

<sup>8</sup> The names of the administrative centers of UOs, not the full official names of municipal units are used hereinafter to simply the perception at the mentioning of specific UOs.



**Fig. 1.** The dynamics of the average weighted debt burden indices (a) and share of expenditures on debt servicing in the aggregate local fiscal expenditures without subventions (b) in the UOs with over 100 000 residents, in all of the Russian municipal unities and federal subjects, 2015–2020, %.

*Source:* for the UOs with over 100 000 residents the index was calculated using the data of Rosstat's MUDB, budget performance reports and published data on municipal debt.

The figures for the regions of Russia were calculated using the data of the regional budgets without including municipal budgets, that is, the data of the budgets of the Russian regions, not the data of the consolidated budgets of the Russian regions.

The calculations on all of Russia's municipal unities were made using the data of the Ministry of Finance of Russia ([https://minfin.gov.ru/ru/performance/regions/monitoring\\_results/Monitoring\\_local/results/](https://minfin.gov.ru/ru/performance/regions/monitoring_results/Monitoring_local/results/). Accessed December 6, 2021).

The calculations on federal subjects were made using the the state debt data of the Ministry of Finance of Russia and the data of the Federal Treasury on the budget performance of Russia's regions (<https://roskazna.gov.ru/ispolnenie-byudzhetov/konsolidirovannye-byudzhety-subektov/1019/>. Accessed March 17, 2021).

## STUDY RESULTS

The sum of the municipal debt accumulated in the UOs with over 100 000 residents by January 1, 2021 was about RUB 325 million<sup>11</sup>, which corresponds to 84.5% of the total debt of the country's municipalities. Taking the fact into account that the share of the studied municipalities in the country's population is about one and a half times smaller (52.6%), it becomes obvious that it is the largest centers of the country that concentrate the largest part of the debt and are the most debt-laden.

The continuous series of the municipal debt data for 2015–2020 available for 157 of the studied urban okrugs indicates that those years were characterized by a constant growth of the total debt of the urban okrugs. The average growth rate for 2015–2020 was 4%, which is slightly lower than the inflation rate. In the past 6 years, however, the growth of the indicator experi-

enced a significant slowdown; while in 2016 the debt of the UOs in question grew by 8% on the previous year, in 2019–2020 the increase was just over 2%. At the same time, the concentration of municipal debt in them continued to grow: while in 2015 the debt of 157 UOs with over 100 000 residents accounted for 75% of the total debt of the country's municipalities; in 2020 that share was 80.4%.

The absolute debt in the urban okrugs with over 100 000 residents grew simultaneously with the outstripping growth of the total tax and nontax revenues; in 2015–2020 they increased with an average rate of 4.9%, and by the end of the recovery period after the 2014–15 crisis they grew by even more than 7%. This reduced the post-2016 debt burden in the studied UOs from 45 to 40.9% (Fig. 1). Throughout the 2015–2020 period, their average debt burden did not rise above 50%, which indicates that the country's big, large, and largest UOs generally have a relatively favorable debt standing.

Despite the growing debt, the average share of the debt servicing costs of the UOs with over 100 000 residents has also declined in the past 5 years (the indica-

<sup>11</sup>The exact municipal debt of all of the UOs with over 100 000 residents as of January 1, 2021 is unknown due to the unavailability of data on 10 of these. As of January 1, 2021 the aggregate debt of the 179 urban okrugs, the data on which, is available was RUB 323.6 billion.

tor was cut from 2.63 to 1.34%). The reduction in the share of those costs was due to the reduction in absolute debt repayment costs (in all of the UOs with over 100 000 residents the estimated total debt repayment costs were cut down by more than 25%). The reduction in these expenditures is the result of the improvement in the conditions of providing loans to the considered UOs by expanding the practice of using cheap budget loans instead of expensive commercial ones. Whereas commercial loans to municipalities are often extended at annual interest rates exceeding 15%, the rates on budget loans most often do not exceed 1–2%.

The trends in the dynamics of the debt indicators of UOs generally coincided with those observed in the regions of Russia. The reduction in debt burden was observed in the regions of Russia as well<sup>12</sup>; however, it began before 2016, developed more rapidly, and was due to the reduction in the aggregate debt of the country's regions, not by the growth of their tax and nontax fiscal revenue.

In recent years, the debt load of the regions has remained approximately twice as low as that of the studied UOs by both debt indicators (see Fig. 1). Even the growth of the regional debt burden in the pandemic year 2020 (the impact of the COVID-19 crisis on the regional fiscal indicators was greater than on the municipal fiscal indicators) did not bring the regions of Russia closer to the average values for the UOs with over 100 000 residents.

Although the debt indicators of the UOs with over 100 000 residents are far from critical on average there are large differences in the debt situation among these UOs (Fig. 2).

As of January 1, 2021, only 37 (or 20% of the sample) out of the 189 considered okrugs had no municipal debt. This group of municipal units includes primarily well-developed settlements with high tax and nontax revenues, namely big centers of mining (Novyi Urengoy, Noyabrsk, Norilsk, Solikamsk, Berezniki) and manufacturing (Tobolsk, Magnitogorsk, Gubkin, Zlatoust, Naberezhnye Chelny, Oktyabrsky, etc.), as well as some big cities and large towns of the Moscow metropolitan area.

