

Assessment of the Tax Base of the Consolidated Group of Taxpayers in Russia using the Method of Polynomial Interpolation

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Abstract

Background: In the foreign practice, the consolidated taxation system is one of the ways to solve the problem of reducing the tax burden on business. Since 2013, a concept of a consolidated group of taxpayers (hereinafter CGT) has existed in the Russian taxation practice. **Methods/Statistical analysis:** As an experiment, we have used a method of polynomial interpolation, which takes into account the empirical tax base data obtained from the consolidated groups of taxpayers, located in the territory of the Russian Federation. The growth of the ratio of changes in the tax base of CGT located in the territories of eight territorial entities of the Russian Federation has showed multidirectional vectors of change in the value of their shares. When building a forecast based on the evaluation of positions of the tangent line inclination angles for the CGT tax base and for all the country's companies, the growth coefficient was +0.8. **Findings:** We have proved the hypothesis of determining significance of the factor of a specific territorial entity of the Russian Federation for the structure of the tax base augmentation with respect to CGT and completely disproved the assumption of an insignificant impact of the regional factor. The determined tendency of reduction in the amount of the tax base when using CGT in some territorial entities of Russia is not indicative and decisive within the scope of the tax base formation regarding all taxpayers of the country. Differentiation is observed from the North-West Federal District in the amount of 0.1297 to the North Caucasus Federal District with the assumed value of the share of -0.14, indicating of the impact of socio-economic level of the regional development, regional support for the development of the respective business areas on the rate of CGT tax base formation, irrespective of the external economic factors. Since 2014, the creation of CGT and new members joining them has been suspended by the Russian Government and postponed until 01.01.2018. In this regard, a vector for further operation of the territorial entities of the Russian Federation to improve the current situation in a particular region of the country should be determined: the setting of reducing income tax rates, with regard to conditions determined by the tax legislation, and the use of special accounting procedure for losses of consolidated groups. **Applications:** The use of the polynomial interpolation makes it possible to examine the current procedure for CGT taxation in Russia, taking into account the impact of regional factors. Further development of the concept of consolidated taxation would solve the actual problems of the Russian tax policy, increasing tax revenues and fiscal capacity of all territorial entities.

Keywords: Consolidated Financial Statements, Corporate Income Tax, Financial Loss, Group of Companies, Interdependent Companies, State Budget, State Tax Policy, Tax Rates

1. Introduction

In Russia, the procedure for creation of a group of taxpayers in historical terms was formed in the period

from 1995 to 1997 during the development of the Federal Law of November 30, 1995 No. 190-FZ "On Financial and Industrial Groups". However, due to lack in the tax legislation of the relevant rules regarding the CGT, it was

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impossible to implement the specified provisions. Only in late 2000, the procedure for determination of consolidated groups of taxpayers was defined in the Federal Law of 16.11.2011 No. 321-FZ. This law stipulated the main provisions which entered into force in 2012 and concerned the definition of principles and conditions for the establishment of a consolidated group of taxpayers, as well as the procedure of calculation and payment of income tax by such participants (Figure 1).

As a result of the first years of functioning of the CGT institution, it can be stated that its practical implementation has a number of problem points, which in the first place shall include a dramatic redistribution of tax revenues between the budgets of territorial entities of the Russian Federation. The existence of weaknesses of the current CGT tax regime may indicate an insufficient theoretical elaboration of some of its aspects at the stage of its implementation, and suggests the need to develop measures to improve it.

Formation in the Russian practice of the concept of group of companies, accepted for the income taxation purposes, is related to the concept of the consolidated group of taxpayers.

The consolidated group of taxpayers is a voluntary association of taxpayers regarding corporate income tax based on the agreement of establishment of such a group on the terms and conditions stipulated by the provisions of the Tax Code of the Russian Federation (TC RF). One of the main prerequisites for the acceptance of the phenomenon of groups of companies for tax purposes and the recognition of the group as a separate entity in respect of the tax relationship is the principle of fiscal neutrality. However, the neutrality principle cannot be the only factor that determines the existence of specific taxation rules

for groups of companies in the tax system of a country. According to the results of the research of tax regimes of groups of companies applied in more than 30 countries, the tax regime of groups of companies is the result of the general economic state policy, and its features reflect the government position regarding the promotion of economic concentration and consolidation of business.¹ Despite the small number of consolidated groups according to the Federal Tax Service of the Russian Federation, income tax revenues from the consolidated groups of taxpayers in 2013 to the consolidated budget of the Russian Federation was 21.4% of the total tax. In the next tax period of 2014, the volume of receipts increased by 0.5%, amounting to 21.9% of the total income tax.

