

EVALUATION OF BUDGET ASPECTS OF FUNCTIONING OF MUNICIPALITIES (THE CASE OF MUNICIPALITIES OF THE NOVOSIBIRSK OBLAST)¹

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In this paper we identify the conditions of formation of the financial base of local self-government, the technique of analysis of the structure, stability of budgets and efficiency of sub-federal budget policy, calculations are carried out on materials of Novosibirsk oblast for the period 2006–2012 years. The structure of the local budgets of Novosibirsk oblast is evaluated, the characteristics of heterogeneity of budget indicators before and after the transfer of funds from the regional budget are calculated. The dependence between transfers and tax and nontax revenues is analyzed; marginal effect of increasing the taxes paid to local budgets is calculated.

TERRITORIAL BUDGET AS THE TOOL FOR REGIONAL ECONOMIC MANAGEMENT

Fiscal policy is a prerequisite for the formation of a single economic space, overcoming the excessive differences in socio-economic development of regions and municipalities. At the regional level, the importance of the budget is primarily determined by its ability to finance the development of social and infrastructural arrangement of the territory, to stimulate industrial activity, to ensure the relative economic independence of regional economic system. Thus, the budget is the most important form of direct exposure to the controls on the processes occurring in the territory. Regional budget is the main source of funding for operating costs of the regional economy and the social sphere. It plays a crucial role in the financing of economic and social programs and investment projects. An important form of territorial impact of the budget is the placement of orders for enterprises in the region for region-wide needs as well as the provision of subsidies to individual enterprises. The budget serves as a multiplier of certain revenues to the territory of the other (non-budgetary) resources. Here we can distinguish equity financing, indirect multiplicative effect, investment in territorial infrastructure, entailing an increase in the flow of financial resources to the territory. Framework for fiscal policy in any country with a federative structure is organized system of intergovernmental fiscal relations.

The practice of management of the public finances in a country with few budgetary levels is called fiscal federalism. There are several models of fiscal federalism, which are based on the principle of decentralization. It is reflected in the form of government, the structure of the federal, regional and municipal law, in patterns of distribution of powers

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between different levels of government and in building unified, but multilevel fiscal systems. At the present stage we can highlight the following points of interest for Russia:

- clear lines of budget authority, the relative autonomy of regional and local authorities, provided by guidance on general standards, the lack of authority at lower levels, not provided by adequate financial resources;
- distribution of revenues should take into account the overall expenditures of the territorial authorities and their fiscal capacity;
- financial assistance to territories should be provided according to normative expenditures and tax potential of the regions;
- members of the Federation and municipalities must each have at least one major tax, which is entirely at their disposal;
- a number of federal taxes (such as personal income tax, corporate income tax) should be divided between the levels of the budget system using either method of addition of rates or stable norms;
- A number of indirect federal taxes (such as VAT, excises), it is advisable to enroll in the federal budget, followed by partial redistribution between areas within established schemes of leveling;
- fiscal policy of all the subjects of the Federation should be based on uniform principles of intergovernmental fiscal relations;
- federal laws should ensure the financial autonomy of local authorities.

The development of intergovernmental fiscal relations in Russia in recent years goes in the direction of strengthening the formalization of the process of distribution of federal financial assistance. It also seeks to eliminate the asymmetry in the fiscal status of the subjects of intergovernmental fiscal relations at various levels. In this case, one has not been able to reach the desired hardness of budget constraints for the authorities of subjects of the Federation, to establish control over the efficient use of resources at the regional level, as well as to achieve the required growth formalization of intergovernmental fiscal relations.

At present, fiscal regulation in Russia is overcentralized; therefore, many municipalities cannot function autonomously and sustainably, as local taxes and other local revenues make up less than 20% of their budgets. The decrease in the share of local budget revenues in the consolidated budget of the Russian Federation, given the growth of the proportion of their expenditures, will lead to an excessive reduction in capital costs compared to the operating costs and, hence, the underfunding of investment expenditures. These problems cannot be solved without consolidating the municipal budget's local revenue base.

Russian municipalities differ noticeably in both the actual tax revenues and tax potential. In this respect, we can single out a group of municipal entities, e.g., the capital cities of oblasts and republics, i.e., centers of constituent entities whose financial statuses differ greatly from those of other Russian municipalities. The local self-government bodies of the constituent entities administrative centers, as a rule, have budgets comparable to those of the constituent entity itself (excluding the municipal budgets). We have selected the Novosibirsk oblast as a research target, as it can be classified among the abovementioned group of Russian constituent entities. An analysis was conducted based on the data on the municipal districts (administrative territorial units comprising several small settlements) (30) and towns (cities) subordinate to the authorities of the Novosibirsk oblast (5).

SPECIFIC FEATURES OF REVENUE GENERATION IN THE BUDGETS OF MUNICIPALITIES OF THE NOVOSIBIRSK OBLAST

The main revenues of local budgets are tax, non-tax revenues and grants from regional budget. Besides, it is only the tax revenues connected with economic potential of the given territory that can be regarded as a stable revenue base for the budgets of local self-government bodies. The nontax revenues are to a large extent either temporary, or instable. Apart from tax, nontax revenues, and grants, the local budget revenue pattern included revenues from entrepreneurial activity. Their share in the aggregate revenues of all the oblast municipalities was, on average, in 2006–2011 1–2%, in 2012 it dropped to 0.5%.

To estimate the level of autonomy of local budgets, we have analyzed the distribution of the municipalities based on the share of collected (tax and nontax) revenues in the aggregate revenues of the local budgets in 2006–2012. The calculations results are presented in Table 1.

Table 1

Distribution of the municipalities of the Novosibirsk oblast by the share of collected revenues*

Share of collected (tax and nontax) revenues, %	Number of municipalities in the group						
	2006	2007	2008	2009	2010	2011	2012
0–10	9	17	12	9	13	14	14
10–20	18	10	10	13	12	11	11
20–30	3	5	7	5	4	5	4
30–40	3	1	3	5	3	2	1
40–50		1	1		1		3
50–60	1		1	2	1		
60–70		1	1	1	1	2	2
70–80	1					1	
80 or more							

* The empty cell in this and the following tables means that none of the municipalities under study fell in the given group.

As can be seen, the proportion of collected revenues for the majority of municipalities of the Novosibirsk oblast was in 2006–2012 within the limits of 20%, and more than one third of municipalities in 2007, 2008, 2010–2012, i.e. five years of the seven-year period under review, the share of tax and nontax revenues was less than 10%. Thus, the situation has worsened compared to the end of 90th – beginning of the 2000s, when the share of this type of revenues for most municipalities of the Novosibirsk oblast was in the limits of 20–40% [1].