Low municipal debt or its absence are also characteristic of most of the urban okrugs in country's geostrategic regions: the subjects of the North Caucasus (Derbent, Grozny, Nalchik), the Far East (Nakhodka, Ussuriysk, Khabarovsk, Petropavlovsk-Kamchatsky) and the Republic of Crimea.<sup>13</sup> According to estimates the low municipal debt in the above-mentioned UOs is due to large amounts of federal budget

aid annually allocated to the budgets of the corresponding subjects. In the UOs of the North Caucasus it is also important that they followed the widespread practice of transferring municipal powers to the regional level due to the extreme deficit in the tax base of local budgets. The narrowing of the list of local powers reduces the local budget burden and, as a consequence, causes the absence of debt.

The worst debt standing, with a debt burden exceeding 50%, is typical of most of the million-plus UOs (with the highest burden values registered in Kazan, Volgograd, Novosibirsk, and Nizhny Novgorod) and UOs with regional capitals, especially centers of regions in the European part of Russia with depressed economy (Smolensk, Kostroma, Penza, Saransk, Saratov, etc.).

There is a direct correlation between the debt burden of a region and its population level (Fig. 3). At the end of 2020 the ratio of debt to tax and nontax fiscal revenues in the million-plus UOs was 2.2 times higher than the average ratio for the considered urban okrugs. In the regional capitals the debt burden was 1.8 times as high as the average debt. At the same time, the towns with a population close to 100 000 residents have low debt burdens (about 20%). Despite the fact that the range of differences in the debt standing among the UOs of different population level has been shrinking since 2016, the observed differentiation has been stable over time.

This is consistent with the situation in the UOs in terms of fiscal capacity. In the framework of the fiscal equalization policy pursued by most of the Russian regions, the UOs with the largest population that occupy the central position in regional settlement systems receive significantly fewer transfers than the smaller peripheral municipal units. As a result, the aggregate fiscal capacity of million-plus UOs is 13% lower than that of the UOs with 100 000 to 250 000 residents, while the fiscal capacity of UOs administered as regional centers is 19% lower. The transfer redistribution policy does not lead to the equalization of fiscal capacities of urban okrugs but deteriorates the standing of the largest centers that have to resort to municipal borrowing at a greater shortage of budget finance.

The UOs in which the debt burden exceeded the 100% level permitted by the Budget Code of Russia included some of the large and largest regional centers in Russia, that is, Kazan, Ufa, Saratov, Izhevsk, Saransk, Smolensk, Kostroma, Oryol, Belgorod, and Pervouralsk, the only noncapital UD in the list.

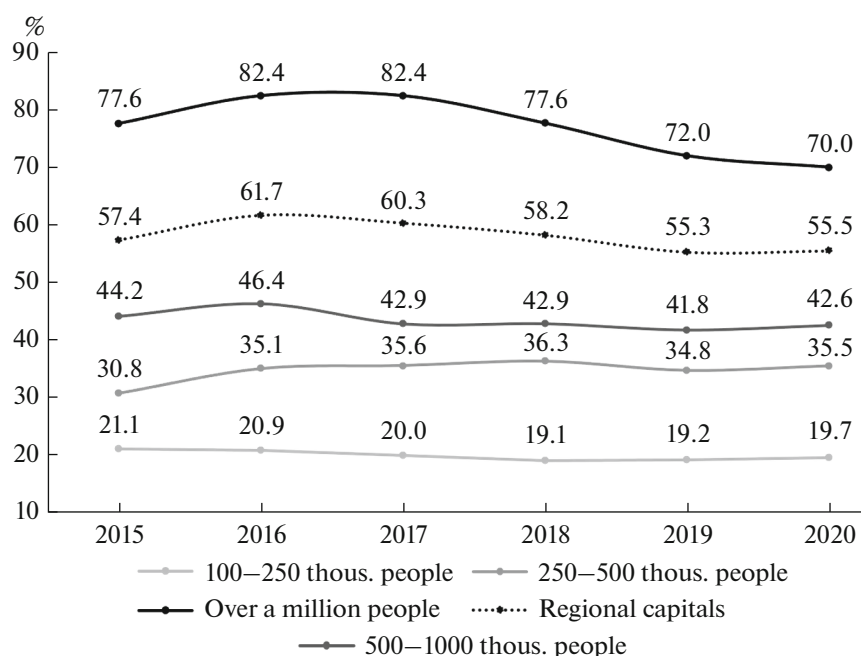
As of January 1, 2021, there were only four urban okrugs with extremely high debt levels (Fig. 2). In the enumerated urban okrugs, the debt burden indicators above the thresholds established by the legislation are often formed at the expense of large municipal loans for the preparation of urban infrastructure for holding events of regional, national, or even global significance. For example, a major event that boosted the

<sup>12</sup>The debt burden for the Russian regions was calculated using indices of the budgets of federal subjects, not of their consolidated budgets.

<sup>13</sup>In the article, the borders of Russia are considered in accordance with the Constitution of the Russian Federation adopted by popular vote on December 12, 1993, with amendments approved during the All-Russian vote on July 1, 2020.



**Fig. 2.** The municipal debt and debt burden in the Russian urban okrugs with over 100000 residents in 2015–2020. *Sources:* calculated by the author according to the data of Rosstat’s MUDB, budget performance reports and published data on the municipal debt of the studied urban okrugs. The names of the administrative centers of respective urban okrugs are underwritten.