In contrast to the international experience, the Russian tax system places restrictions on certain categories of taxpayers, not allowing them to create a consolidated group. In particular, the following companies cannot be included in the group:

- The companies that are in the process of reorganization or liquidation in bankruptcy proceedings;
- The companies in which the amount of the net assets exceeds the amount of the authorized capital;
- Residents of special economic zones, or being under special tax regimes;
- The companies carrying out educational or medical activities, paying zero tax rate of income tax; being not considered as the taxpayer or being released from an obligation to pay taxes;
- Payers of tax on gambling business;
- Credit and consumer cooperatives and microfinance institutions.

At the same time, the participants of the financial markets (banks, insurance companies, professional participants of the securities market, private pension funds) may be included in the consolidated group if all other members of this group operate in the similar area.

When determining the tax base in Russia, a partial consolidation regime is used: as a general rule, the income from intragroup transactions is not excluded from the general tax base and is subject to taxation under the general procedure. Similar procedure is used in Germany² and Italy.³ The preparation and submission of income tax returns for the consolidated group is carried out by a responsible member. The other group members are relieved of the procedure of submitting of tax returns, except in certain cases. For example, during the reporting

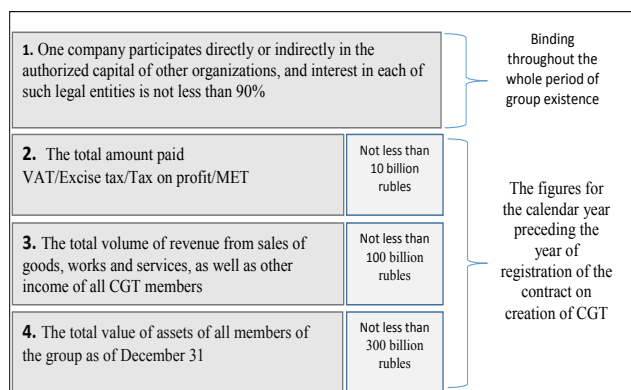


Figure 1. Terms of creation of a consolidated group of taxpayers in Russia.

(tax) period the company received an income which not taken into account when calculating the consolidated tax base, i.e. not taxed at the basic 20% rate.

However, it should be noted that there are some general requirements that are applied regardless of the participation of organizations in the CGT. According to them, the transactions related to the transfer of assets between the parent company and its subsidiaries in which it has the stake of above 50% shall be exempt from taxation. Taking into account the established conditions for equity entry into the CGT at the level of 90%, this norm relieve from taxation certain types of transactions between some members of the consolidated group. At the same time, some types of transactions are not taken into account for tax purposes. Such transactions are carried out within a group between:

- subsidiaries of the parent company, on the basis of which the consolidated group has been formed;
- the parent company and its subsidiaries in which it has either only indirect participation or direct participation of below 50% when the total direct and indirect participation is of at least 90%.

2. Concept headings

According to the Russian Ministry of Finance and the Federal Tax Service of Russia for the period of 2012–2013,

Table 1. Groups of taxpayers registered in 2012-2013.