It is noteworthy that, over the period under study, in the Novosibirsk oblast, the proportion of collected revenues was more than 30% for a very small number of municipalities: 3 – in 2007, 5 – in 2006 and 2011, 6 – in 2008, 2010 and 2012, 8 – in 2009. This is explained by the fact that most of the territories in Novosibirsk oblast (except for a number of urban settlements subordinate to the oblast) have rural specialization. Over 50% of collected revenues for the entire period were considered only in the city of Novosibirsk. In 2006, 2008–2012 more than half of aggregate budget revenues were also collected revenues in the town of Ob. In 2009 and 2011 to the category of such municipalities concerned also science town Koltsovo.

One of the weaknesses of the system of intergovernmental fiscal relations at the level of the subject of Federation is a high degree of centralization of budget revenues on sub-federal level, bias in favor of grants in the structure of municipal budget revenues. To test this assertion, consider the distribution of the share of grants in the aggregate budget revenues of municipalities in the Novosibirsk oblast (Table 2).

Table 2

Distribution of the municipalities of the Novosibirsk oblast by the share of grants in their budgets

Share of grants, %	Number of municipalities in the group						
	2006	2007	2008	2009	2010	2011	2012
0–20	0	0	0	0	0	0	0
20–30	1	0	0	0	0	1	1
30–40	1	1	2	3	1	2	2
40–50	0	0	0	0	3	1	0
50–60	0	1	2	1	1	0	3
60–70	3	3	2	4	2	2	1
70–80	5	4	7	5	4	6	4
80–90	19	14	12	13	12	9	11
90 or more	6	12	10	9	12	14	14

It follows from Table 2 that, in the majority of municipalities of the Novosibirsk oblast, grants make up more than 70% of budget revenues, and consistently high throughout the period considered is the number of territories for which the share of grants exceeds 90%. In the structure of grants a high proportion of subventions and subsidies from the upper-level budget, which is caused by the transfer of the powers and financial resources from the regional to the local level.

The situation is even worse if we consider the level of settlements. Distribution of 26 urban and 429 rural settlements of the Novosibirsk oblast by the share of major groups of revenues in the aggregate budget revenue is presented in Tables 3 and 4.

Table 3

Distribution of settlements of the Novosibirsk oblast according to the share of tax and nontax revenues in the aggregate budget revenue

Share of tax and nontax revenues	The proportion of urban settlements with the appropriate share of tax and nontax revenues						
	2006	2007	2008	2009	2010	2011	2012
50% or more	19,23	38,46	42,31	46,15	23,08	15,38	3,85
60% or more	7,69	19,23	23,08	26,92	15,38	11,54	3,85
70% or more	3,85	7,69	7,69	23,08	7,69	3,85	3,85
80% or more	3,85	0	3,85	11,54	3,85	0	3,85
90% or more	0	0	0	7,69	0	0	0
Share of tax and nontax revenues	The proportion of rural settlements with the appropriate share of tax and nontax revenues						
	2006	2007	2008	2009	2010	2011	2012
50% or more	5,83	4,43	4,66	6,29	5,13	3,50	2,56
60% or more	4,20	2,10	2,80	3,26	3,50	2,80	1,86
70% or more	3,03	1,63	1,86	2,56	2,80	1,63	0,47
80% or more	2,33	0,47	1,40	0,93	2,10	1,17	0,23
90% or more	1,63	0	0,70	0,93	0,47	0	0,23

One can notice, that the proportion of urban settlements, for which the share of tax and nontax revenues is more than half of aggregate budget revenues increased from 2006 to 2009 from 19.23% to 46.15%, and then began to decline sharply, reaching in 2012 the level of 3.85%. The proportion of rural settlements with the corresponding share of tax and non-tax revenues was in the period under consideration at a very low level (maximum was achieved in 2009 and it was just 6.29%).

Table 4

Distribution of settlements of the Novosibirsk oblast according to the share of grants in the aggregate budget revenue

Share of grants	The proportion of urban settlements with the appropriate share of grants						
	2006	2007	2008	2009	2010	2011	2012
50% or more	80,77	61,54	57,69	53,85	76,92	84,62	96,15
60% or more	65,38	50,00	34,62	42,31	73,08	73,08	88,46
70% or more	42,31	34,62	19,23	23,08	61,54	61,54	65,38
80% or more	15,38	7,69	7,69	11,54	30,77	34,62	38,46
90% or more	0	0	3,85	3,85	3,85	0	0
Share of grants	The proportion of rural settlements with the appropriate share of grants						
	2006	2007	2008	2009	2010	2011	2012
50% or more	94,17	95,57	95,34	93,71	94,87	96,50	97,44
60% or more	90,21	93,71	90,21	90,68	92,77	94,87	94,41
70% or more	84,15	85,55	83,92	85,31	89,28	91,38	91,84
80% or more	66,90	72,49	76,92	74,83	78,09	84,15	85,78
90% or more	32,40	44,52	47,55	44,06	44,99	56,88	56,41

The situation is exactly the opposite, if we consider the share of grants in the aggregate revenues of urban and rural settlements of the Novosibirsk oblast. As is shown in Table 4, the proportion of urban settlements in whose budgets grants accounted for more than half of the aggregate revenue was in the period under review at a high level, and in 2012 it amounted to more than 96%. The corresponding proportion of rural settlements exceeded 90% level during the period under review. In addition, the rising trend is shown by the proportion of settlements, in which the share of grants is over 90% of aggregate budget revenues. It increased during the period from 32.40% in 2006 to 56.41% in 2012.

INHOMOGENEITY CHARACTERISTICS OF THE FISCAL CAPACITY OF MUNICIPALITIES IN THE NOVOSIBIRSK OBLAST

When comparing budgets of the same level, it is important to assess the expediency of concentrating resources from the standpoint of equalizing the municipalities' fiscal capacity and the levels of socio-economic development of the municipalities. This comparison can be conducted by using the per-capita inhomogeneity characteristics of the fiscal capacity before and after the municipal budgets were given grants from upper-level budgets. We propose to use variation indicators as characteristics of inhomogeneity, i.e., the range of asymmetry, scatter, excess of scatter, standard deviation, and variation coefficient [2].

With increasing homogeneity of the fiscal capacity in the sample, the variation indicators should go down. In our work we assessed the above indicators for the per capita collected and disposable budget revenues of municipalities of the Novosibirsk oblast, i.e., revenues that exclude grants to local budgets from the oblast budget and revenues that include these grants (Table 5).