**Fig. 3.** The debt burden dynamics in UOs with different populations in 2015–2020, %.

*Source:* Calculated by the author according to Rosstat's MUDB data, fiscal performance reports and published data on the municipal debt of the studied urban okrugs.

Calculated for 157 of the 189 UOs with over 100 000 residents with an array of continuous data on their municipal debt in 2015–2020.

debt in Saransk was the FIFA World Cup in 2018, in Kazan the debt was boosted by the Universiade in Kazan in 2013, and in Smolensk the UD debt was boosted by the celebration of the city's 1150th anniversary.

Sometimes, the debt reaches extremely high levels due to the urgent need to implement an infrastructural project in an urban okrug that is not tied to holding major events. For example, in Pervouralsk the urgent and costly modernization of the municipal water supply system resulted in extremely high debt burden levels up to 2019. In 2015, the urban okrug's debt was 6.9 times (!) higher than the amount of the tax and nontax revenue of the municipal budget.

The studied UOs are distributed in a similar manner by a second debt sustainability indicator, that is, the share of debt servicing expenditures in aggregate expenditures without considering subventions (the coefficient of correlation with debt burden was 0.88). However, the correlation between the share of debt expenditures and the debt burden is still not strict. It is violated by the differences in credit terms among municipalities. For example, as of the end of 2020, the debt burden in Yaroslavl and Saratov was equally high reaching 89.4%, all the debt was formed by commercial loans. However, in Yaroslavl, the share of loan service costs is 1.5 times higher than in Saratov (4.5% vs. 3.1%). Obviously, the reason for the observed differ-

ences is that in Yaroslavl the loans were issued under less favorable conditions, i.e., at higher interest rates.

The results of the correlative analysis of the debt burden of UOs with over 100 000 residents with several factor indices (Table 1) prove that there is no obvious steady dependence of the debt standing of UOs on any of the groups of factors distinguished by foreign researchers. The correlation coefficient showed no significant value in any of the indices; however, the statistical dependence of the debt of a municipal unit on its fiscal standing (Benito and Bastida, 2004; Feld et al., 2011; Ribeiro et al., 2019), geographical position (Vilasaliya, 2013), share of able-bodied population (Wichowska, 2019), and other factors has been proven by many foreign researchers in their works.

The largest coefficient value of 0.3 is characteristic of the UO population index and corresponds to the existence of a moderate positive connection, which partially confirms the observed dependence of the UO debt burden on the UO population level but also proves that this dependence is not univocal.

The situation where the largest cities by population and the cities that play a central role in the national and regional settlement patterns have a larger debt burden makes Russia similar to the countries of Eastern Europe (Dept ..., 2007). For example, in such countries as Poland (Wichowska, 2019) and Czech Republic (Sedmíhradská and Šimíková, 2007) the territorial distribution of municipal debt is also charac-

**Table 1.** The results of the correlational analysis of debt burden in the Russian urban okrugs with over 100000 residents and with factor indicators

Group of factors	Indicator	Source	Period	$K_{correl}$
Factors of the fiscal and financial standing of municipal unities	Local fiscal revenue in netback prices, RUB000's	MUDB	2015–2020	0.16***
	Tax and nontax revenue of local budgets in netback prices, RUB000's	MUDB	2015–2020	0.15***
	Average annual fiscal capacity per resident by fiscal revenue in netback prices, RUB000's per capita	MUDB	2015–2020	–0.22***
	Share of tax and nontax revenue of local budget in total fiscal revenue, %	MUDB	2015–2020	–0.07**
	Endowment with tax and nontax fiscal revenue in netback prices, RUB000's per capita	MUDB	2015–2020	–0.24***
	Share of fiscal gap/surplus in local fiscal revenue, %	MUDB	2015–2020	–0.18***
Economic factors	Fixed capital expenditures per capita without considering small enterprises, RUB000's per capita	MUDB	2015–2020	–0.13***
	Average monthly salary of corporate employees in the prices for 2020, RUB	MUDB	2015–2020	–0.11***
	Average monthly household income in netback prices according to the data of the FTS on the taxable base of PIT, RUB000's	Russian FTS	2015–2019	–0.22***
Economic and geographical position factors	Highway distance to regional capital, km	Computed in the ArcGIS software suite according to the data of Open-StreetMap	2020	–0.26***
	Highway distance to the nearest city with over half a million residents, km		2020	–0.04
	Highway distance to the nearest million-plus city, km		2020	–0.09***
Social factors	Population as of January 1, people	MUDB	2015–2020	0.31***
	Share of able-bodied population, %	MUDB	2015–2020	–0.08***

*Source:* Calculated by the author according to the data of the MUDB of Rosstat, budget execution reports, tax accounts of FTS, Open-StreetMap, and published data on the municipal debt of the studied urban okrugs.

Factor indicators for the correlation analysis were selected with reliance on foreign studies, proceeding from the completeness of the data in the MUDB of Rosstat and their relevance for reflecting the influencing factor. \*\*\* Means that the correlation coefficient is significant at significance level  $\alpha = 0.01$ . \*\* Means that the correlation coefficient is significant at significance level  $\alpha = 0.05$ . The absence of \* means that the correlation coefficient is insignificant at significance level  $\alpha \leq 0.1$ .

terized by the center-periphery gradient and the positive dependence of the municipal debt burden of a populated locality on its population level is statistically proven. However, in the world's most developed economies an opposite situation is observed; in the United States (Cropf and Wendel, 1998) and Sweden (Vllaslija, 2013) the largest centers have enough funds of their own to fund budget-backed projects, while more peripheral and less populated localities have to use borrowing.

