ESTIMATION OF MUNICIPALITY FEDERAL TAX POTENTIAL

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The paper measures the federal tax potential in the city of Obninsk. The subject of research is to improve the estimation procedure for measuring municipality federal tax potential.

During the research we used the methods based on the indicators of income actually collected and those of tax reporting, as well as developed methodology on the basis of Laffer curve and regression analysis.

Inflow of Federal taxes in the Obninsk budget in 2001-2009 was analyzed. Average and optimal federal tax rates in Obninsk were calculated and recommendations for increasing tax potential of the municipal unit were made. The concept of "measure of use of municipality federal tax potential" was introduced, and its analysis was conducted for 2001-2009.

The practical implications of research consists in the fact that the main methodological recommendations developed during the research reveal the important directions of municipality tax potential increase , its correct analysis and forecasting and can be used in practice by the municipality with the purpose of budget planning for next year.

Keywords: estimation of tax potential; municipality; average tax rate; tax revenue; federal taxes.

ОЦЕНКА НАЛОГОВОГО ПОТЕНЦИАЛА ФЕДЕРАЛЬНЫХ НАЛОГОВ МУНИЦИПАЛЬНОГО ОБРАЗОВАНИЯ

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В статье проведена оценка налогового потенциала федеральных налогов города Обнинска. Предметом исследования выступает совершенствование методики оценки налогового потенциала муниципального образования для федеральных налогов.

В ходе исследования были использованы методики, основанные на показателях фактически собранных доходов и показателях налоговой отчетности, к тому же была разработана методика на основе построения кривой Лаффера и регрессионного анализа.

Проанализировано поступление федеральных налогов в бюджет города Обнинска в 2001-2009 гг. Рассчитаны значения средних и оптимальных налоговых ставок федеральных налогов для города Обнинска и предложены рекомендации для увеличения налогового потенциала муниципального образования. Введено понятие коэффициента использования налогового потенциала федеральных налогов муниципального образования, а также проведен его анализ за 2001-2009 гг.

Практическая значимость работы состоит в том, что выработанные в процессе проведенного исследования основные методологические рекомендации раскрывают важные направления повышения налогового потенциала муниципального образования, его корректного анализа и прогнозирования и могут быть использованы в работе муниципалитета при планировании бюджета на следующий год.

Ключевые слова: оценка налогового потенциала; муниципальное образование; средняя налоговая ставка; налоговые поступления; федеральные налоги.

Municipalities annually make the draft budget for the next fiscal year. However it is necessary to carry out enormous number of preliminary analytical work in order to make the high-quality draft budget. The analysis of municipality capacity to accumulate tax revenues into the budget is compound and important element of such work. It should be noted that the tax potential is the only indicator that shows at best municipality capacity. Use of the municipality tax potential indicator (TP) when planning the budget is the result of the leading role of accumulating tax revenues into the budget. And revenues from federal taxes form the major part of it (more than 50%). Therefore the estimation of municipality federal tax potential is very actual research objective.

The main objectives of the research conducted are the following:

1) to analyse federal tax revenues in the municipality budget;

2) to calculate federal tax potential;

3) to reveal efficiency of technique use.

Two existing techniques are considered in this research: the first is based on an indicator of actually collected income, the second – on indicators of tax reporting [2]. The technique on the basis of Laffer curve and regression analysis, earlier considered in works [1, 3-5] was also developed and in relation to the federal taxes it can be presented as follows:

1) Analysis of federal tax revenues in the municipality budget;

2) Calculation of average tax rate for each federal tax;

3) Development of regression models of average tax rate dependence on federal tax revenues and vice versa;

4) Selection of one model showing the best results;

5) Calculation of the tax potential of each federal tax;

6) Calculation of the cumulative federal tax potential;

7) Calculation of use of municipality federal tax potential (UTP) and its analysis.

The main current hypothesis of research is that Laffer curve is really applicable in practice for definition of optimum federal tax rate. To approve this hypothesis the budget of the first science city of the Russian Federation – city of Obninsk was chosen. Data for carrying out research were obtained in Obninsk administration.

According to the Tax Code of the Russian Federation the federal taxes and charges are: value added tax; excise tax; personal income tax; corporate tax; mining tax; water tax; charges for using objects of fauna and those of water biological resources; state duty. But according to circumstances Obninsk budget gets only limited part of them. So, assessments to budget from value added tax, mining tax, etc. are not made, and assessments from excises are cancelled in 2005. Therefore in this research only two federal taxes are considered: personal income tax (PIT) and corporate tax (CT).

