

## **The systematic approach to optimization of activity of the tax authorities**

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**Abstract.** One of the basic provisions of the system approach is that, on the one hand, the object in question is represented by a system of models, on the other hand, it is considered as an element or component of another, more common system. The economic interpretations of optimizing the activities of the tax authority are highlighted: optimizing costs and results, optimizing the level of predictability, optimizing labor productivity, etc. They allow different mathematical concepts, for example, optimizing costs and results can be represented by their difference or their ratio. The success of the creation and implementation of the optimization program is determined by taking into account all significant factors affecting the activities of the tax authority and its results. To identify all factors, a set of dichotomous classifications of factors has been proposed: static-dynamic, internal-external, etc. The selection of significant factors is based on attributing them to one of three classes: a) contributing to optimization; b) impeding optimization; 3) do not affect the optimization. The following is estimated: 1) direct and indirect influence; 2) momentary and ongoing; 3) predictable and unpredictable; 4) with increasing and weakening effect. On this basis, an economic-mathematical model has been developed to optimize the activities of the tax authority.

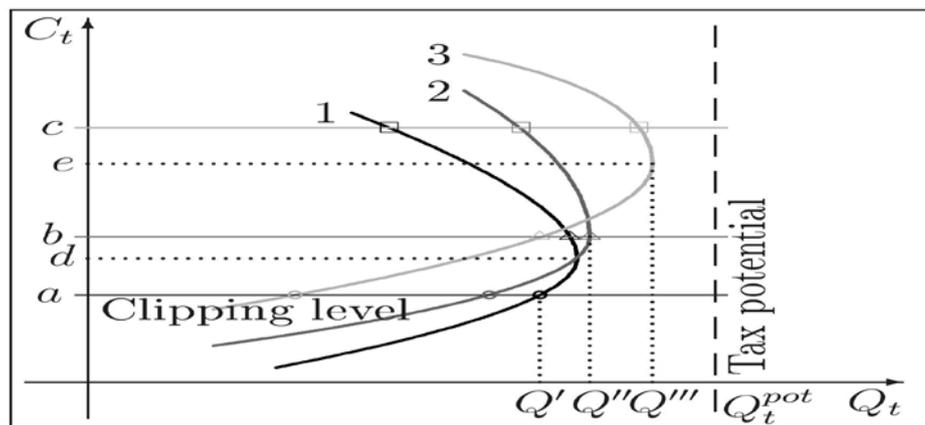
### **1. Introduction**

The main indicators of the efficiency of the tax authority are: a) the amount of tax revenues; b) the difference between the volume of tax revenues and the cost of the tax authority; c) the ratio of tax revenues to the costs of the tax authority[1]. These indicators are influenced by such factors as the quantitative and qualitative composition of taxpayers; quality control work of the tax authority, including the organization of business processes in the tax authority, legislative base [2], etc. The paper presents a model for optimizing the cost of the tax authority, taking into account the role of various factors on the amount of tax revenues to the budget, proposed various classifications of these factors.

## 2. Optimization of the tax authority in the context of the systematic approach

### 2.1. Relations between the costs of the tax authority and the amount of tax revenues to the budget

One of the basic indicators of the efficiency of the tax authority, according to which the optimization of costs for the activities of the tax authority is assessed, is the difference between the amount of tax revenues and the cost of receiving them. In this article, by optimizing the costs of tax payments, the authors understand the definition of such a size of these costs, at which the difference between revenues to the budget from paying taxes and fees (hereinafter - tax revenues) and the costs of receiving them, that is, "net income" will be maximum. A graphic representation of the cost of collecting taxes and their results is presented in Fig. 1.



**Fig. 1: The relationship between the costs of levying taxes and their results.**

Notation used:  $Q_t$  - tax revenues less expenses for the activities of the tax authority;  $Q_t^{pot}$  - tax potential;  $C_t$  - the cost of levying taxes and fees; 1, 2, 3 - variants of the lines "Costs - Receipts";  $a, b, c$  - "cutoff levels".