Table 5

Inhomogeneity of per-capita budget revenues

Indicator	Collected revenue						
	2006	2007	2008	2009	2010	2011	2012
Range of asymmetry	29,42	49,55	40,59	19,36	8,34	12,22	5,08
Scatter	1075	2293	2626	2209	1915	2571	2244
Excess of scatter	1,406	1,851	1,747	1,273	1,128	1,325	1,254
Standard deviation	1702	3286	3868	3297	2598	4357	3182
Variation coefficient, %	92,31	102,94	98,52	78,13	57,71	84,76	57,17
	Disposable revenue						
	2006	2007	2008	2009	2010	2011	2012
Range of asymmetry	13,59	19,70	13,07	14,21	6,13	4,00	4,15
Scatter	3098	2629	6219	6734	9461	7874	8742
Excess of scatter	1,009	1,112	1,129	1,113	1,124	1,000	1,038
Standard deviation	4493	10297	10217	9955	12219	11285	11954
Variation coefficient, %	41,67	53,03	46,82	44,99	39,17	33,39	32,13

It follows from the data in Table 5 that the range of asymmetry between the municipalities in the Novosibirsk oblast after grant transfers from the oblast budget was decreasing in 2006–2012. The most significant reduction was observed in 2008 and 2011. The scatter of the municipalities based on the indicators of collected and disposable revenues, in general, increases over the period under study.

The excess of scatter is greater than one in all of the explored cases. This is indicative that half of the municipalities with lower values of the indicators under study (i.e. collected and disposable budget revenues) are close to one another in these indicators than the other half of the municipalities. Otherwise, the excess of scatter would be less than 1.

The growth of the standard deviation of disposable revenue as compared to the standard deviation of the collected revenue is explained by the increase in the average level of the varied indicator. This effect occurs if the growth rate affects most of the elements of the sample. Because in Novosibirsk oblast all the municipalities get financial aid from the regional budget, then this result is easily explained. If grants from the regional budget should be addressed only to pull the budgets of low-income to middle-level, the standard deviation would be reduced. But due to the high centralization of financial resources on a regional level, some grants are not coupled with function of leveling of development, so it is necessary to eliminate this part of the financial flows, i.e. to estimate the change in inhomogeneity with regard to the increase in the average value of local budgets' revenues. As such indicator the variation coefficient by the standard deviation was used.

As seen in Table 5, the indicator of disposable revenues has a lower variation coefficient, i.e., the inhomogeneity of the municipalities' fiscal capacity after grant transfer from the oblast budget is 1.5–2.5 times.

To determine which municipality groups experienced losses as a result of changes in the aggregate scatter indicators, we need to consider the changes in the distribution of territories based on the level of budget income as a result of money transfer from upper-level budgets. Tables 6–7 present the distribution of municipalities by the level of collected and disposable budget revenues per capita. Tables 8–9 show the same but centered values (the difference with the average for the region level).

Table 6

**Distribution of municipalities of the Novosibirsk oblast
by the level of collected revenues**

Per-capita revenue, thousand rubles	Number of municipalities in the group						
	2006	2007	2008	2009	2010	2011	2012
0–1	7	6	1	1			
1–4	25	22	23	19	18	19	13
4–7	2	2	7	10	14	10	16
7–10	1	2		2		3	3
10–13		2	1	2	3	1	
13 or more		1	3	1		2	3

Table 7

**Distribution of municipalities of the Novosibirsk oblast
by the level of disposable revenues**

Per-capita revenue, thousand rubles	Number of municipalities in the group						
	2006	2007	2008	2009	2010	2011	2012
0–2	1						
2–10	14	5	1	1			
10–18	18	14	14	10	3	2	1
18–26	2	11	13	12	11	7	4
26–34		1	6	9	10	9	11
34–42		3		2	4	12	11
42–50					4	2	5
50–58		1			2	1	
58–66				1	1	1	1
66 or more			1			1	2

Table 8

**Distribution of municipalities of the Novosibirsk oblast by level of centered indicators
of collected revenue**

Per-capita revenue, thousand rubles	Number of municipalities in the group						
	2006	2007	2008	2009	2010	2011	2012
Less than –2		6	9	11	8	13	10
–2 – –1	5	15	14	55	8	7	10
–1–0	20	3	1	4	4	4	6
1–2	7	6	7	10	12	5	4
2–4	1			1		3	1
4–6	1	2		1	1	1	1
6–8	1	1	1	2	2		
8 or more		2	3	1	1	2	3

Table 9

**Distribution of municipalities of the Novosibirsk oblast by level of centered indicators
of disposable revenue**

Per-capita revenue, thousand rubles	Number of municipalities in the group						
	2006	2007	2008	2009	2010	2011	2012
Less than –15		1	1	1	2	3	3
–15– –10		4	0	1	4	4	4
10– –5	4	3	7	8	8	4	5
–5–0	15	16	14	12	6	6	8
0–5	14	5	7	7	6	10	7
5–10	0	2	5	3	1	3	2
10–15	2			2	4	2	3
15–20		3			1	1	
20–25					1		1
25–30					1	1	
30 or more		1	1	1	1	1	2

The data in Tables 6–7 show that after the grant transfers to municipalities of the Novosibirsk oblast from the regional (oblast) budget, there is sharp growth in the per-capita budget-revenue indicator by territory.

If, before the transfers from oblast budget, the modal interval was from 0 to 4 thousand rubles in 2006 and from 1 to 7 thousand rubles of per-capita budget revenues in 2007–2012 (the vast majority of municipalities fall within a given interval), after the distribution of grants from the upper-level budget per-capita revenues increase dramatically. This situation is explained by the relatively high concentration of financial resources at the regional (oblast) level and, as a consequence, the acute shortage of locally collected budget resources in the municipalities of the Novosibirsk oblast. In 2006, in only seven municipalities disposable revenues per capita were less than 8 thousand rubles. In 2007, the disposable revenues of the five municipalities accounted for less than 10 thousand rubles; in 2008 and 2009 only in one municipality disposable budget revenues per capita was less than 10 thousand rubles. In 2010–2012 per-capita disposable revenues of all municipalities of the Novosibirsk oblast accounted for more than 10 thousand rubles. Modal interval for per-capita budget revenues with grants in 2006 was the interval from 2 to 18 thousand rubles, in 2007–2009 – from 10 to 24 thousand rubles, in 2010–2012 4 from 18 to 42 thousand rubles. This indicates a significant increase in absolute and relative size of fiscal regulation resources in the municipal revenues in the Novosibirsk oblast.

To exclude the effect of changes in the average level of budget revenues and assess the changes in their distribution with regard to the increased fiscal capacity standard, we have calculated centered values of the collected and disposable budget revenues.