Responsible group member	Industry	Year of group creation	Number of members at the time of group creation
Gazprom, OJSC	Oil and gas	2012	56
NK Rosneft, OJSC	Oil and gas	2012	22
Severstal, OJSC	Metallurgy	2012	9
Surgutneftgaz, OJSC	Oil and gas	2012	7
NK Lukoil, OJSC	Oil and gas	2012	41
NLMK, OJSC	Metallurgy	2012	10
Novatek, OJSC	Oil and gas	2012	11
AK Transneft, OJSC	Oil and gas	2012	35
Tatneft, OJSC	Oil and gas	2012	4
MegaFon, OJSC	Communication	2012	4
Rostelekom, OJSC	Communication	2012	2
Gazprom Neft, OJSC	Oil and gas	2013	8
Rosatom, State Corporation	Energy	2013	34
Mechel, OJSC	Metallurgy	2013	16
GMK Norilskii Nikel, OJSC	Metallurgy	2013	16

Source: Based on the information from https://www.nalog.ru/rn77/related_activities/statistics_and_analytics/forms/

15 consolidated groups of taxpayers was created. According to the result of data analysis (Table 1), it can be concluded that the association of taxpayers in CGT took place mainly in the oil and gas, telecommunications, and metal industries. The list of the consolidated groups of taxpayers, agreements on the establishment of which were registered by the tax authorities in 2014, is shown in Table 2.

An important feature of the Russian tax practice is that losses of CGT members incurred by them before entering into this group are not accounted together with the consolidated tax base. So, such member's losses may only be used after cessation of his membership or group liquidation. At the same time, the losses incurred by CGT members in connection with the sale of depreciable property, assignment of claims, sale of the land and buildings prior to the entry can be taken into account when determining the costs of the consolidated tax base. And the losses incurred during the period of existence of the consolidated group of taxpayers are taken into account when determining the tax base.

3. Statistical methodology

As a study method, we have used the method of polynomial interpolation. On the basis of empirical data, we obtained

Table 2. Groups of taxpayers, the establishment agreements of which were registered in 2014

Company name	Industry	Year of group creation	Number of members at the time of group creation
Oskolskii elektrometallurgicheskii kombinat, OJSC	Metallurgy	2014	n/a
Tander, CJSC	Retail chain	2014	n/a
Bank VTB 24(CJSC)	Banking	2014	23
SIBINTERTELEKOM, CJSC	Communication	2014	n/a
Rostelekom, OJSC, long-distance and international telecommunications services	Communication	2014	n/a

F Based on the information from https://www.nalog.ru/rn77/related_activities/statistics_and_analytics/forms/

a formed functional description of the composition and structure of the tax base for the consolidated group of taxpayers located in the territory of the Russian Federation. As the financial indicators, we used the official data given by the Federal Tax Service of Russia for the period from the beginning of the formation of CGT in 2012 to the tax period of 2014 based on the size of the tax base of the consolidated groups in all eight territorial entities of the Russian Federation and in the whole country.

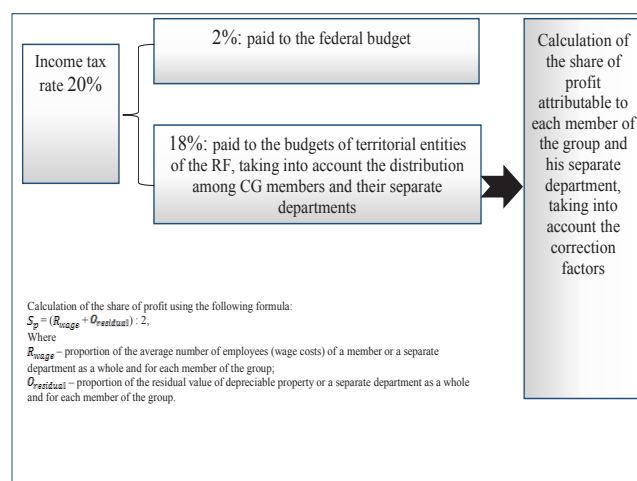
The choice of the tax base as the empirical basis is the most comprehensive reflection of financial and economic activity of the organizations, as it is a cost, physical or other characteristic of the object of taxation and represents the amount of tax accruals for a unit of measure of the tax base.⁵

Applied method of CGT interpolation during the analyzed period allowed making the following statements. Given the small size of a sample for study of the impact of the CGT creation on the size of the tax base in the whole country, we have analyzed the change in a share of the CGT tax base relating to the volume of the tax base as a whole for each territorial entity of the Russian Federation (RF region). At the same time, the functional dependence of a share at a time interval shall satisfy the following conditions:

$$\lim_{t \rightarrow +\infty} f(t) = 1 \vee \lim_{t \rightarrow +\infty} f(t) = 0; 0 \leq f(t) \leq 1 \quad (1)$$

This condition was the reason for the use of the polynomial interpolation scheme (Figure 2).