Let's analyse federal tax revenues in the Obninsk budget, presented in figure 1. The major part of the federal taxes composes the income tax – more than 50% of all federal tax revenues. In 2001-2004 the second place belonged to corporate tax– its part ran up to 40%due to the legislation changes and, first of all, change of percentage from the sum of the tax arriving into the budget. So, if in 2001-2003 76% from the sum of the tax arriving into the budget of the Kaluga region went to Obninsk budget, in 2004 this percentage was already 40%, and in 2003 decreased by 10%. All this resulted in reduction of corporate tax in the local budget, and from 2006 to 2009 its average value made up about 5% from federal tax revenues in the Obninsk budget.
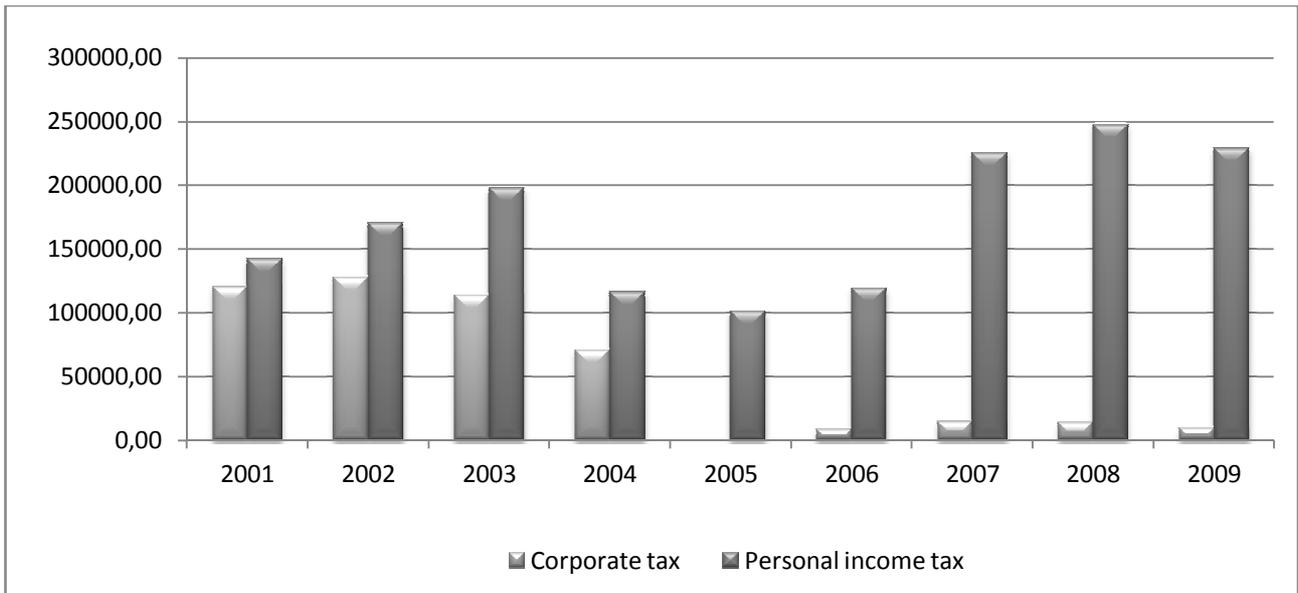
Fig. 1. Federal tax revenues in the Obninsk budget

Total amount of federal tax revenues fluctuates wavy. We can mark two peaks – in 2003 and 2008 where amount of tax revenues runs up to 311 and 260 million rubles accordingly. However it decreased further though this phenomenon had different reasons: if in 2004 reduction of tax revenues amount can be explained by legislation changes and corresponding change of percentage of the sum of the tax arriving to the Kaluga region, in 2009 it is more connected with the consequences of 2008 crisis.

Now let's calculate tax potential of each federal tax. Let's begin with personal income tax (PIT). In the beginning we will construct a number of the variables reflecting value of the average tax rate of the personal income tax (ATR_{PTI}) that represents dependence of personal income tax revenues in the municipality budget on income of citizens and profit of the enterprises:

$$ATR_{PIT} = \frac{Tax\_revenue_{PIT}}{Salary + \Pr ofit} \qquad (1)$$

Calculation of values of the average tax rate for the personal income tax in Obninsk is presented in table 1.