If we take into account that all the municipalities of the Novosibirsk oblast are recipients of regional grants, which results in growth in the average level of fiscal capacity, then the outcomes of the oblast's fiscal policy appear to be less effective. The data in Tables 8–9 show that there is an increase in both the number of urban settlements and municipal districts with below average budget revenues and the number of municipalities with the highest revenues.

To assess the increase or decrease in the cross-territory differentiation by the level of collected and disposable budget revenues one can use the funds coefficient and Gini index calculated by Lorenz curve [3].

The funds coefficient, or income differentiation coefficient, is determined as the ratio of income received by 10% of the highest-income territories to the income of 10% of the lowest-income territories. Such comparison shows how many times the first group have revenues higher than the second. The dynamics of the funds coefficient is also informative,

as it illustrates a decrease or increase in the municipalities' differentiation. When analyzing the budgets of municipalities funds coefficient was calculated for collected and disposable budget revenues in dynamics.

The Gini index shows the concentration of income by groups of territories, which gives one an idea of the territories for whom the distribution mechanism works in their favor; the incomes are either distributed relatively evenly among the territories or the main benefit goes to a small group of territories, where the concentration of income is pronounced.

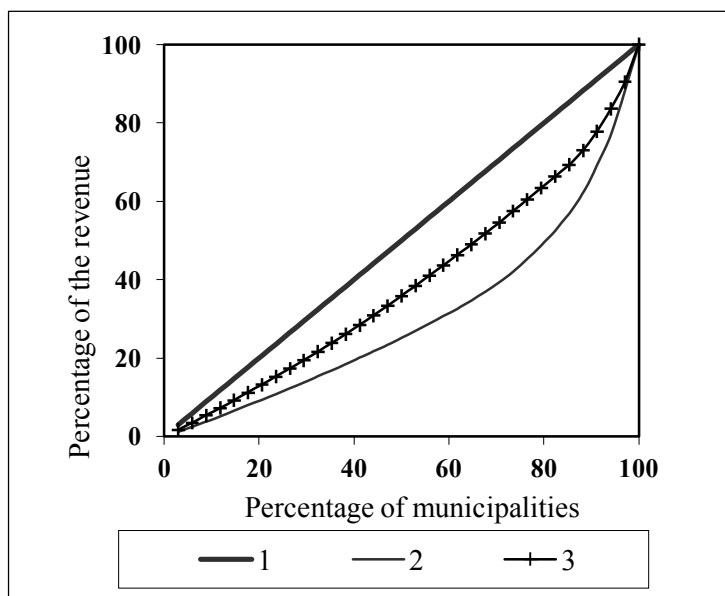


Fig. 1. Graphical representation of the Lorenz curves

Geometric interpretation of the Gini index (Figure 1) is area of the figure «crescent», which is limited by the top line of uniform distribution of revenue (line 1), and the bottom by the Lorenz curve (curves 2 or 3). The index is calculated as a percentage Gini area ratio of this figure to the area of an isosceles triangle with the length of the cathetus of 100 and apexes (0, 0), (0, 100), (100, 100). Accordingly, the greater is the value of the Gini index, the greater the disparity between the territories. The dynamics of the Gini index indicates the direction of change in inequality over time. With the reduction of inequality, the Lorenz curve is shifted from «2» to «3», approaching the curve of absolute equality «1».

Gini index (G) is calculated by the following formula:

$$G = \left[1 - 2 \cdot \sum_{i=1}^{N-1} (X_{i+1} - X_i) \cdot (Y_{i+1} + Y_i) : 2 \right] \cdot 100\%,$$

where N – number of segments that are broken abscissa and the ordinate axis (respectively, the number of points on which we construct the Lorenz curve would be equivalent to the value of N + 1).

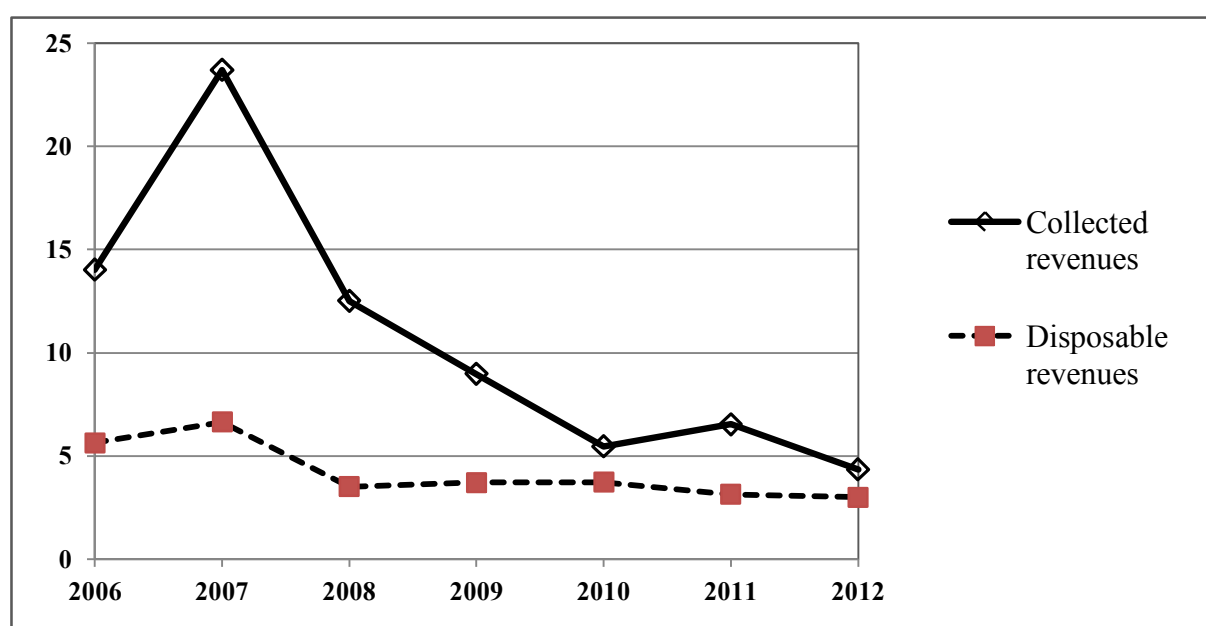
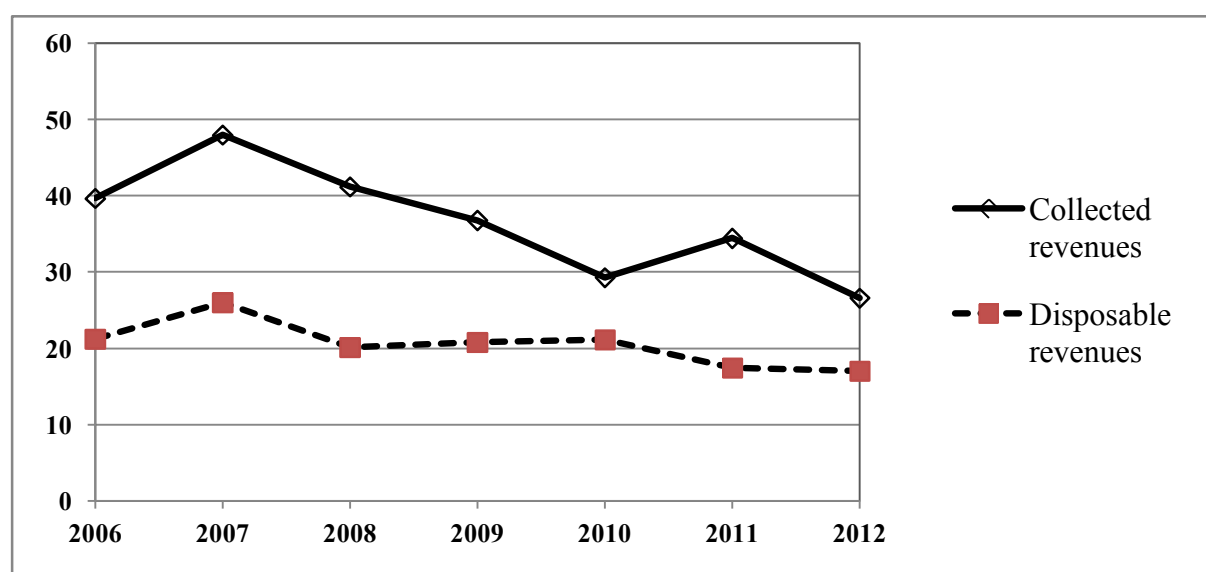
Located in the sum expression $(X_{i+1} - X_i) \cdot (Y_{i+1} + Y_i) : 2$ represents the area of a trapezoid, the sides of which form the Lorenz curve's segments above and below the x-axis, Y_i and Y_{i+1} – the length of the bases of the trapezoid, and the height of the trapezoid is $(X_{i+1} - X_i)$.

