

USING OF VARIANT OPTIMIZATION METHODS FOR DETERMINATION OF RATIONAL TAXATION AMOUNT

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Abstract: In this thesis the model for optimization of taxation drawn up on the basis of forming relative single indexes is offered, based on the choice of the best taxation scheme, using pre-calculated variants with systematically changing elements. The concept of optimal (comfort) value of fairness and efficiency is formulated in tax policy. Solution of problem of tax policy system's requirements noncompliance with optimization method of successive concessions is described.

Keywords: taxes, tax policy, the optimization of the tax system, the effectiveness of the tax system, fairness of the tax system.

JEL Classification: H21

1 INTRODUCTION

The problem of a balanced taxation policy has been studied by scientists of different economic systems over the centuries. Despite the abundance of such studies, the question of social justice and a balanced, efficient taxation policy remains relevant to this day.

The goal of research is to define the term “balanced taxation policy”, to assess the current practice of the social tax collection in Latvia in terms of balance, and to develop methodological guidelines for the formation of a socially effective model of taxation.

The object of research is the tax system of Latvia.

To achieve the set goal the following tasks need to be solved:

- to examine the theoretical approaches to the formation of a balanced and effective taxation policy;
- to assess the operational practice of the social security tax collection in Latvia;

- to identify and substantiate the ways of implementing a balanced model of taxation.

For the purposes of the research the methods of analysis, synthesis, comparison, logical generalization, regression and mathematical models were applied.

Let's introduce the value of optimal (comfort) value of fairness and efficiency compatibility in tax policy (FEC). Tax policy's value has to be determined taking into account basic relations of these criteria with the appropriate taxes.

For this purpose, it is useful to develop the method that would allow rationally and reasonably to choose FEC, which will maintain at the required level economic policy of the state and comfort taxation for individuals and legal persons.

As it follows from the theoretical research, the taxation policy is a tool of economic management and the regulatory instrument of market negative developments. However, as practice shows, the philosophy of the taxation policy resident in legislators has a different character: all taxes, without exception, are considered to be the budget revenues, while other functions of taxes, such as the promotion of innovation in the economy, social income adjustment, and social responsibility, are irrelevant or secondary.

According to the author, this occurs for several reasons:

- the taxation system falls behind the changes in the economy;
- changes in the taxation system do not feature systematic character and flexibility, and are unilateral: the sole purpose of legislators is to replenish the budget;
- inefficient tax administration in terms of optimization of tax revenues and control makes it necessary to increase taxes collected from law abiding taxpayers, and change tax rates.

These reasons have contributed to some negative phenomena observed in today's Latvia: hidden employment, a significant gap between the official and real income growth, the growing amount of money savings in extra bank circulation, reduction of tax collection and increase of the budget arrears, the outflow of labor force abroad, the confrontation within the society, the poor quality of public health. Under these conditions, the formation of socially effective taxation system in Latvia is becoming particularly important.

The fundamental principles for the formation of a taxation model have been established by scientific researchers and practitioners. These include: the need for a consistent and stable taxation system that encourages economic development; a differentiated approach to the tax burden, taking into account the social dimension of taxation; an effective system of tax control. These principles are enshrined in the regulations of most European countries and are not disputed in the scientific community.

The model of a balanced taxation policy involves the synthesis of efficiency and justice². Justice assumes that the payment of taxes should be linked to the size of the obtained public good and the ability to bear the financial burden³. According to some economists, the more justified the system of taxation is, the less effective it is⁴.

One may disagree to this opinion, because a justified system of taxation encourages more productive labor and thus contributes to the economic growth.

The analysis of income taxation imposed on the population of Latvia and its evaluation in terms of balance led to the following conclusions:

The income tax imposed on the population features an unstable trend (Table 1). In 2010 and 2011 there was a significant decline in the growth of income tax and social security payments. This was due to the effects of the crisis in the economy. In 2012, the situation somewhat improved. The social payments compared to the personal income tax had grown slightly. In 2013 compared with 2003, the growth of personal income tax amounted to 76.62%, and the increase of social payments - 146.32% (Table 1).

Table 1. Increase in performance with respect to 2003, in %⁵

Year	Average monthly wage (gross)	Economically active population (15-64 years)	Personal income tax	Social security tax
2003	0.00	0.00	0.00	0.00
2004	9.49	-0.08	22.92	16.66
2005	27.74	-1.36	34.18	31.81
2006	56.93	0.49	63.69	69.21
2007	106.57	1.81	84.94	12374

² N.Gregory Mankiw. Principles of Economics, 4th edition: St. Petersburg: Piter, 2012, p.273.

³ ibid, p.273

⁴ ibid, p.272

⁵ Central Statistical Bureau of Latvia; <http://www.csb.gov.lv/>

2008	148.91	3.15	114.08	163.33
2009	139.05	0.49	94.96	195.08
2010	131.02	-2.80	66.33	102.37
2011	140.88	-5.33	34.35	118.74
2012	150.00	-5.38	72.92	141.06
2013	161.31	-7.29	76.62	146.32

Source: Own

Unsustainable growth in tax revenues occurs against the background of relatively stable growth of average wages and population size decline. The correlation analysis results are reported in Table 2.