As an example, consider the relationship between tax revenues  $Q_t$  and  $C_t$  costs for the activities of the tax authority for some three combinations of factors (of course, in reality, the number of such combinations may be much greater). Suppose the dependencies between tax revenues  $Q_t$  and  $C_t$  expenditures on the activities of the tax authority for each of some of the three combinations of factors in fig. 1 are described, respectively, by curves 1, 2, 3. As an example, let us consider the retention of the functionality of employees, i.e., the increase in costs for the tax authority's activities is reduced to recruiting new employees while retaining their duties, as well as information collection and processing technologies. In this case, an increase in the number of employees will lead to an increase in the number of tax audits, more thorough processing of documents, etc. Firstly, this may lead to an increase in tax revenues to the budget. Secondly, an attempt to increase the number of employees may be confronted with objective limitations: a shortage of qualified personnel, a shortage of space to accommodate additional employees, etc. We called the level of funding, at which such limitations arise, the "cut-off level". Financing in excess of the cut-off level is meaningless, since it is not possible to master these amounts: for example, to hire additional employees due to the lack of the necessary specialists. Suppose that for the combination of factors shown in fig. 1 line 1 cutoff level is  $a$ , line 2 cutoff level is  $b$ , line 3 cutoff level is  $c$ . Then in the situation shown in fig. 1 by line 1, the optimal cost would be  $d$ , but it significantly exceeds the

cut-off level  $a$ . For the situation depicted by line 3, the optimal cost level is  $e$ , which is well below the line representing the cut-off level  $c$ . In the case of line 2, the cut-off level and the optimal cost level are the same.

## **2.2. Classification of factors affecting the amount of tax revenues to the budget**

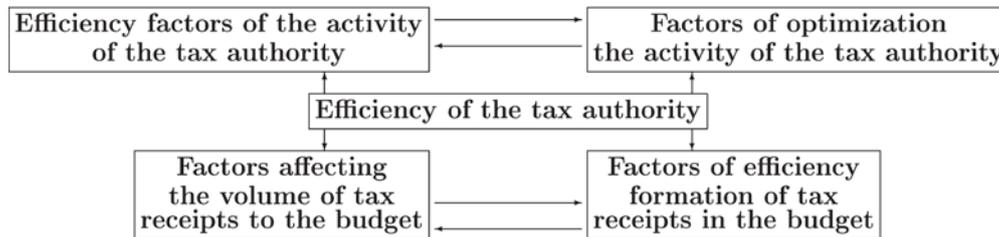
Analysis of the nature of the factors influencing the amount of tax revenues allows us to identify a group of external and internal factors. Accordingly, the external factors include: inflationary factors; the system of government; natural and climatic factor; geographical factor; federal legislative factor; political factor; macroeconomic factor and a number of others. Internal factors, in turn, include: regional legislative factor; socio-demographic factor; resource factor; infrastructure factor, as well as such internal factors as: the volume of the shadow economy, investment, innovation, environmental, cultural (tax culture), administrative (tax administration). Note that the condition for a more complete formation of the volume of tax revenues is to take into account all the factors listed, and their ranking depends, first of all, on the economic condition of the country (region). The problem of selecting criteria by which the work of tax authorities should be assessed is still open, although many relevant techniques have been developed and proposed, which differ in both the information base and the goals. It should also highlight the static (constant) and dynamic (variable) factors [3]; direct and indirect; managed and unmanaged. Each group of factors, in turn, includes several subgroups, which is characterized by more individual characteristics - examples of factors included in this subgroup. Impact on groups of factors or on individual factors can improve or worsen the efficiency of the tax authority, optimize or deoptimize the costs and results of the tax authority's activities (increase or decrease the difference between the amount of tax revenues and the expenses of the tax authority to receive them). Management by influencing groups or subgroups of factors is undoubtedly more complex than influencing individual factors. At the same time, any of these impacts can improve or worsen the efficiency of the tax authority, that is, increase or decrease the difference between the volume of tax revenues and the cost of obtaining them. One important point should be noted: the main purpose of the tax authority is to obtain the maximum possible difference between the amount of tax revenues and the cost of obtaining them.