Values of the funds coefficient and Gini index calculated for the collected and disposable budget revenues of municipalities of the Novosibirsk oblast are shown in Table 10, graphic interpretation of these indicators is shown in Figures 2 and 3.

Table 10

Funds coefficient and the Gini index calculated for municipalities of the Novosibirsk oblast

Years	Funds coefficient		Gini index	
	Collected revenue	Disposable revenue	Collected revenue	Disposable revenue
2006	14,02	5,63	39,69	21,23
2007	23,69	6,64	47,97	26,03
2008	12,51	3,51	41,20	20,17
2009	8,98	3,70	36,79	20,78
2010	5,46	3,73	29,32	21,13
2011	6,53	3,14	34,45	17,48
2012	4,35	2,99	26,62	17,04

*Fig. 2.* Graphical interpretation of the dynamics of the funds coefficient*Fig. 3.* Graphical interpretation of the dynamics of the Gini index

ASSESSMENT OF THE FISCAL POLICY ON THE ECONOMIC DEVELOPMENT OF MUNICIPALITIES OF THE NOVOSIBIRSK OBLAST

In order to assess how well the current system of intergovernmental fiscal relations cope with its functions, (in particular the alignment of budgetary security differentiation of municipalities and encouraging municipalities to strengthen their own revenue base), you can use methods of regression analysis and ranking of municipalities in terms of collected and disposable budget revenues. With this interest are not the ranks, but changing them in the process of budgetary control, i.e. the extent to which these ranks are changed after receiving of intergovernmental grants from upper-level budget. This change can be estimated by calculating the Spearman and Kendall correlation coefficients. Obviously, the normal system of budgetary control should not allow ill-founded and abrupt changes in the ranks of the territories, i.e. correlation coefficients should be close to 1.

Spearman's rank correlation method allows determining the closeness (strength) and direction of correlation between the two signs. Each value of the two study data sets assigned rank. On the basis of their ranks are calculated difference d and Spearman correlation coefficient is calculated by the following formula:

$$\rho = 1 - \frac{6 \sum d^2}{n(n^2 - 1)},$$

where $\sum d^2$ – the sum of the squares of the differences between ranks, and n – the number of paired observations.

When using the rank correlation coefficient conditionally evaluate closeness of the relationship between signs, considering the coefficient equal to 0,3 and less weak closeness of the connection parameters, values greater than 0,4 but less than 0,7 – moderate closeness of the connection parameters, and values of 0,7 and more – high performance closeness of the connection.

Kendall's rank correlation coefficient determines the extent to which the ordering of all pairs of objects in two variables and is used to identify the relationship between quantitative and qualitative indicators, if they can be ranked. This ratio is preferable to calculate in the case of outliers.

Values of the first indicator (X) are ranked in ascending order and assign them grades. Then, the values of second indicator (Y) are ranked and Kendall's correlation coefficient is calculated by the following formula:

$$\tau = \frac{2S}{n(n-1)},$$

where $S = P - Q$.

P – the total number of observations following the current observations with a large value of ranks Y .

Q – the total number of observations following the current observations with a lower value of ranks Y .

Values of Spearman's and Kendall's rank correlation coefficients calculated for series of collected and disposable budget revenues of municipalities of the Novosibirsk oblast for the period 2006–2012 years are presented in Table 11.

As the calculations in 2006, 2007, 2011 and 2012 showed a moderate correlation between the ranks of collected and disposable revenues of municipalities' budget in the region. In 2010, the relationship was weak. Calculations for the periods 2008 and 2009 found no statistically significant relationship between the ranks of collected and disposable budget revenues. Importantly, in 2006 and 2007 the relationship of analyzed signs carried upright

character, but in the case of 2010–2012 relationship was reversed, i.e. municipalities with large values of collected (tax and non-tax) budget revenues had lower values of disposable revenues, i.e. revenues taking into account the grants. This fact indicates that there is a significant change in the ranks of the municipalities of the Novosibirsk oblast after they received grants.

Table 11

Spearman's and Kendall's rank correlation coefficients calculated for the series of collected and disposable budget revenues of municipalities of the Novosibirsk oblast in 2006–2012

Coefficient	2006	2007	2008	2009	2010	2011	2012
Spearman's rank correlation coefficient	0.40	0.61	−0.17	−0.17	−0.37	−0.47	−0.63
Kendall's rank correlation coefficient	0.28	0.44	−0.14	−0.16	−0.28	−0.37	−0.44

To answer the question of whether resources transferred from the oblast budget to local self-government bodies serve the purpose of intraregional equalization, it is of interest to determine the dependence between the grants from the oblast budget and per-capita tax or nontax local budget revenues. Therefore, we propose to estimate the following equation:

$$T_i = \alpha + \beta \cdot R_i + \xi_i,$$

where T_i are per-capita grants from the oblast budget to the i -th municipality, R_i – indicates per capita tax and nontax revenues of the i -th municipality, α is the intercept, β is the slope coefficient, and ξ_i are the regression residuals. The results of calculations are presented in Table 12.