It is interesting that the correlation analysis shows no correlation between the debt burden and the indices that characterize the factor of economic development of UOs, while in Russian UOs a significant correlation of the latter with the fiscal capacity indices is noted. This is inconsistent with the conclusions of studies of the municipal debt situation in several developed countries (for example, the United States (Farnham, 1985; Kiewiet and Szakaty, 1996) and Spain (Fernández and Jiménez, 2002; Vera, 2018)). At

different times those studies proved the existence of a statistically significant positive relationship between economic potential and municipal debt: municipalities with a more developed economy and higher household incomes are also characterized by higher volumes of accumulated debt on average.

The weak dependence levels established by the correlation analysis are largely explained by the determining role of institutional conditions (regional regulatory framework, peculiarities of tax distribution with regard to municipalities and peculiarities of provision of interbudget transfers to municipalities in different regions, the kind of relations between the administrations of UOs and the authorities of federal subjects, etc.). The priority influence of institutional factors on municipal debt is the most studied aspect and has been proven by a wide variety of studies in foreign countries (Cropf and Wendel, 1998; Feld et al., 2011; Ribeiro et al., 2019; Vera, 2018). However, in the works of foreign authors, a statistically significant link has most often



been established with the legislative framework of municipal budget and municipal debt management, which is set by superior government bodies (Feld et al., 2011; Vera, 2018).

In Russia, there are also some other kinds of influential institutional conditions. The manner of their influence is seen based on the example of certain Russian UOs. For example, the study of publications in mass media and talks with representatives of local government bodies of some UOs show that the participation of representatives of big businesses in the work of municipal authorities encourages the reduction in debt burden as well as the general reduction in fiscal expenditure burden. Examples of towns with the city-forming role of large companies and with no or very low debt include Cherepovets (Severstal); Solikamsk and Berezniki (Uralkali); Salavat (Gazprom Salavat); UO centers of oil and gas production companies in the Khanty-Mansi and Yamalo-Nenets autonomous okrugs (Nefteyugansk, Noyabrsk and others).

In addition to providing high tax payments to local budgets, large companies often provide significant financial support for the implementation of local urban projects as part of their social responsibility policy and obligatory payments under license agreements.

There are numerous examples where large businesses have funded the building and management of socially significant facilities in the studied UOs. Some of the examples are the building of a school for 1725 alumni in Nizhnevartovsk<sup>14</sup> and a sports center for 700 people in Novokuibyshevsk with the sponsorship by PAO Rosneft<sup>15</sup>, funding of training centers and labs for schoolchildren, organization of mass urban events by PAO Gazprom Dobycha Noyabrsk in Noyabrsk<sup>16</sup>, building of modern kindergartens in Norilsk using the funds of PAO Norilsk Nickel<sup>17</sup>, and many other examples. These events held and managed by large companies save millions of rubles of local treasuries on expenditures, which allows the municipal okrugs where these companies run their activities to develop and fulfil their obligations with borrowing.

Another example of the influence of institutional decisions on debt can be traced by the example of big and large UOs of Moscow oblast. Despite the high

provision of tax and nontax budget revenues (in 2020 it was 1.8 times higher than the average level for the UOs with over 100000 residents with adjustment for the cost of living) and high fiscal independence (the share of tax and nontax budget revenues is 55.5% against the average level of 41.5% for all of the UOs with over 100000 residents), in Moscow oblast several UOs with over 100000 residents with higher debt load indices occur (49.2% in Solnechnogorsk as of January 1, 2021, 43.3% in Naro-Fominsk, 40.2% in Noginsk, 39.1% in Podolsk). Open data on the portals of administrative bodies and conversations with officials representing local government bodies of the Moscow oblast' show that in their UOs the fiscal debt burden is often formed by the need to urgently ensure with the help of municipal funds the construction of social and engineering infrastructure in new large apartment complexes, whose design or construction does not contemplate the necessary infrastructure for various reasons.

A prime example is the city of Podolsk where the municipal debt doubled between 2015 and 2018 and reached RUB 2.2 billion as a result of the urgent need to build social and engineering infrastructural facilities in Kuznechiki, a new residential area with 45 000 apartments built in 2010–2012 by the Ministry of Defense of the Russian Federation for military men. In particular, the local authorities had to use funds of the municipal budget to urgently tackle the difficulties with connecting the new houses to the utilities; the difficulties arose due to the construction of the second stage of Apartment Complex Kuznechiki-2 on the lands of a former military unit, which were not designed and prepared for housing construction.<sup>18</sup>

The debt standing of an UO depends, among other things, on the policy of municipal authorities for attracting various types of municipal borrowing.

The most widespread instrument used for borrowing by the UOs with over 100000 residents, as well as by all of the municipalities in the country, are commercial loans (bank loans). These loans were taken by 114 (or 89.1%) of the 128 considered municipal units that had municipal debt as of January 1, 2021 and for which the data on its structure were available (Fig. 4). Unlike budget loans, commercial loans can be taken by municipalities without any legislative restrictions, which makes commercial loans highly available; this type of loan prevails in most urban okrugs with the largest debt levels.