- a) In terms of territorial entities of the Russian Federation for the study period of 2012–2014, the increase of the ratio of the CGT tax base was recorded only in three Russian territorial entities (North-Western, Northern and Far Eastern Region). In the North-West Federal

**Figure 2.** The distribution of the profit tax by CGT members.

District, the increase the CGT tax base was the largest one. The study of results of the interpolation of empirical observations is characterized by an angle of inclination of the tangent (North-Western Federal District) to the diagram of the functional dependence determining the rate of change of the function. The coefficient of variable was positive ($k = 0.1297$), which gives reasons for the increase of the function value over time. For the Northern Region of the Russian Federation the coefficient was also positive ($k = 0.021$), confirming the positive dynamic factor. However, the actual growth of the CGT tax base in this region is significantly lower than in the North-Western Region. The positive tendency for CGT tax base increasing was noted in the Far Eastern Region ($k = 0.115$), where the growth is lower than in the North-Western Region of the Russian Federation, but

is 5 times higher than in the Northern Region of the Russian Federation.

- b) In terms of the rest of the territorial entities of the Russian Federation, for the study period of 2012–2014, a negative dynamics of decrease in the CGT tax base volume was noted. At the same time, the North Caucasian Federal District showed the greatest rate of decline in the tax base in relative figures. In this case, we used a derivative of the function that describes this dependence. The tangent to this function has a negative coefficient of argument specifying the study period ($k = -0.14$). In other territorial entities of the Russian Federation a less negative dynamic on the coefficients was noted. In particular, for the Central Federal District, $k = -0.0235$, Volga Federal District, $k = -0.0416$, the Southern Federal District, $k = -0.0625$ and the Urals Federal District, $k = -0.0367$.
- c) During the study period, the increase in the ratio of change in the tax base of CGT located on the territories of eight territorial entities of the Russian Federation showed multidirectional vectors of change in shares value. This made it possible to formulate the following statement in the form of influence of the factor of the region on the value of formation of CGT of the tax base, regardless of external economic factors. At the same time, the increase in the volume of the tax base in these regions of the country was determined by the possibility of applying a reduced rate of income tax from 18 to 13.5% for both the responsible member of the group and for his own members of the group. In this case, the expansion of the tax base volume makes it possible to proportionally increase the size of the profit of a particular party or a separate division when paying the income tax to be paid to the budget of the particular territorial entity of the Russian Federation.

4. Hypothesis

In our study, we have proposed the following hypothesis for determination of significance of the factor of a specific territorial entity of the Russian Federation for the improvement of the structure of the tax base with respect to CGT.⁶ The following experimental steps have been used to confirm the justification of the hypothesis.

Stage 1. Carrying-out of an analysis of variability. The main objective of this analysis is to confirm the impact of principles of the assessment on the size of the tax base determined by the CGT, a regional component (tax and other levers of administrative control of territorial entities of the Russian Federation in this particular region). At the same time, the variation in data regarding the tax base increase depends not only from the analyzed factor, but other random factors. In this regard, the verification was carried out on the basis of determination of factor and residual dispersions based on the following formula, taking into account the Fisher–Snedecor criterion⁴:

$$S_{residual}^2 = S_{total}^2 - S_{actual}^2 \quad (2)$$

Based on the official data of the Federal Tax Service of Russia, regarding the size of the CGT tax base in eight territorial entities of the Russian Federation, we have the following: number of region factor levels - 8 (p), number of tests at each level - 3 (n) (the data for 2012, 2013 and 2014). Total number of tests carried out: 24 (N) (Table 3).