Table 2. Correlation coefficients

Average monthly wage (gross)	Economically active population (15-64 years)	Average monthly wage (gross)	Average monthly wage (gross)
Personal income tax	Personal income tax	Social security tax	Social security tax
0,767	0,184	0,932	-0,133

Source: Own

The analysis showed a weak correlation between the number of economically active population and social tax revenues. The main reasons for this are as follows:

- The principle of universal incidence of taxation is violated. Entrepreneurs, who own businesses and at the same time manage them, do not pay themselves wages. Under the current tax system it is more profitable to pay themselves dividends instead. Total dividends accrue 15% income tax and the dividends that have been paid – 10%, in total - 25%. The social tax rates are 10.50% of wages paid by employees and 23.59% are paid by employers. The total rate is 34.09%. In accordance with the law, the fees of journalists, artists, lawyers, etc. are not subject to social security payments. There are also restrictions of the maximum size of fees subject to social tax.
- The principle of social justice is violated. Social benefits are paid to a bankrupt entrepreneur and to a journalist left without income, etc.
- A voluntaristic approach to tax planning. In 2014 in comparison with 2003, the projected growth of social tax was by 263.97%. At the same time, the number of active population in 2013 actually reduced by 7.29%, and the improvement of the demographic situation in the near future is not foreseen. The increase in gross wages in 2013 amounted

to 161.31%. It can be concluded that in the given circumstances the projected figure for the gain of tax is unrealistic.

To build a socially effectual model of taxation one needs to strictly adhere to certain basic principles. It is necessary to amend the legislation of the Latvian Republic in the following aspects: to eliminate discriminatory approach to taxation, to eliminate unreasonable benefits in the system of social security tax collection; to plan tax revenue based on the actual situation by taking into account the determining factors; in the course of fiscal system reformation to respect the mandatory nature of the social regime as a factor ensuring a rapid economic growth and favorable development of the society.

Before to realize variant optimization, it is necessary to specify numerical values of relative single indexes that characterize “fairness” and “efficiency” of tax policy for the appropriate state in each case and period.

We will specify numerical values of relative single indexes according to single scheme:

$$K_{ij} = P_{ij} / P_{i, bl}; \quad K_{ij} = P_{i, bl} / P_{ij}, \quad (1)$$

$$i = 1, N; \quad j = 1, M,$$

where K_{ij} - relative designation of relative single index;

P_{ij} - value of single index of researched characteristic (“fairness” or “efficiency”);

$P_{i, bl}$ - value of single index taken as basic (possible) level;

i - name of the estimated characteristic;

j - no. of variant;

N - the number of relative single indexes;

M - the number of researched variants.

As $P_{i, bl}$ we assume quality indexes for the appropriate taxation variant that can be considered the best or value $P_{i, bl}$ can be determined according to other special considerations.

As values of relative single indexes $P_{i, bl}$ it is possible also to assume critical values of quality indexes of researched variants of the system.

Relative single indexes – “fairness” $K_{f,j}$ and “efficiency” $K_{e,j}$ – are formed so that their values in the range of values less than 1 show not allowed quality

values (their characteristics), but allowed values of index $K_{i,j}$ are equal to 1 or exceed 1.

Using values of relative single indexes (1), we construct the graphs showing their dependence as the combined diagram, which research showed an inability of FEC, taking into consideration providing of necessary efficiency, without verification of taxation characteristics that determine the criterion of fairness.

We will show application of method of variant optimization on the example of relative situation, which parameters are simulated in Table 3.

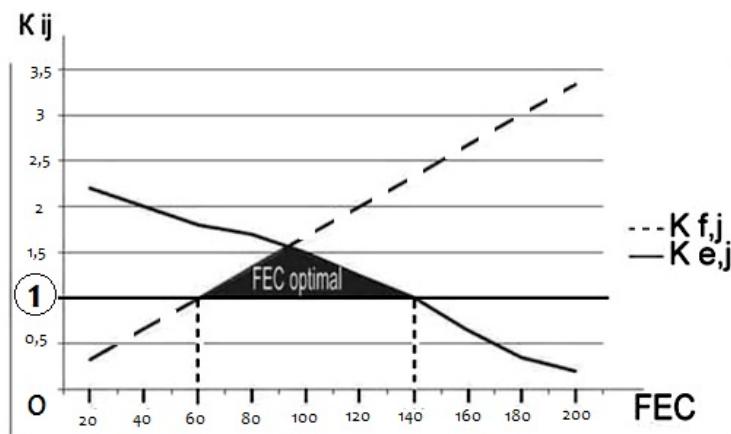
Table 3. Characteristics of the parameters used for the calculations of relative single indexe

Nº variant, j	1	2	3	4	5	6	7	8	9	10
FEC	20	40	60	80	100	120	140	160	180	200
$P_{f,j}$	900	450	300	225	180	150	130	115	110	90
$P_{f,bl}$	300									
$K_{f,j}$	0,33	0,67	1,00	1,33	1,67	2,00	2,31	2,61	3,00	3,33
$P_{e,j}$	44	40	36	34	30	25	20	13	7	4
$P_{e,bl}$	20									
$K_{e,j}$	2,20	2,00	1,80	1,70	1,50	1,25	1,00	0,65	0,35	0,20

Source: Own

Using the values of calculated relative single indexes, we construct the graphs of their dependence on tax policy as the combined diagram (fig. 1).