Commercial loan volumes and credit terms (interest rates, loan life) determine the level of annual fiscal expenses on municipal debt service ( $K_{correl}$  between the volume of commercial loans and debt service expendi-

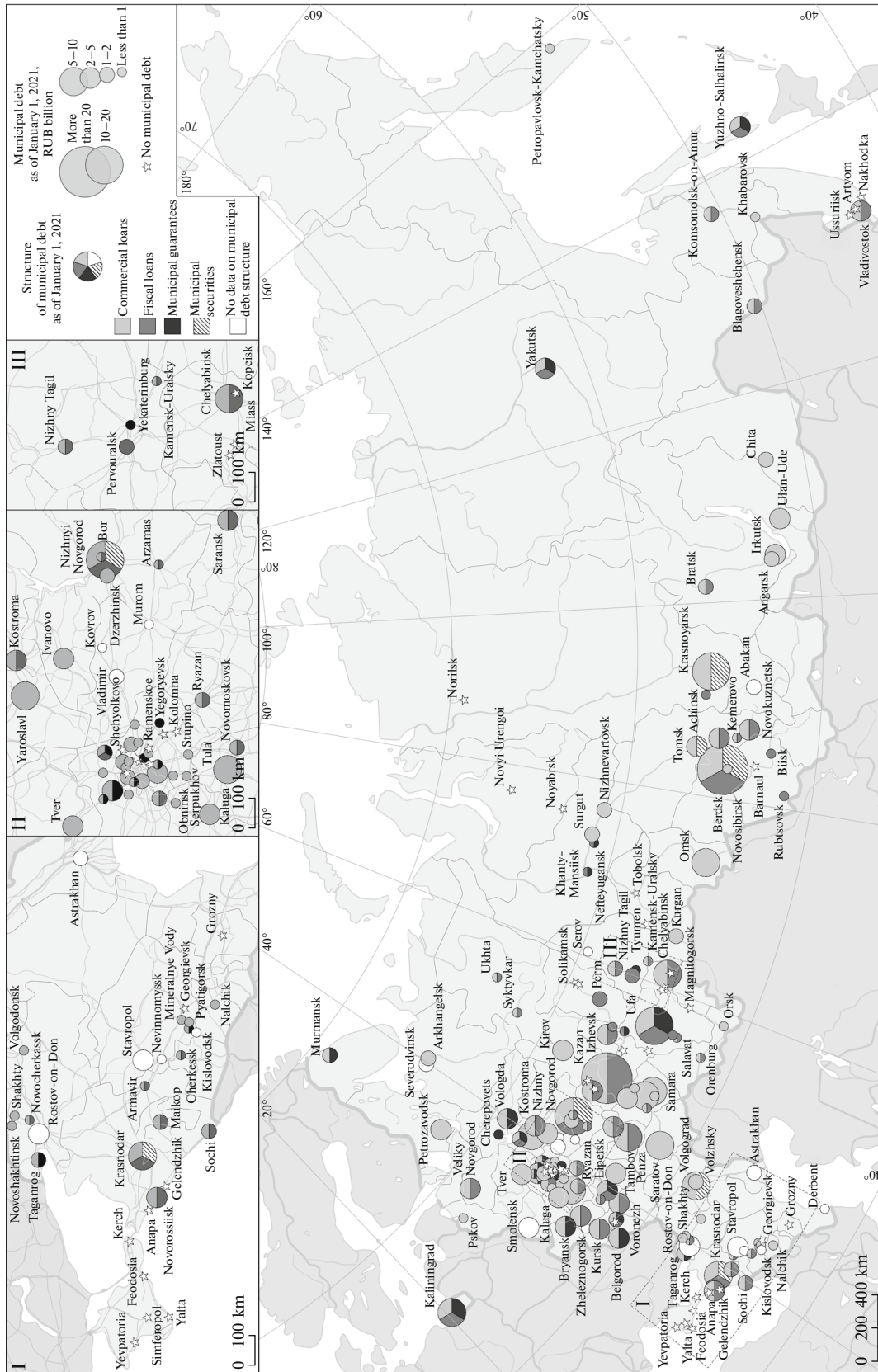
<sup>14</sup>In 2020 Rosneft allocated over RUB 900 million on socially significant projects for kids//LENTA.RU. [https://lenta.ru/news/2021/06/01/rsnft\\_deti/](https://lenta.ru/news/2021/06/01/rsnft_deti/). Accessed October 28, 2021.

<sup>15</sup>Palaces, Gardens, Hospitals: Rosneft invests in Social Facilities of Volga Federal District//REALNOYE VREMYA. <https://realnoevremya.ru/articles/91740-dvorcy-sady-i-bolnicy-rosneft-vlozhlis-v-socialnyu-infrastrukturu-pfo>. Accessed October 28, 2021.

<sup>16</sup>Gazprom Mining Noyabrsk. Social Responsibility. <https://noyabrsk-dobycha.gazprom.ru/social/>. Accessed October 28, 2021

<sup>17</sup>New Kindergartens Built with the Sponsorship of Norilsk Nickel Open in Norilsk. <https://www.nornickel.ru/news-and-media/press-releases-and-news/v-norilске-otkrylis-novye-detskie-sady-postroennye-na-sredstva-norilskogo-nikelya/>. Accessed October 28, 2021.