## **2.3. The impact of the identified factors on the optimization of the cost of the tax authority**

The impact of a factor affecting the optimization of costs of the tax authority is as follows: 1) it contributes to optimization; 2) impedes optimization; 3) does not affect the optimization. The following is estimated: 1) direct and indirect impact; 2) simultaneous and continuing impact; 3) predictable and unpredictable impact; 4) impact with increasing and weakening effect.

Note that this classification of factors affecting the amount of tax revenue generation is, in the literal sense of the word, conceptual, since there are practically no "absolute factors" - absolutely static and dynamic, absolutely manageable and uncontrollable; in a certain situation, external factors become internal, dynamic - static and vice versa; direct - indirect. Thus, each of these dichotomous partitions is not absolutely exact - there are always intermediate (transitional) variants.

The listed types (groups) of factors are the basis for the formation of the tax authority's performance model, see Fig. 2, which includes: factors of the efficiency of the tax authority; factors optimizing the work of the tax authority; factors affecting the amount of tax revenues to the budget; factors of efficiency of formation of tax revenues in the budget [4].



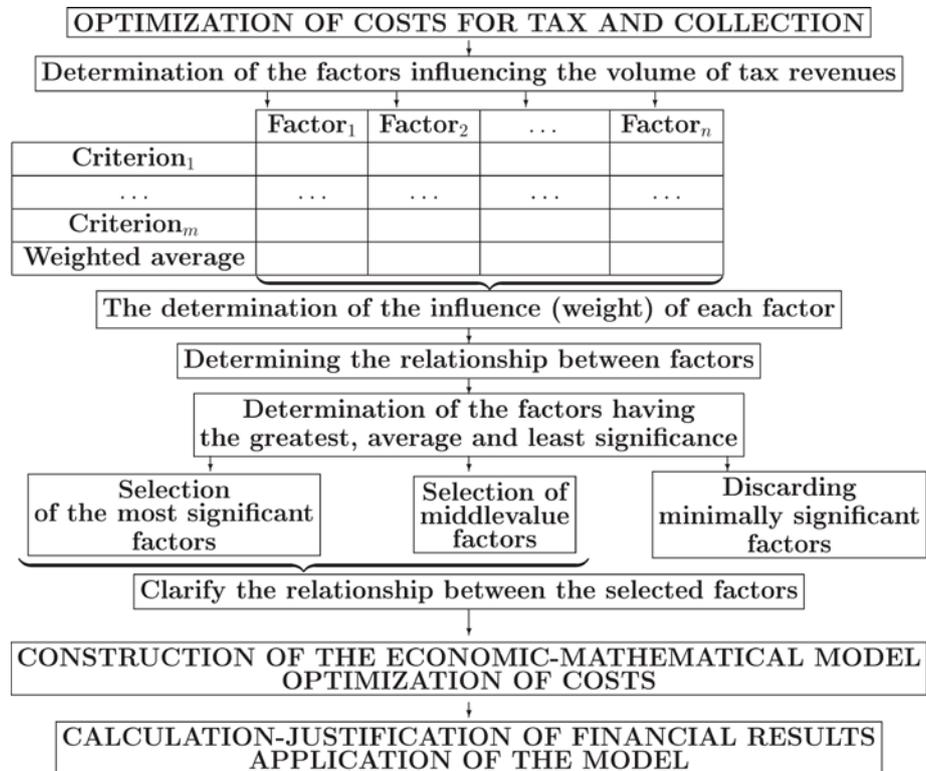
**Fig. 2. Model for increasing the efficiency of the tax authority**

The presented model shows the interaction and interrelation between the factors of efficiency of the tax authority, factors of optimization of the tax authority, factors affecting the amount of tax revenues to the budget and factors of efficiency of tax revenue generation in the budget. In other words: understanding, taking into account and using the relationship and interaction of the listed factors is a universal (conceptual) tool for increasing the efficiency of the tax authority [5]. Thus, the impact on the factors of optimization of the tax authority entails an increase in the efficiency of the tax authority and vice versa: the impact on the factors of the efficiency of the tax authority entails the optimization of the activity of the tax authority [6]. On the other hand: the impact on the factors of efficiency in the formation of tax revenues to the budget entails an increase in the volume of tax revenues to the budget [7]. Thus, the impact on any element of the matrix inevitably entails an impact on its other elements, which should lead, ultimately, to improving the efficiency of the tax authority [8].