Figure 1. Combined diagram of dependences of relative single indexes from FEC

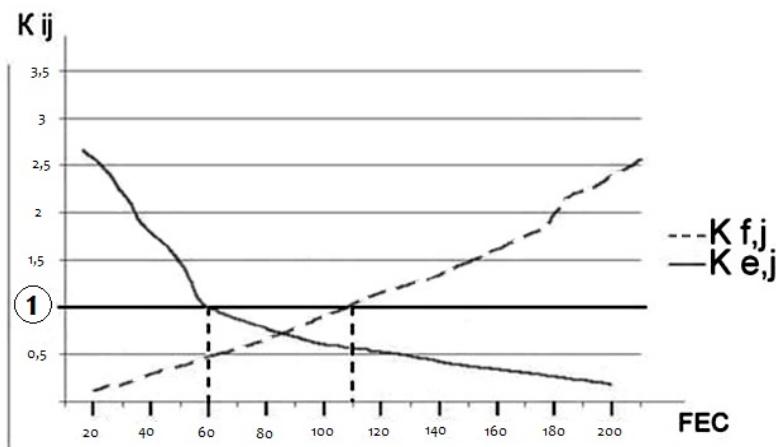


Source: Own

The offered method of variant optimization can be used to compare different schemes of taxation or to carry out the plan for the state development and creation of state-owned enterprises or additional workplaces.

The considered task is nonlinear and can have a lot of solutions. Physical and logical analysis provides single solution-making. The most difficult situation is, if unacceptable solutions have been refused and there is not any suitable (fig. 2).

Figure 2. Incompatibility of relative single indexes



Source: Own

It means that the assumed characteristics and features are incompatible, and it is not possible to specify the value of FEC, taking into consideration these limitations.

In such situation it is useful to use the optimization method of successive concessions. For this purpose a group consisting of 22 experts has been formed. They have been offered to determine priority(to carry out ranging) of relative single indexes, characterizing principles of tax policy, that is, duties, fairness, efficiency, clearness and exactness, convenient levy of taxes for taxpayers, as well as ranging of taxes provided by tax legislation of the Republic of Latvia.

Compliance degree was specified, using Kendall's coefficient of concordance.

Opinion of experts is agreed, if value of coefficient of concordance is more than 0,6. As at ranging of principles of tax policy the value of coefficient of concordance was < 0,6, the experts have been divided into two subgroups in accordance with their opinions (according to the degree of coordination).

The first subgroup consists of 14 experts, the second – of 8. The calculations showed that opinion of each of these two subgroups of experts is agreed. In accordance with it the principles of taxation are divided according to their importance in the order specified in Table 4, 5.

Table 4. Distribution of taxation principles on importance according to results of opinions of the first subgroup of experts

	Principles of taxation
1.	Principle of fairness
2.	Principle of clearness and exactness
3.	Principle of duties
4.	Principle of efficiency
5.	Principle of convenient levy of taxes for taxpayers

Source: Own

Table 5. Distribution of taxation principles on importance according to results of opinions of the second subgroup of experts

	Principles of taxation
1.	Principle of duties
2.	Principle of clearness and exactness
3.	Principle of fairness
4.	Principle of efficiency
5.	Principle of convenient levy of taxes for taxpayers

Source: Own

At ranging of taxes existing in Latvia, opinion of all 22 experts was agreed. According to it taxes in order of reduction of importance are divided as follows (Table 6).

Table 6. Distribution of taxes of Republic of Latvia according to results of opinions of experts

	Taxes in Republic of Latvia
1.	Value Added Tax (VAT)
2.	Excise Duty
3.	Enterprise Income Tax
4.	Real Estate Tax
5.	State Social Insurance Mandatory Contributions
6.	Natural Resources Tax
7.	Personal Income Tax
8.	Customs Duty
9.	Tax on Cars and Motorcycles
10.	Company Car Tax
11.	Microenterprise tax
12.	Lottery and Gambling Tax
13.	Electricity Tax
14.	Vehicle Operating Tax
15.	Tax on Subsidized Electricity

Source: Own

2 CONCLUSIONS

To build a socially effectual model of taxation one needs to strictly adhere to certain basic principles. It is necessary to amend the legislation of the Latvian Republic in the following aspects: to eliminate discriminatory approach to taxation, to eliminate unreasonable benefits in the system of social security tax collection; to plan tax revenue based on the actual situation by taking into account the determining factors; in the course of fiscal system reformation to respect the mandatory nature of the social regime as a factor ensuring a rapid economic growth and favorable development of the society.

To solve the set task it is necessary to determine and to describe quantitatively all relations of fairness and efficiency with taxes applied in the appropriate state and, using the method of variant optimization offered in this thesis to develop the system of determination of optimal taxation parameters allowing to set the scheme of taxation accepted by the majority of members of society.

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