Stage 2. In order to calculate the total and factor dispersion characterizing the variability of the data in general and in groups, we have determined the total average value $X_{total} = 307\,560\,065$. When calculating the sum of squares of deviations of the value of the tax base in each

Table 3. Summarized results of the use of polynomial interpolation scheme for the consolidated group of taxpayers

Territorial entities of the RF	2012	2013	2014
Central Federal District	930 980 547	637 750 315	459 289 660
Northwestern Federal District	184 130 166	304 919 354	414 554 811
North Caucasian Federal District	34 165 235	31 456 432	21 585 592
Southern Federal District	134 303 435	135 668 437	124 638 965
Volga Federal District	340 015 275	313 305 123	273 044 861
Ural Federal District	639 035 880	557 083 088	944 853 197
Siberian Federal District	147 371 749	217 345 017	180 505 920
Far Eastern Federal District	103 672 373	112 846 125	138 919 994

CGT group, a selective factorial dispersion of the following values was obtained:

$$S_{actual}^2 = \sum_{i=1}^8 n_i (X_i - X_{total})^2 = 1\,382\,499\,875\,104\,270\,000,$$

where, X_i – average values of the CGT tax base for each territorial entity of the Russian Federation (factor level).

According to Table 3, when determining the data, we determine the total sample dispersion in the form of the following value:

$$S_{total}^2 = \sum_{i=1}^8 \sum_{j=1}^3 1(X_{ij} - X_{total})^2 = 161\,159\,753\,281\,800\,000,$$

where, X_{ij} – value of the tax base in the territorial entities of the Russian Federation and within the studied tax periods.

When determining the residual dispersion characterizing the influence of random factors on the analyzed feature, we used the following formula:

$$S_{residual}^2 = S_{total}^2 - S_{actual}^2 = 229\,097\,678\,177\,532\,00 \quad (3)$$

Since S_{actual}^2 describes changes in monitoring results related to changes in the regional factor, and $S_{residual}^2$ describes those related to changes in all other influencing factors, a comparison of these values makes it possible to evaluate the significance of the impact of regional factors on the results of performed observations.

Stage 3. On the basis of performed studies of the effect of territorial entities of the Russian Federation on the effectiveness of the use by organizations in the form of CGT, we will carry out a comparison of two dispersions using the Fisher–Snedecor distribution. In order to confirm this hypothesis, we formulate the following: whether the impact of regional factors on the results of observations at a significance level of 10% is significant (error of the first kind). Using the Fisher–Snedecor criterion, we calculate the observed value:

$$F_{observed} = \frac{S_{actual}^2 (N - p)}{S_{residual}^2 (p - 1)} = 13.79324.$$

We compare the resulting value to the value of the Fisher–Snedecor distribution function in a critical point $F_{critical}$ corresponding to the selected significance level of 10%.

The obtained data in Table 4 show the Fisher–Snedecor distribution function value in the form $F_{critical} = 2.13$.

Thus, if $F_{observed} > F_{critical}$ (in our case $13.79324 > 2.13$), the regional factor has a significant impact and must be considered when analyzing the effectiveness of the implementation CGT by territorial entities of the Russian Federation (Table 4).

Therefore, the hypothesis of determination of the significance of the factor of a specific territorial entity of the Russian Federation for the improvement of the structure of the tax base with respect to CGT completely refutes the assumption of a slight impact of the regional factor. In this regard, the discovered tendency of decrease in the volume of the tax base when using the CGT in some territorial entities of the Russian Federation is not indicative and decisive within the scope of formation of the tax base of the whole country. It defines the further vector of work of territorial entities of the Russian Federation regarding the improvement of the current situation in a particular region of the country (specifically, the establishment of reducing income tax rates, taking into account those set out in the Tax Code of the Russian Federation). Thus, the formation of the CGT in Russia since its beginning in 2012 and during the subsequent three years' period was successful in terms of increase in the volume of the income tax base in general.

5. Discussion

In the assessment of the effects of introduction of CGT into the tax system, most economists first of all indicate a decrease in tax revenues to the budget system.⁷ Such estimates are ambiguous, since an increase in the 2012–2014 period in the volume of CGT tax base depends only on factors of applying by individual territorial

Table 4. Comparative data on the dispersion of the results of CGT research in Russia