Table 12

Estimation results for the equation $T_i = \alpha + \beta \cdot R_i + \xi_i$

Indicator		2006	2007	2008	2009	2010	2011	2012
R^2		0.002	0.11	0.21	0.21	0.19	0.26	0.42
Estimate of α		8564	13150	19884	21444	36154	36126	47114
t statistics		8.31	6.74	13.18	11.22	8.88	12.03	12.82
95% confidence interval	lower bound	6467	9180	16810	17553	27873	30015	39638
	upper bound	10660	17119	22958	25335	44435	42237	54590
Estimate of β		0.10	0.88	−0.92	−1.09	−2.21	−1.52	−2.78
t statistics		1.25	2.05	−2.91	−2.91	−2.81	−3.38	−4.84
95% confidence interval	lower bound	−0.74	0.01	−1.56	−1.85	−3.81	−2.43	−3.95
	upper bound	0.94	1.75	−0.28	−0.33	−0.61	−0.60	−1.61
Number of observations	total	35	35	35	35	35	35	35
	excluding outliers	35	35	34	34	35	35	35

The given data show that, in the Novosibirsk region in 2006, the relationship between collected revenues and grants was not statistically significant, i.e. grants from the regional budget were accidental. In 2007, there was a statistically significant positive correlation between the studied variables. In the case of exclusion from consideration the city of Novosibirsk, dependence remained statistically significant positive, coefficient of determination increased. When we estimated regressions for 2008 and 2009 Severnyi raion was excluded from the consideration. During the period from 2008 to 2012 there was a statistically significant negative correlation between these parameters. In other words, with 5% error probabil-

ity, it was found that the oblast fiscal policy in 2008–2012 is aimed at equalizing the per-capita budget revenues of the municipalities. In connection with this, we should note that all of the coefficient estimates in the analyzed regression in 2008–2012 are also significant at a 99% confidence level.

The literature has repeatedly emphasized that, in the given system of intergovernmental fiscal relations, local governments are not interested in implementing rational, transparent, or responsible fiscal policy. We can assess whether municipalities of the Novosibirsk oblast have positive or negative stimuli for responsible fiscal policy by the marginal effect of increases in taxes allocated to local budgets, i.e., by the growth of disposable revenue that results in the growth of tax revenues to the budget by 1 ruble, as follows:

$$(Y_{it} - Y_{it-1}) = \alpha + \beta (X_{it} - X_{it-1}) + \varepsilon_{it},$$

where Y_{it} – are disposable revenues of the i -th municipality in year t , X_{it} – are tax revenues of the i -th municipality in year t , β is the slope coefficient, α is the constant, and ε_{it} are the regression residuals.

If there are no stimuli to increase tax and nontax revenues, then the regression coefficient β must be statistically insignificant. If stimuli (increase or decrease) are present, the regression coefficient shall be statistically significant (positive or negative). The city of Novosibirsk was excluded from the calculations. The estimation results are shown in Table. 13.

Table 13

Estimation results for the equation $(Y_{it} - Y_{it-1}) = \alpha + \beta (X_{it} - X_{it-1}) + \varepsilon_{it}$

Indicator		2006–2007	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012
R ²		0.45	0.10	0.10	0.26	0.27	0.64
Estimate of β		157640	94760	14743	200241	57365	68485
t statistics		5.87	3.68	1.04	7.24	1.65	4.07
95% confidence. interval	lower bound	102906	42320	–14126	143893	–13474	34219
	upper bound	212374	147201	43612	256590	128203	102751
Estimate of α		2.72	–1.03	0.55	2.38	1.56	1.06
t statistics		5.07	–1.88	1.95	3.31	3.43	7.54
95% confidence. interval	lower bound	1.63	–2.15	–0.02	0.92	0.63	0.78
	upper bound	3.81	0.08	1.12	3.85	2.49	1.35

The presented results indicate that for two periods considered, namely 2007–2008 and 2008–2009 years measured dependencies were found to be statistically insignificant. This fact can be explained by the 2008 crisis, which entailed certain changes in fiscal policy in the region. Other dependencies presented in Table 13 have proven to be statistically significant; the estimate of the β coefficient in all the regressions is greater than zero; furthermore, this coefficient is also significant at a 99% confidence level. Thus, the stimuli work towards conserving and developing municipalities' local tax potential in the Novosibirsk oblast.

An analysis of the revenue breakdown of the local budgets of the Novosibirsk oblast speaks of their low level of autonomy, since it is typical for them to not have any stable revenue base. For the majority of the municipalities, the percentage of grants makes up more than 70% of the revenue sources. The low level of collected revenues is not offset by a reliable mechanism for setting fixed rates of regional and federal taxes transferred to the local budgets.

BUDGET COEFFICIENTS FOR MUNICIPALITIES OF THE NOVOSIBIRSK OBLAST

An important aspect of the budget analysis is the analysis of the stability of regional and local budgets [4]. This analysis can be performed using budget coefficients (Table 14). The practical application of budget coefficients increases the objectivity of the assessment of regional and local budgets, and helps to identify the factors influencing them.

Table 14

Budget coefficients		
Name	Formula	Content
The ratio of grants and collected revenues	$R_{GCR} = G/CR$	G – grants; CR – collected (tax and non-tax) revenues
Coefficient of budget effectiveness of territories*	$C_{BE} = R/P$	R – budget revenues; P – average annual population of the municipal settlement
Coefficient of budget debts*	$C_{BD} = D/E$	D – local budget deficit, E – municipal settlements budget expenditures. Если $D < 0$, то $C_{BD} = 0$.
Coefficient of budget coverage*	$C_{BC} = R/E$	R – budget revenues E – budget expenditures
Coefficient of budget provision of the population	$C_{BP} = E/P$	E – budget expenditures P – average annual population of the municipal settlement.

* C_{BE} , C_{BD} , C_{BC} are calculated in two ways. I variant: R – is collected (tax and nontax) revenues of municipal settlement, D – is the difference between expenditures and collected revenues of municipal settlements' budgets; II variant: R – is disposable revenues of municipal settlement (tax, non-tax revenues and grants from the regional budget), D – is the difference between expenditures and disposable revenues.