<sup>18</sup>Tragic Fate of Kuznechiki-2 Moscow-area Microdistrict//Rambling in Moscow. <https://zen.yandex.ru/media/pomoskve/pechalnaia-sudba-podmoskovnogo-mikroraiona-kuznechiki2-60a165d54b8d81065b72c867>. Accessed October 29, 2021.



**Fig. 4.** The structure of municipal debt of urban okrugs with over 100 000 residents as of January 1, 2021.

*Source:* Made on the basis of the data on the municipal debt of the studied urban okrugs. The names of the administrative centers of respective urban okrugs are underwritten.

tures is 0.92). In UOs with large amounts of accumulated commercial loans, annual debt repayment expenditures can reach 2.5% and more of all local fiscal expenditures (for example, these are the cases of Yaroslavl, Tula, Petrozavodsk, Omsk, etc.). For example, in 2020, the municipal debt servicing expenditures in Omsk were RUB 414.7 (!) million.

As of January 1, 2021, only 59 (46.1%) of the 128 considered UOs had budget loans. At the same time, there are no definite regularities in the distribution of budget loans among them. We cannot say that budget loans are received predominantly by regional capitals or, on the contrary, by noncapital centers of the regions. The regional centers account for half (29 out of 59) of the 59 UOs with budget loans as part of municipal debt.

The granting of budget loans to municipalities is regulated by the fiscal laws of the regions of the Russia (according to par. 2 of Clause 93.3 of the Budget Code of the Russia), which is the reason that the availability of budget loans in the studied UOs is determined to a large extent by the peculiarities of the regional budget policies. This can be seen on the sketch map (see Fig. 4): it is noticeable that in several Russian regions the granting of budget loans to UOs is more widespread than in others. For example, budget loans are present in the structure of debt of all of the UOs of Kemerovo oblast, in most of the examined UOs of Krasnodar and Altai krais, Nizhny Novgorod and Sverdlovsk oblasts, the Republic of Bashkortostan. On the contrary, there are only two UOs (Sergiev Posad and Naro-Fominsk) in Moscow oblast that use budget loans, only one such UO out of the considered five in Rostov oblast, and none in Stavropol krai.

In the debt of UOs with over 100000 residents municipal guarantees and securities are even rarer structural components than budget loans.

According to the collected data, at least 56 of the studied UOs had municipal guarantees in the structure of their municipal debt for the past 6 years, whereas only 25 of these UOs had municipal guarantees in the structure of their municipal debt as of January, 2021.

As shown by a study of information sources and expert interviews with representatives of local authorities, the municipalities provide guarantees primarily to utility suppliers (heat, gas, and electricity) for the payment of funds in the event of the insolvency of UOs that purchase these resources for supply to households and municipal organizations.<sup>19</sup> There are no geographic patterns in the distribution of municipal guarantees by UOs. It can be assumed that this instrument is most often used by the UOs in which the inability of

the population to pay for public utilities due to insolvency is an especially acute problem.

As of the end of 2020, municipal securities were issued only by six UOs with over 100000 residents. Unlike in other countries, where municipal bonds are the main borrowing instrument (due to their cheapness in comparison with commercial loans) (Nishatov, 2019) and are often aimed at raising additional funds for urban development projects, in Russia the market for local securities is undeveloped. All of the country's municipal securities are issued by the six mentioned UOs. At the same time, four of them used the issuing of bonds as an alternative way to cover the local fiscal gap. The exceptions are the urban okrugs of Tomsk and Novosibirsk, where bond-secured loans are issued to attract additional funds for developing the research and technology infrastructure on the territory of the modern Tomsk campus and Novosibirsk Akademgorodok.

The low occurrence of this type of borrowing in small towns and noncapital cities is also observed in most of European transition economies (Dept ..., 2007) (in particular, in the Czech Republic and Slovakia), where municipal bond issues are virtually inaccessible for small and medium-sized urban centers due to institutional barriers. In Russia, the low popularity of municipal bonds is most likely due to the weak issuing management expertise of local UO administrations and underdeveloped regional infrastructure for issuers, as well as by the high restrictions imposed on the issue of municipal securities by the Federal Law On Peculiarities of Issue and Circulation of Federal and Municipal Securities (in effect until 2019).<sup>20</sup>

## CONCLUSIONS

The conclusions derived from the study results are provided below.

(1) The debt burden of big and large Russian UOs is mostly determined by their population level. This regularity places Russia in the same niche as the countries of Eastern Europe and contradicts the trends observed in the most developed economies. The worst debt standing is characteristic of million-plus UOs and other big regional centers. In the context of their low endowment with transfers from superior budgets, the urban okrugs of these categories are the ones with a greater shortage of funds on supporting expenditure powers, which makes these UOs use the municipal debt procedures.

(2) The case of the UOs with over 100000 residents does not exhibit any strict dependence of their debt indicators on their fiscal and financial situation and the level of economic development. In most cases,

<sup>19</sup>Mikhailova, E.D., Municipal Guarantee Agreement: Legal and Practical Aspects, *Municipal Administration Practices*. <http://cmokhv.ru/materials/mat25042014/>. Accessed October 26, 2021.

<sup>20</sup>Latest Version of Federal Law 136-FZ on Peculiarities of Issuing and Circulation of Public and Municipal Securities of July 29, 1998. [https://www.consultant.ru/document/cons\\_doc\\_LAW\\_19702/](https://www.consultant.ru/document/cons_doc_LAW_19702/). Accessed September 26, 2021.