Source of variation	Dispersions	Degrees of freedom	Average deviation squares	Fobservation	Fcritical
Between CGT	1 385 499 875 104 270 000	7	197 499 982 157 752 000,00	13.79324	2.13
Inside CGT	2 290 976 781 775 320 000	16	143 186 048 860 958 00,00	-	-
Total on CGT	161 159 753 281 800 000	23	-	-	-

entities of the Russian Federation of reducing income tax rates in respect of CGT engaged in certain activities. In particular, the extraction and processing of oil and gas, manufacturing of petroleum products and their implementation, transportation of oil and gas,⁸ diamond mining and wholesale trade of precious stones. It should be noted that the possibility of application of the reducing rate, which may be one of the reasons for the decline in tax revenues, lies within the scope of competences of territorial entities of the Russian Federation. In this case, its introduction may indicate that the regions have no significant risk associated with loss of a certain amount of income tax and with the interest in the competitive growth⁹ and investment attractiveness of a particular region.

Russian tax legislation provides the payment of income taxes in the federal and regional budgets for organizations operating in the different territorial entities of the Russian Federation, with regard to the special rules for calculation of the tax base and the tax amounts for each region. Similar rules are provided for the consolidated tax base distribution if the CGT members carry out their activities in different regions. None of the world's countries has statutory mechanism for distributing the tax base of a group of companies that would be fully comparable with the Russian one.² At the same time, the conventional procedure for the application of the concept of formulary apportionment¹⁰ is used. Share of profit of each member of the group and of each separate department in the aggregate profit of the consolidated group is determined by the responsible party. It is calculated as an arithmetic average value of the share of the average number of employees (wage costs) and the proportion of the residual value of depreciable property of that member of a separate department in the average number of employees (labor costs) and the residual value of depreciable property for the whole consolidated group (see Figure 3). Thus, the consolidated CGT tax base is apportioned among the regions in which their members operate, based on two-factor formula that is the main feature of the FA concept.⁵ As a result, the transactions between members of the CGT are considered as uncontrolled in terms of application of transfer pricing control rules, since the distribution of the amount of income tax between the budgets of the territorial entities of the Russian Federation is carried out using a determined formula, regardless of the price used in the transaction.

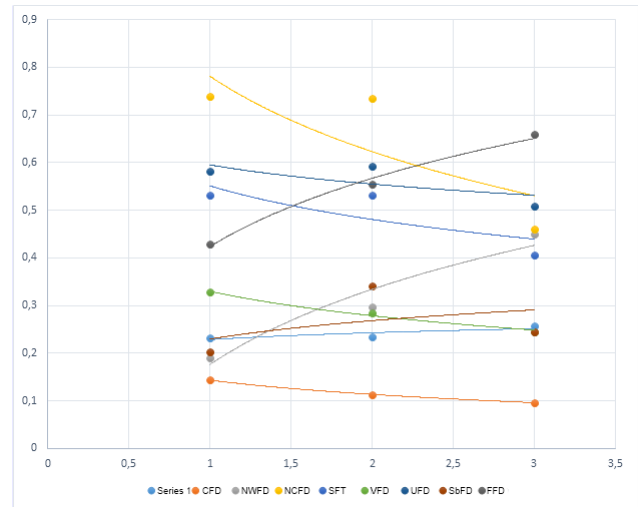


Figure 3. Use of polynomial interpolation system when changing the proportion of the CGT tax base for the period of 2012-2014.

6. Conclusion

In general, the reduction of tax revenues to the budgets of territorial entities of the Russian Federation when using the tax consolidation regime depends on the following factors:

- The use by the group members of a reduced rate of tax paid to the budgets of territorial entities of the Russian Federation;
- The loss suffered by the group members as a result of their activities.

The current CGT taxation system in Russia requires more careful study, taking into account the practical experience of its application in different countries of the world. In assessing the consequences of the introduction of CGT into the tax system for monitoring period of 2012-2014, first of all we should note its influence on the change of tax revenues to the budget system. Despite the large number of advantages, the establishment of a consolidated group can lead to several negative consequences for the companies:

- a) member of CGT having an unused loss formed within tax periods prior to the entry into the group,¹¹ has the right to use the loss only after the withdrawal from the group or upon its liquidation;
- b) failure of the responsible party to fulfill its obligation to pay the tax (fine, penalty), other members of the group bear joint and several responsibilities for the non-fulfillment of obligations by the responsible party;

- c) an increase in the tax burden of the CGT members as a result of formation of certain types of tax base reserves;¹²
- d) on-site tax audit of the consolidated group, given the fact that the tax authorities have the right to suspend the audit for up to 6 months, means that it can take 1.5 years.