#### **2.4. Economic-mathematical model of cost optimization**

As follows from Fig. 1, the relationship between tax collection costs and their results should be such that the  $C_t$  point — the tax collection and tax collection costs are as close as possible to the optimal tax collection and collection costs or optimal costs — only in this case the maximum possible difference between tax revenues and the cost of their receipt. The need to get closer to this situation entails a corresponding impact on the groups, subgroups and types of individual factors considered above that ensure the efficiency of the tax authority's activities and, accordingly, an increase in tax revenues to the budget [9]. It should be remembered that the impact on a particular factor (group of factors) can lead to a worsening of the situation - to reduce the size of the difference between the amount of tax payments and the cost of receiving them. Thus, an excessive increase in the number of tax audits will, in general, lead to an increase in tax revenues to the budget, but the increase in such payments will be covered by the costs of such audits. A similar situation may arise when a significant, unreasonable increase in the cost of the behavior of information activities by the tax authority, in the implementation of ineffective investment projects, in the event of an excessive increase in the tax burden on business and in some other cases. Of particular interest in studying this problem is economic-mathematical modeling, that is, a simplified reflection of economic reality using equations, graphs, describing the interaction

of various factors. At the same time, an economic model usually seeks to explain how economic conditions affect key economic variables, and mathematical modeling involves the use of functions that reflect in a mathematical form the dependence of one set of variables on another, and graphs depicting dependencies between two or more variables. The composition of these tasks, the relationship and the elementary economic and mathematical model of cost optimization presented by the authors in Fig. 3.



**Fig. 3: The model and tasks of optimization of the costs of levying taxes and fees**

As can be seen from Fig. 3, the final result of optimizing the costs of collecting taxes and fees is the calculation-justification of the financial results of applying the developed economic-mathematical model of such optimization. At the same time, it is necessary to take into account the costs of introducing this model into the practice of the tax authority, which will undoubtedly entail additional costs, the calculation and justification of which also requires a separate scientific study [10].

### 3. Conclusion

We can distinguish the following groups of factors optimizing the activities of the tax authority: increasing the amount of tax revenues to the budget and raising the costs of the tax authority's activities; reducing the amount of tax revenues to the budget and reducing the costs of the tax authority; reducing the amount of tax revenues to the budget and reducing the costs of the tax authority; increasing the amount of tax revenues to the budget and reducing the costs of the tax authority [11]. Factors that increase the amount of tax revenues to the budget and increase the costs of the tax authority's activities are of interest if the increase in tax revenues exceeds the increase in the costs of the tax authority's activities. Of greatest interest is a group of factors that increase the

amount of tax revenues to the budget and reduce the costs of the tax authority. At the same time, a reduction in the cost of the tax authority's activities should be considered in the long term (in the future) [12]. In the case when the optimal amount of financing of the tax authority's activity is determined by the cut-off level (see Fig. 1), and with an increase in the level of funding, the difference between tax revenues and expenses for the tax authority's activities increases, the government should take a set of measures to increase the cut-off : organize retraining of personnel, build additional premises [13], etc. In the case when the cut-off level exceeds the optimal amount of funding, the state should focus, firstly, on the selection of the optimal combination of significant factors, i.e., affecting the amount of tax revenues; secondly, on refining the estimate of the optimal amount of funding for promising combinations of significant factors. For the presented model, the following research directions are relevant. First, it is necessary to clarify the model taking into account the specific type of costs for the tax authority's activities: salary costs, infrastructure support and development, in particular, equipment, etc. Secondly, it is important to identify and formalize the main factors affecting the level tax revenues. Some of them are clear: the number of taxpayers and the amount of their income, the level of tax discipline, etc.

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