UOs with a developed economic sector and high tax revenues of their budgets have a better debt standing; however, this regularity is violated by other institutional factors. These include the peculiarities of the federal and regional fiscal policies, the social aid of big business agent, or the miscalculation of infrastructural supplies in designing new residential areas in UOs with an active migration gain.

(3) The distribution of expenditures on municipal debt servicing is primarily determined by the availability, volume, and terms of commercial loans. However, since the use of commercial loans is a popular practice among the UOs with over 100000 residents (89.1% of these UOs have such loans in their debt structure), the territorial distribution of the share of debt expenditures is generally consistent with the distribution of the debt burden index.

(4) Like fiscal finances, municipal debt is not currently a resource for urban development. In sporadic cases, municipal loans are used by the UOs with over 100000 residents to implement projects of improving living standards or accelerating economic growth. In almost all of the country's considered UOs such debt securities as fiscal loans and municipal bonds are used solely for attracting additional funds to cover fiscal gap.

As a whole, the study results form a negative development forecast for the big, large, and largest urban okrugs of Russia for the next several years. The market for municipal bonds and other new means of reducing the debt burden of the country's municipal units are undeveloped. In the context of the tightening fiscal legislation requirements on using debt securities introduced since 2022, a large number of UOs with over 100000 residents will have even more difficulties with attracting additional fiscal funds. This means that the country's key urban centers will have even fewer opportunities for accumulating money to form their development budgets.

The current debt situation in the Russian UOs with over 100000 residents suggests once again that the country's municipal units have suffered from a protracted crisis in their fiscal standing and experience issues with fiscal self-sufficiency. This is another proof of the acute need for reconsidering the fiscal policy and distribution of authority at the local level.

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#### CONFLICT OF INTEREST

The author declares no conflict of interest.

#### REFERENCES

- Benito, B. and Bastida, F., The determinants of the municipal debt policy in Spain, *J. Public Budgeting, Accounting & Fin. Manag.*, 2004, vol. 16, no. 4, pp. 492–525. <https://doi.org/10.1108/jpbafm-16-04-2004-b002>
- Bogatstvo i samostoyatel'nost': chto delaet byudzhet goroda us-toichivym* (Wealth and Independence: What Makes the City Budget Sustainable), Moscow: STRELKA KB, 2017.
- Brik, A.D. and Plokhotnikova, G.V., Managing the debt burden of the municipalities of the Russian Federation: Economic and legal analysis, *Vestn. Inst. Druzhby Narodov Kavkaza (Teor. Ekon. Upravl. Narodnym Khoz-vom)*, *Ekon. Nauki*, 2020, vol. 53, no. 1, pp. 63–68.
- Cropf, R.A. and Wendel, G.D., The determinants of municipal debt policy: A pooled time-series analysis, *Environ. Planning C: Government and Policy*, 1998, vol. 16, no. 2, pp. 211–224. <https://doi.org/10.1068/c160211>
- Didenko, A.N., Development budgets – the basis for the growth of socio-economic development of the Russian Federation, its federal subjects and municipalities, *Mestnoe Pravo*, 2021, no. 2, pp. 63–72.
- D'yakova, E.B. and Perekrestova, L.V., Directions for the development of the financial and budgetary potential of Volgograd, *Vestn. Volgograd. Gos. Univ. Ser. 3: Ekon. Ekol.*, 2008, vol. 13, no. 2, pp. 176–184.
- Farnham, P.G., Re-examining local debt limits: A disaggregated analysis, *South. Econ. J.*, 1985, vol. 51, no. 4, pp. 1186–1201. <https://doi.org/10.2307/1058388>
- Feld, L.P., Kirchgässner, G., and Schaltegger, C.A., Municipal debt in Switzerland: New empirical results, *Public Choice*, 2011, vol. 149, no. 1, pp. 49–64. <https://doi.org/10.1007/s11127-011-9828-5>
- Fernández, P.E. and Jiménez, D.P., Análisis del endeudamiento y efectos de su control en las corporaciones locales, *IX encuentro de economía pública, hacienda y medio ambiente*, Vigo, 2002, p. 71–90.
- Gafurova, G.T., Assessment of the municipal debt of the city of Kazan, *Fin. Anal.: Probl. Resheniya*, 2012, vol. 117, no. 27, pp. 24–32.
- Ivan'kova, E.N., Kovaleva, Yu.D., and Pavlova, I.V., Assessment of municipal debt on the example of the city of Smolensk, in *Aktual'nye problemy ekonomiki, ucheta, audita i analiza v sovremennykh usloviyakh: Sb. nauchn. rabot studentov, aspirantov i prof.-prep. sostava po itogam Natsional'noi nauchn.-prakt. konf.* (Actual Problems of Economics, Accounting, Audit and Analysis in Modern Conditions: Coll. of Sci. Papers of Students, Graduate Students and Teaching Staff Based on the Results of the National Sci. and Pract. Conf.) (Moscow, 2019), Petrovskaya, M.V., Chaplyuk, V.Z., Sorokina, L.N.,