Table 1

Calculation of values of the average tax rate for the personal income tax

Year	Tax revenue from PIT, thous. rub.	Inflation in base-year prices	Tax revenue in base-year prices, thous. rub.	Income of citizens and profit of the enterprises in base-year prices, thous. rub.	Average tax rate, %
1	2	3	4 = 2:3	5	6 = 4:5
2001	142028,4	1,00	142028,4	1804197	7,87%
2002	195752,8	1,15	170071,9	1881316	9,04%
2003	254800,0	1,29	197654,2	2147424	9,20%
2004	167540,0	1,44	116351,5	2272812	5,12%
2005	161122,0	1,60	100896,7	3058522	3,30%
2006	207743,0	1,74	119349,8	3513917	3,40%
2007	439547,0	1,95	225466,9	4505474	5,00%
2008	545770,0	2,21	247091,1	3656129	6,76%
2009	549597,0	2,40	228698,3	3636909	6,29%

The obtained data are evidence of considerable average tax rate fluctuation in 2001- 2009 – from 3,3% to 9,2%. Personal income tax revenue has also changed. It should be noted also that the greatest volume of personal income tax revenue in the budget Obninsk fell to 2008 and came to 247091,1 thousand rubles at 6,76% average tax rate.

Further two regression models were constructed for personal income tax: the model reflecting dependence of tax revenues from tax rate, and the model reflecting dependence of tax rate from tax revenues. As the second type of model does not reflect dependence of variables, we will consider further regression model for personal income tax, reflecting dependence of tax revenues on tax rate. The short characteristic of all models studied in research for personal income tax is presented in table 2.

Table 2

Model summary and parameter estimates for PIT

Equation	Model summary			Parameter estimates		
	R Square	DW	Sig.	Constant	b1	b2
Linear	0,19	1,59	0,25	-	10709,82	-
Logarithmic	0,26	2,40	0,16	-	72561,03	-
Inverse	0,32	3,31	0,11	-	-425168,15	-
Quadratic	0,95	0,87	0,00	-	5180450,00	-34567800,00
Cubic	0,94	0,86	0,00	-	103716,61	-7429,12
Exponential	0,25	2,38	0,17	-	0,08	-

The final equation of regression for personal income tax corresponds to quadratic type of model and looks as follows:

$$y(PIT) = 5180450 \times ATR_{PIT} - 34567800 \times ATR_{PIT}^{2} \text{ , where} \tag{2}$$

$y(PIT)$ – tax revenues from personal income tax in Obninsk budget;

ATR_{PIT} – average tax rate for personal income tax.

Since the P-value is less than 0,05 there is a statistically strong link between the variables. The R-Squared statistic indicates that the model as fitted explains 94,77% of the variability. In this case the predicted curve differs from real that is clearly visible in figure 2.
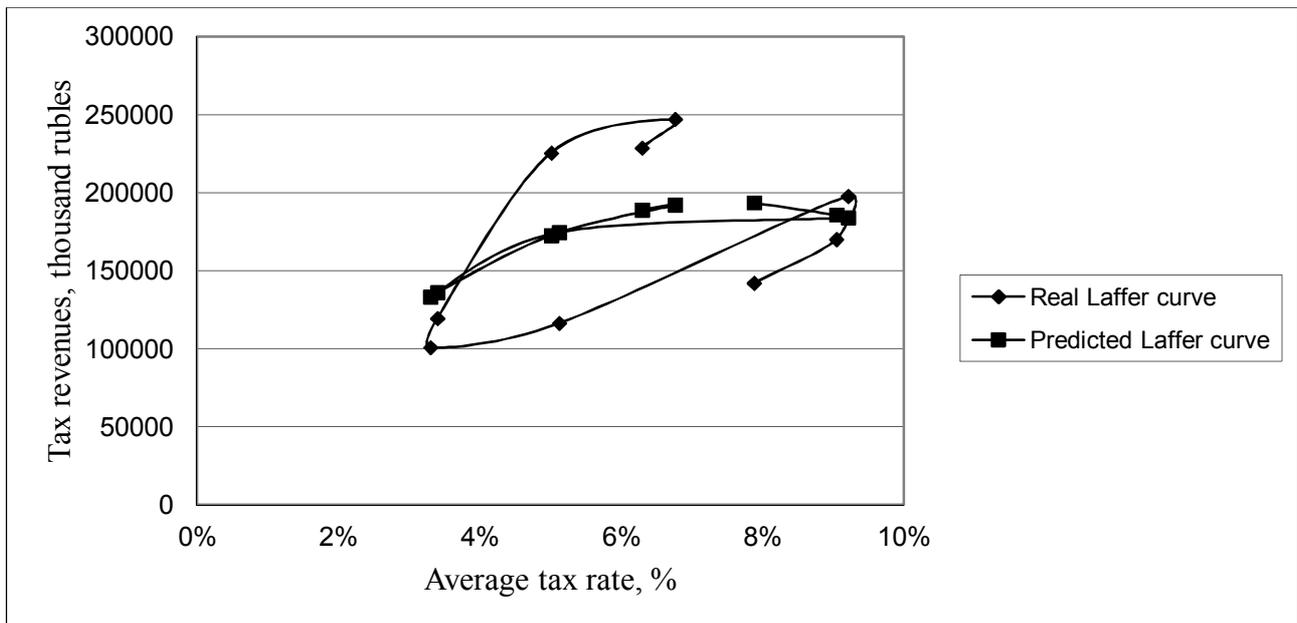
Fig. 2. Laffer's real and predicted curves for personal income tax