Let's analyze the results of calculations of given budget coefficients for municipalities of the Novosibirsk region (Table 15–19).

Table 15

The ratio of grants and collected revenues							
Indicator	Value of R_{GCR}						
	2006	2007	2008	2009	2010	2011	2012
maximum	13,59	38,55	41,48	21,06	26,58	28,95	19,33
minimum	0,36	0,57	0,46	0,55	0,59	0,36	0,64
average	6,87	8,95	8,28	6,74	8,18	8,45	7,58

In the Novosibirsk oblast the ratio of grants and collected revenues reaches a maximum in 2006–2009 in Zdvinsky raion, in 2010 and 2011 – in Kyshtovsky, in 2012 – in Ust-Tarsky raion.

The minimum value of the ratio of grants and collected revenues was characteristic for the city of Novosibirsk in 2006–2010 and in 2012 and in 2011 for science town of Koltsovo (Novosibirsk is second from the end). We'd like to note other municipalities of Novosibirsk oblast, included in the group with the lowest value of the ratio of grants and collected revenues. In 2006, this may include cities of Ob, Novosibirsk and Ordynsky raion, in 2007 – the

city of Ob and science town of Koltsovo. In 2008 their number also included Novosibirsk raion, cities of Berdsk and Iskitim. In 2009–2012 this group of municipalities included Novosibirsky raion, the cities of Berdsk, Iskitim, Ob, science town of Koltsovo. It is worth noting that throughout the period in question the value of R_{GCR} was less than one in 2006, 2008, 2010 and 2012, only in two municipalities (cities of Novosibirsk and Ob), and in 2007, 2009 and 2011 – in three municipalities (cities of Novosibirsk, Ob and science town Koltsovo). I.e. for all other municipalities the grants exceed tax and nontax revenues collected. Average level of the considered factor is very high, i.e. during 2006–2012 years on the average for municipalities of the Novosibirsk oblast grants from the regional budget exceed the tax and nontax revenues in 7–9 times. And that's just the average excess. The maximum value in 2006 and 2012 – more than 10, in 2009–2011 – more than 20, and in 2007 and 2008 – more than 38! Number of municipalities that had the ratio of grants and collected revenues more than 10 in 2006 were 8, in 2007 and 2010 – 10, in 2008 – 12, in 2009 – 9, in 2011 and 2012 – 11, i.e. in these municipalities grants exceeded the collected revenues by more than 10 times.

Table 16

Coefficient of budget effectiveness of territories

Indicator	Value of C_{BE}						
	2006	2007	2008	2009	2010	2011	2012
I variant							
maximum	8526	13040	16445	16403	12484	25501	14784
minimum	290	263	405	847	1497	2086	2910
average	1844	3192	3927	4220	4501	5140	5566
II variant							
maximum	24866	57264	70282	64812	62434	67624	69272
minimum	1830	2906	5379	45622	10180	16913	16702
average	10781	19416	21823	22629	31197	33793	37206

According to the first variant of calculations for this coefficient for the period from 2006 to 2012 cities of Ob, Novosibirsk and science town of Koltsovo headed the list of municipalities. Relatively high coefficient of budget effectiveness of territories (collected budget revenues per capita) was in 2006 in the Novosibirsky raion, cities of Berdsk and Iskitim, in 2007 – in Iskitimsky, Severnyi raions, cities Berdsk and Iskitim, in 2008 – in the Kuibyshevsky, Novosibirsky, Severnyi raion, cities of Berdsk and Iskitim, in 2009 – in Ordynsky, Severnyi raions, cities of Berdsk and Iskitim, in 2010 – in Barabinsky, Ordynsky, Severnyi raions and in the city of Iskitim, in 2011 – in Karasuksky and Toguchinsky raions as well as in the city of Iskitim and in 2012 – in Novosibirsky and Kochenevsky raions and in the city of Iskitim. That is, those municipalities that are characterized by a relatively low value of the coefficient R_{GCR} discussed above.

Coefficient of budget effectiveness of territories was minimal in 2006, 2011 in the Kyshtovsky raion, in 2007–2009 – in Zdvinsky, in 2010 – in Karasuksky, 2012 – Ust-Tarsky raion. In addition, we allocated a steady group of Novosibirsk oblast's municipalities with traditionally low collected budget revenues per capita. These include Vengerovsky, Dovolensky, Zdvinsky, Kyshtovsky, Ubinsky and Ust-Tarsky raions.

In the second variant of calculations maximum of the coefficient of budget effectiveness of territories in 2006 was observed in science town of Koltsovo, in 2007 – in

Iskitimsky raion, in 2008–2011 – in the Severnyi raion, in 2012 – in the most distant from the city of Novosibirsk Kyshtovsky raion, having a high proportion of grants from regional budget. During the reporting period in the group of municipalities with a relatively high value of this coefficient also included Bagansky, Kargatsky, Maslyaninsky, Tatarsky, Ubinsky, Ust-Tarksky and Chistoozerny raions, science town of Koltsovo.

The minimum value of the coefficient of budget effectiveness of territories, calculated according to the second variant was in 2006 and 2012 in the city of Berdsk, in 2007–2010 – in Karasuksky raion and in 2011 – in the Novosibirsky raion. Importantly, among the territories with relatively low values of this coefficient were municipalities, which had the highest values of the same coefficient, calculated according to the first variant, i.e. cities in which the level of tax and nontax revenue was the largest, after the distribution of grants from the regional budget had the lowest values of disposable revenues. There were such cities as Novosibirsk, Berdsk, Iskitim and Ob. Among the municipalities that had the lowest values of disposable revenues, were Iskitimsky, Kochenevsky, Moszkowsky, Novosibirsky, Suzunsky and Toguchinsky raions.

As noted above, $C_{BD} + C_{BC} = 1$. Consequently, we consider the results of calculations of these budget coefficients together.