We have used the official data of the Russian FTS as digital data regarding the formation of a common income tax base for all taxpayers for the tax period of 2006-2014 and the volume of the CGT tax base from the beginning of their formation in 2012 to 2014 tax period. We have processed the statistical data using polynomial interpolation method and discovered a stable tendency during the study period to an increase in the tax base for the country as a whole, regardless of the presence of CGT. However, it should be noted that despite a slight decrease in the CGT tax base, a forecast made for the next fiscal periods is positive. We have evaluated the reasonable forecast on the basis of the angle of inclination of the tangents of the CGT tax base and the positive dynamics tendency in the amount of the tax base (Figure 4). The angle of the tangent inclination is determined by its coefficient k with a variable and describes the increase ($k > 0$) or decrease ($k < 0$) of the analyzed value of the tax base volume. Thus the increase in the tax base for all taxpayers for 2015 is taken with the growth as $k = +0.7$. In turn, the change in volume of the CGT tax base is also taken with the growth as $k = +0.8$. Nevertheless, this general decreasing tendency in the income tax base in the context the country and CGT in particular for the period 2013-2014 cannot be definitely considered as negative consequences for a variety of causes.

Firstly, the creation of preferences for companies in the form of the possibility of balancing in the current period of profit and loss of the consolidated group members

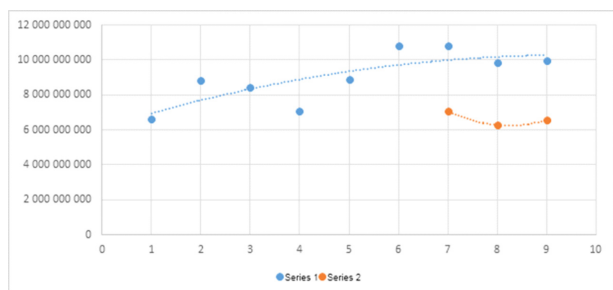


Figure 4. Prognosis data when using polynomial interpolation system in respect of the income tax base.

was originally considered as one of the goals in the development of the Russian concept of fiscal consolidation. In such a manner, companies are provided with additional resources for their development, economic growth and the potential increase in tax revenues in the future.

Secondly, the possibility of applying a reduced rate, which may be one of the reasons for the decrease in tax revenues, lies within the field of competence of the regions of the country. Its introduction may indicate that the regions have no significant risk associated with loss of a certain amount of income tax and are interested in the competitive growth and investment attractiveness of a particular region.

Taking into consideration the significant role of the consolidated group for the tax system, it seems that the definition of directions of further development of the institution of the tax consolidation shall be carried out with due account for goals and objectives of the currently implemented fiscal and budgetary policy.

Russian tax legislation provides a significant number of restrictions in the use of the tax consolidation regime, which limits the ability of companies to use it comparing with the majority of analyzed foreign regimes. In particular, the distinguishing features of Russian CGT are:

- a) only Russian companies may become members of a consolidated group, while foreign law in some cases provides the possibility to include to a group foreign companies operating in the country through permanent representation and being residents of countries that have substantial economic connections with this country.
- b) the share participation threshold for inclusion in the CGT of subsidiaries in Russia is set at a quite high level (90%). At the same time, the group creation procedure has also some additional criteria that characterize the scope of activities of the group of companies (revenues, assets, size of paid taxes).
- c) in most foreign countries intercompany transactions are either fully exempt from taxation¹³ or there is a possibility to postpone taxation until the party's withdrawal from the group or the output of property outside the group.
- d) In most countries, with varying degrees of restriction it is permitted to take into account during the calculation of the group consolidated base the losses incurred by its members prior to their membership or its creation;¹⁴ when a member leaves the group, the loss incurred in a period of consolidation in many countries may be partially allocated in favor of the leaving member.

We shall consider such differences first of all as potential opportunities for further enlargement of the size of the tax base and its further increase, in view of improving practice of taxation of consolidated groups of taxpayers in the regional aspect.

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