This can be explained by unaccounted   random factors when creating the model. Then we have to equate regression equation to zero, and calculate value of the average tax rate at which the maximum volume of tax revenues from personal income tax will be reached. Having received equation root, it is possible to tell that optimum tax rate for personal income tax is 0,07. Having substituted value of optimum tax rate in regression equation for personal income tax we will receive tax potential for personal income tax. Thus, tax potential of personal income tax comes to 193249,28 thousand rubles at 7% optimum tax rate.

Let's estimate tax potential of corporate tax. Calculation of average tax rate for corporate tax in the city of Obninsk is presented in table 3.

Table 3

Calculation of values of the average tax rate for corporate tax

Year	Tax revenue from CT, thous. rub.	Inflation in base-year prices	Tax revenue in base-year prices, thous. rub.	Income of citizens and profit of the enterprises in base-year prices, thous. rub.	Average tax rate, %
1	2	3	4 = 2:3	5	6 = 4:5
2001	120205	1,00	120205,4	1804197	6,66%
2002	147092	1,15	127795,0	1881316	6,79%
2003	146366	1,29	113539,5	2147424	5,29%
2004	101732	1,44	70649,8	2272812	3,11%
2005	0	1,60	0	3058522	0,00%
2006	14695	1,74	8442,4	3513917	0,24%
2007	28583	1,95	14661,7	4505474	0,33%
2008	30640	2,21	13871,9	3656129	0,38%
2009	22942	2,40	9546,6	3636909	0,26%

The analysis of obtained data says that average tax rate of corporate tax also considerably changed in 2001- 2009 – from 0,0% to 6,79. The greatest volume of revenue was in 2007 and came to 4505474 thousand rubles at 0,33% average tax rate.

Two opposite regression models construction for corporate tax showed that in further research it is necessary to consider regression model reflecting dependence of tax revenues from tax rate. The characteristic of all models studied during research for corporate tax is presented in table 4.

Table 4

Model summary and parameter estimates for CT

Equation	Model summary			Parameter estimates		
	R Square	DW	Sig-	Constant	b1	b2
Linear	0,98777	0,47	5,91E-08	6080,7148	18387,24	-
Logarithmic	-	-	-	-	-	-
Inverse	-	-	-	-	-	-
Quadratic	0,997946	1,52	0,00	-	2897450	-15505700
Cubic	0,99716	1,43	8,75E-07	-	21905,13	730,90
Exponential	-	-	-	-	-	-

Thus, having analysed results, it is possible to tell that the best parameters are shown by quadratic equation as follows:

$$y(CT) = 2897450 \times ATR_{CT} - 15505700 \times ATR_{CT}^{2}, \text{ where} \qquad (3)$$

$y(CT)$ – tax revenues from corporate tax;

ATR_{CT} – average tax rate for corporate tax.