Table 17

Coefficient of budget debts

Indicator	Value of C_{BD}						
	2006	2007	2008	2009	2010	2011	2012
I variant							
maximum	0.933	0.975	0.976	0.950	0.963	0.967	0.950
minimum	0.261	0.357	0.366	0.395	0.404	0.143	0.340
average	0.823	0.838	0.816	0.795	0.822	0.819	0.814
II variant							
maximum	0.196	0.073	0.119	0.145	0.064	0.080	0.075
minimum	0	0	0	0	0	0	0
average	0.011	0.004	0.025	0.015	0.012	0.014	0.003

Table 18

Coefficient of budget coverage

Indicator	Value of C_{BC}						
	2006	2007	2008	2009	2010	2011	2012
I variant							
maximum	0.739	0.643	0.634	0.605	0.596	0.857	0.660
minimum	0.067	0.025	0.024	0.050	0.037	0.033	0.050
average	0.177	0.162	0.184	0.205	0.178	0.181	0.186
II variant							
maximum	1	1	1	1	1	1	1
minimum	0.804	0.927	0.881	0.855	0.936	0.920	0.925
average	0.989	0.996	0.975	0.985	0.988	0.986	0.997

The minimum value of C_{BD} and, accordingly, the maximum value of C_{BC} in the first variant of calculations was in the city of Novosibirsk in 2006–2010, in science town Koltsovo in 2011 and in 2012 in the city of Ob. Less than 0.5 C_{BD} was also only in the city of Ob in 2006–2010, in cities of Novosibirsk and Ob in 2011 and in the cities of Novosibirsk in 2012. In the group of municipalities, relatively well on this indicator during the period under review included Novosibirsky raion and all the cities of the Novosibirsk oblast. Also in this group were Karasuksky raion in 2006–2008, Ordynsky raion in 2006 and 2009, Severnyi raion in 2007 and 2008, Iskitimsky raion in 2008 and 2012, Moshkovsky and Toguchinsky raions in 2011. Noteworthy very high average value of the coefficient of budget debts, calculated according to the first variant: 0.795 – in 2009 and more than 0.8 – in other years in the period under consideration. Accordingly, the average value of the coefficient of budget coverage, calculated according to the first variant, in 2009 is 0.205, while in other years it is less than 0.2. Thus, on average, less than 20% of the expenditures of municipalities of the Novosibirsk oblast covered by the tax and nontax revenues collected in their territories.

The maximum value of the coefficient of budget debts was in 2006–2009 in Zdvinsky raion, in 2010 and 2011 – in Kyshtovsky, in 2012 – Ust-Tarsky raion. Among the municipalities with the highest values of this coefficient, and hence the lowest values of the coefficient of budget coverage there are Bagansky, Vengerovsky, Dovolensky, Kargatsky, Kolyvansky, Kyshtovsky, Maslyaninsky, Ubinsky, Ust-Tarsky and Chistoozerny raions, i.e. those areas in which the ratio of grants and collected revenues considered above had the highest values. Note that a fairly large group consists of the territory in which the value of the coefficient of budget coverage calculated according to the first variant is less than 0.1 (or C_{BD} greater than 0.9), i.e. tax and nontax revenues for these areas cover less than 10% of expenditure needs. In 2006 and 2009, respectively, there were 9 such municipalities, in 2007 – 16, in 2008 and 2012 – 12 in 2010 and 2011 – 14.

According to a second variant of the calculations in 2006 in 24 municipalities of Novosibirsk oblast C_{BD} was equal to zero. In 2007 the coefficient of budget debts was equal to zero in 25 municipalities, in 2008 – 10, in 2009 there were 20 such municipalities, in 2010 – 17, in 2011 – 13 and in 2012 – 29. Expenditures of local authorities are determined by their disposable revenues, which consist of collected revenues, grants from the regional budget and borrowed funds (loans, etc.). Borrowed funds are very small. Because region covers from its budget a significant part of major expenditures of municipalities for which local self-governments bodies do not have money, the coefficient of budget debts, calculated by the second variant for the entire period is considered low values, respectively, the coefficient of budget coverage for all the cities and raions of the oblast is close to unity.

Table 19

Coefficient of budget provision of the population

Indicator	Value C_{BP}						
	2006	2007	2008	2009	2010	2011	2012
maximum	24961	56190	68766	62565	66680	69695	69978
minimum	2275	3134	5567	4417	10306	16487	15975
average	10583	18944	22214	22444	31257	33934	35916

As already have been mentioned, in all the municipalities of the Novosibirsk oblast disposable revenues per capita are slightly different from the total expenditures per capita. Overall, therefore, the results of calculations of budget provision of the population in cities and raions of the Novosibirsk oblast coincide with the results of the coefficient of budget effectiveness of areas, considered by the second variant.

The analysis showed that one of the key problems in the field of budgetary alignment at the subnational level – are significant differences in the budgetary provision of municipalities before and after budget equalization. They are so significant that municipalities

being the most financially secured on the result of the budget tax and nontax revenues, after the distribution of grants are among the “outsiders” according to per-capita budget revenues.

Thus, the analysis of performed budget coefficients illustrates their opportunities and practical significance for the assessment of local budgets. First, the calculation of these coefficients allows proving the size of financial assistance to local authorities from the regional budget. Second, budget coefficients allow presenting more transparently a financial situation in the region, including the identification of the solvency of each municipality (i.e. as a municipality has capacity in the formation of budget revenues). Taken together budget coefficients allow us to estimate the structure of budgets of local self-government bodies. Finally, the calculation of the coefficients for different years allows monitoring dynamics.

Setting up an effective local self-government requires, first of all, the consolidation of the revenue base of local budgets. At present, the proportion of collected revenues in the total sum of revenues in the local budgets of the municipalities of Novosibirsk oblast, is, on average, less than 20%. This means the dependence of the local budgets on the upper-level authorities.

This is supported by the recently increased centralization of the territorial budgets accompanied by an increase in the percentage of grants in the municipal budgets. In particular, in the majority of municipalities of Novosibirsk oblast, grants make up more than 70 of all their revenues. However, as calculations have shown, this does not deprive the local self-government bodies of stimuli to fund their activities aimed at increasing their local tax base. Therefore, despite the lack of local resources and insufficient autonomy, the local self-government bodies of Novosibirsk oblast are interested in implementing effective fiscal policy.

The system of intergovernmental fiscal relations is of economic, political, and social importance for the country's development. However, financial aid should play a secondary role in the development of a local tax base for budgets at each level. In order for the whole national budget system to function effectively, i.e., for budgets of different levels to be balanced and autonomous, it is necessary, first of all, to establish clear-cut and valid criteria for the distribution of tax revenues between budgets of all levels.

In general, a system diagnostics of territorial budgets creates an information base for future managerial decisions – for the elaboration of the development's strategy, training of development's programs, budgeting, etc. [5]. The results allow you:

- to use in further work prepared structured description of the territorial fiscal system, including key numerical parameters and relationships;
- to identify the main causes of problems arising in the municipality;
- to prepare solutions based on identified trends and estimates of the budget situation in various areas of revenues and expenditures of the regional and local budgets;
- to gain the understanding of the available reserves and restrictions;
- to pre-identify areas in which it is advisable to carry out a problem decision in order to prepare the elaboration of practical recommendations;
- to focus on developing solutions for the most problematic areas;
- to gain the understanding of best practices from other regions and countries, as well as to avoid a repetition of negative results.

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