- Eds., Moscow: Nauchnyi Konsul'tant, 2019, pp. 321–326.
- Kiewiet, D.R. and Szakaty, K., Constitutional limitations on borrowing: An analysis of state bonded indebtedness, *J. Law, Econ., Organization*, 1996, vol. 12, no. 1, pp. 62–97.  
<https://doi.org/10.1093/oxfordjournals.jleo.a023362>
- Komarevtseva, O.O., Management of municipal debt changes through the mechanism of building a multiplicative model, *Vestn. Mosk. Gor. Ped. Univ. Ser.: Ekon.*, 2017, vol. 12, no. 2, pp. 85–91.
- Kuznetsova, O.V., Budget possibilities of cities with a population of over one million in Russia as a factor in their socio-economic development, *Vestn. Mosk. Univ. Ser. 5. Geogr.*, 2018, no. 4, pp. 75–82.
- Kuznetsova, O.V., Contrasts in budgetary opportunities in city-regions and city-municipalities in Russia and the experience of Germany, *Reg. Res. Russ.*, 2020, vol. 10, no. 3, pp. 522–529.  
<https://doi.org/10.1134/S2079970520040152>
- Leksin, V.N. and Shvetsov, A.N., *Munitsipal'naya Rossiya: Sotsial'no-ekonomicheskaya situatsiya, pravo, statistika (entsiklopedicheskii spravochnik)* (Municipal Russia: Socio-Economic Situation, Law, Statistics (Encyclopedic Reference Book)), Moscow: Editorial URSS, 2001.
- Mamedov, A.A. and Avksent'ev, N.A., Regional and municipal debt of the constituent entities of the Russian Federation: Retrospective analysis and prospects, *Nauchno-Issled. Fin. Inst. Fin. Zh.*, 2014, vol. 22, no. 4, pp. 66–80.
- Mestnoe samoupravlenie v Rossii: sostoyanie, problemy, puti sovershenstvovaniya. Itogovyi doklad* (Local Self-Government in Russia: State, Problems, Ways of Improvement. Final Report), Moscow: Ekon-Inform, 2009.
- Nishatov, N.P., *Rynok gosudarstvennykh i munitsipal'nykh tsennyykh bumag: ucheb. posobie* (Market of State and Municipal Securities: Textbook), Moscow: Tsentrkatalog, 2019.
- Pechenskaya, M.A., Modern problems of budgetary development of regional centers, *Aktual. Probl. Ekon. Prava*, 2020, vol. 14, no. 1, pp. 40–56.  
<https://doi.org/10.21202/1993-047X.14.2020.1.40-56>
- Pechenskaya-Polishchuk, M.A., Trends in attracting resources to the budgets of regional centers, *J. New Econ.*, 2021, no. 1, pp. 90–104.  
<https://doi.org/10.29141/2658-5081-2021-22-1-5>
- Povarova, A.I., Debt problems of municipalities (on the example of urban districts of the Vologda region), *Vopr. Territor. Razvitiya*, 2015, vol. 27, no. 7, pp. 1–11.
- Problemy reformy mestnogo samoupravleniya: strukturnye i finansovye aspekty* (Problems of Local Self-Government Reform: Structural and Financial Aspects), Moscow: Inst. Ekon. Perekhod. Perioda, 2005.
- Ribeiro, N.A., Jorge, S.M., and Nogueira, S.P., A new approach to determinant factors of local government debt, *34th IBIMA Conference International Business Information Management Association. Vision 2025: Education Excellence and Management of Innovations Through Sustainable Economic Competitive Advantage*, Madrid: International Business Information Management Association, 2019, pp. 6475–6491.
- Sarkisyan, A.R., Yanchenko, D.V., Yanchenko, E.A., Abramenko, I.P., Vectors of optimizing the credit load of the constituent entities of the Russian Federation and municipalities, *Upravl. Ekon. Sist.: Elektron. Nauchn. Zh.*, 2019, no. 11, pp. 1–9.
- Sedmíhradská, L. and Šimíková, I., Municipal debt in the Czech Republic, in *Debt Management in Transition Countries: Experience and Perspectives*, Bratislava: NIS-PAce, 2007, pp. 43–59.
- Sumskaya, T.V., *Mestnoe samoupravlenie: evolyutsiya byudzhethnoi politiki* (Local Self-Government: The Evolution of Budget Policy), Novosibirsk: Inst. Ekon. Organizatsii Prom. Proizvodstva Sib. Otdel. Ross. Akad. Nauk, 2016.
- Vera, J.O., Explanatory factors and limitations of Spanish local debt, *Academia Revista Latinoamericana de Administracion*, 2018, vol. 31, no. 2, pp. 360–377.  
<https://doi.org/10.1108/ARLA-12-2015-0330>
- Vllasaliya, E., Factors affecting municipal debt, *Master thesis within Economics*, Jönköping: Jönköping International Business School, Jönköping Univ., 2013.
- Wichowska, A., Determinants of debt in rural municipalities on the example of the Warmińsko-Mazurskie Voivodeship, *Acta Scientiarum Polonorum. Oeconomia*, 2019, vol. 18, no. 4, pp. 121–130.  
<https://doi.org/10.22630/ASPE.2019.18.4.52>
- Yagovkina, V.A. and Nedopivtseva, D.A., Local self-government in a crisis: A budgetary aspect, *Munitsipal'noe Imushchestvo: Ekon., Pravo, Upravl.*, 2017, no. 1, pp. 29–35.
- Yartseva, I.Yu., Efficient debt management: Reality or necessity, *Probl. Ucheta i Finansov*, 2014, vol. 16, no. 4, pp. 3–6.

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