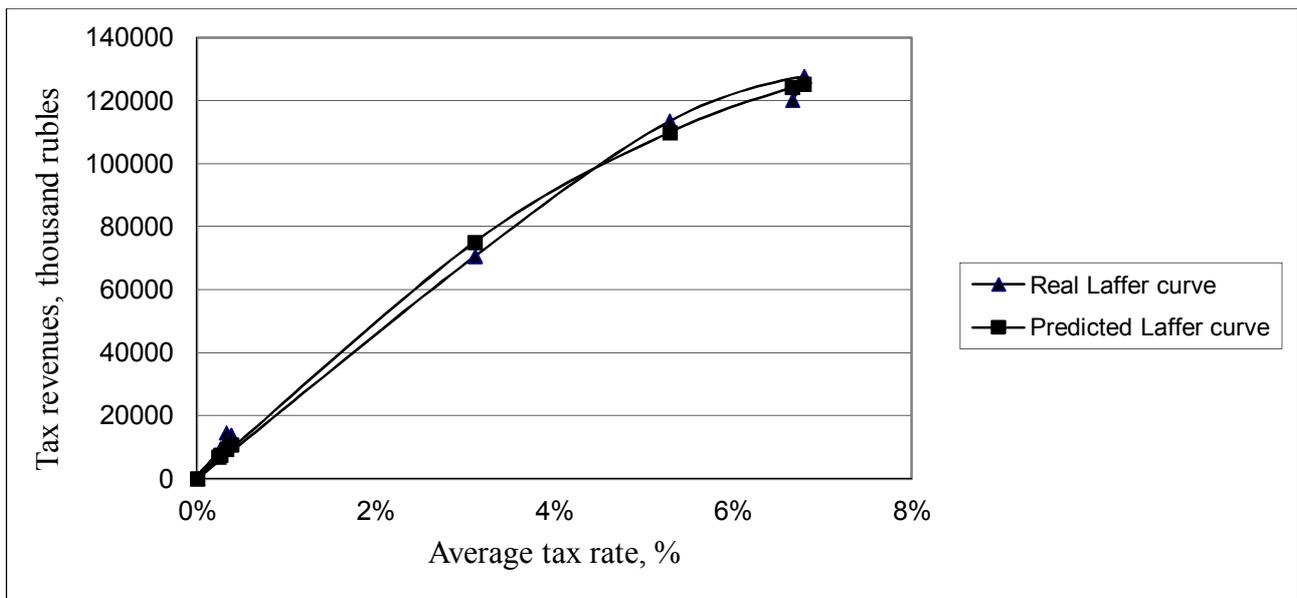In figure 3 we will consider Laffer curve for corporate tax.

Fig. 3. Laffer's real and predicted curves for corporate tax

In this figure we can see that predicted curve almost repeats real curve, it deviating only a little that suggests about high quality of the constructed predicted model. As a result of the solution of quadratic regression equation and substitution of the received value it is possible to tell that tax potential of corporate tax comes to 135174,33 thousand rubles at 9% optimum tax rate.

Then cumulative frderal tax potential will come to 328423,61 thousand rubles at the 9% and 7% optimum tax rates for personal income tax and corporate tax accordingly.

The concept "use of municipality tax potential for federal taxes" representing the ratio of current federal tax potential to that calculated (optimum) is examined in detail in the work [1] and suggests about underexploitation of all reserves and need of

tax rates increase , on reaching the optimum. Comparison of estimation methods of cumulative tax potential for federal taxes can be seen in table 5.

Table 5

Comparison table of federal tax potential estimation methods in the city of Obninsk

Year	Data		Estimation of TP by method based on actually collected income		Estimation of TP by method based on the indicators of tax reporting	
	Actual tax revenues, thous. rub.	UTP	TP, thous. rub.	UTP	TP, thous. rub.	UTP
2001	262233,80	0,79	262233,80	0,79	271291,78	0,82
2002	297866,90	0,91	253619,27	0,77	308164,44	0,93
2003	311193,68	0,94	263967,73	0,80	321971,92	0,98
2004	187001,32	0,56	158743,59	0,48	193475,72	0,58
2005	100896,66	0,31	83744,23	0,25	104428,04	0,31
2006	127792,22	0,39	106489,66	0,32	132256,51	0,40
2007	240128,60	0,73	200039,82	0,61	248518,44	0,75
2008	260963,04	0,79	217292,92	0,66	270082,88	0,82
2009	238244,94	0,73	198220,63	0,60	246573,97	0,75

From represented above the table it is possible to draw a conclusion that use of municipality tax potential for federal taxes ratio rather strongly varies in 2001-2009. So, minimum value for estimated data is equal to 0,25 in 2005, and maximum is 0,98 in 2003 (for actual revenues 0,3 and 0,95 accordingly) that means that it is necessary to adhere to the offered recommendations of optimum tax rates establishment for personal income tax and corporate tax (7% and 9%).   It will lead to increase of the cumulative tax potential of the federal taxes to 328423,61 thousand rubles.   Having multiplied this value by inflation coefficient, it is possible to calculate tax potential for any year we are interested in. So, in 2010 it is equal 844049 thousand rubles, in 2011 – 903165 thousand rubles, in 2012 – 962281 thousand rubles and in 2013 – 1018113 thousand rubles.

Thus, the conducted research showed that the offered hypothesis is right. Having compared estimates of federal tax potential by use of two existing methods and actual tax revenues with calculated values of cumulative tax potential in Obninsk, it should be noted that their values strongly differ from actual ones, and actual revenues are less than maximum possible level. It means that it is necessary to correct fiscal policy in Obninsk through communication with the federal authorities and bringing tax rates to optimum level as municipality has no right to change them without permission.

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