The synchronicity phenomenon of trends of income tax and population savings in the Russian Arctic

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Abstract. The article attempts to assess the impact of an existing tax burden on an individual’s standard of living and the possibility to savings, as well as to determine the trajectory of changes in the level of tax burden and population savings. The regions of the Russian Arctic were chosen as the research object, since, the harsh environmental conditions, the compensation for living expenses of the population is significantly higher than in other regions of the Russian Federation. The differentiation of incomes of the Arctic population and the structure of incomes using are analyzed for research of the phenomenon of synchronism of the trajectories these indicators. The measure the cost of living of northerners has been carried out. The relationship between the standard of living, the dynamics of savings and the tax burden has been established. Based on the author's methodological approach, the maximum possible tax burden is determined, which reflects the maximum level of the tax rate in comparison with the income of individual residing in the region of the Arctic zone. Proposals for the introduction of innovations in the individual tax system for the fair distribution of tax burdens in conditions of increased discomfort of people live are formed.

1. Problem statement

Initially, the functional role of income taxes (fiscal, distributive) has a specific and relatively independent character, but in terms of the integration of these functions both in fiscal system and in system of regional socio-economic development, taxes of this type could be considered in two ways. On the one hand, tax is instrument for regional budget system’s needs; on the other hand, it is a mechanism regulating the level of disposable incomes of the population and the structure of their use. In addition, the consistency of income taxes is the involvement in the mechanism of social regulation of all its elements, which contributes to the achievement of equity in income distribution [1]. Due to the tough climatic conditions in the Arctic regions, the compensation of expenses of population livelihood is significantly higher than in other Russian regions [2-3]. Despite high average per capita incomes, the living standard of the population of the Arctic regions is approaching the living standard of the average Russian, although, it would seem, incomes should be higher than the average Russian level because northern allowances are included in population income of the Arctic regions. In addition, the regional income disparity and living standard of population in the regions has a significant impact on savings. In regions the population with high income savings most of the income than the population of with low income. Therefore, the determination of the fair tax burden of the population of the Russian Arctic will not only balance income with consumer price, but also increase the general income level and population savings.
Today, the issue of fair taxation is the subject of many research papers of foreign and Russian scientists. Such scientists as A. Bryzgalin, L. Lykova, S. Pepelyaev made a significant contribution to the development and research of taxation problems. The issues of tax burden assessment and the influence of different factors on its level (government support, non-tax payments, social instability) are set out in the scientific publications of D. Ryakhovsky, E. Ermakova, A. Kadushkina, E. Balatsky. The problems of population savings and ways of their using were studied by V. Gurtov, T. Zaslavskaya, A. Kalmykov, Y. Melekhin. The population savings as an investment resource for regional development were considered by such famous scientists N. Blank, Y. Kashin, O. Lavrushin, G. Kobylinskaya. However, despite there has been a large number scientific publications relating to separate income taxes and population savings, issues of the relationship and interaction of these indicators remain still low understood. Therefore, the purpose of the research is to establish complementarily between tax burden of an individual and his savings level based on an equitable distribution of population incomes, taking into account the characteristics of the region. In Russia, the taxation of individuals is represented by three taxes: income tax, property tax and transport tax. The research is focused by income taxes, namely, personal income tax (PIT). This is mainly due to the income tax is key tax in the formation budget revenues of region.

2. Tax burden in the income structure of the population

The government has two main objectives in the formation of fiscal policy. The first is a fair distribution of tax burden between segments of the population to reduce inequality in the redistribution of their income. The second is attracting additional budgetary resources for regional development. This means that all aspects of state financial policy including tax and budgetary components should be focused not only on fiscal objectives, but also on solving social and economic problems [4, p. 164]. Is it really? To answer the posed question, we will conduct a comprehensive assessment of the main indicators of living standard of population and their structural characteristics.

We will analyse the dynamics of the average per capita incomes of the population in the Arctic regions over the past eight years (figure 1).

![Figure 1. Dynamics of average per capita population incomes in the Arctic regions, rub.](image)

In the Arctic regions population incomes in absolute terms have a tendency to grow and these incomes are higher Russian average. Considerable deviation income level is observed in the Nenets, Chukotka and Yamalo-Nenets Autonomous Okrugs (more than 2 times from Russian average). Since 2013, income growth is slowing both in Russia as a whole and in the Arctic regions. However, based on the tendency of growth of the population’s income in absolute and relative values it cannot be argued about the satisfaction of the population with their welfare level.

In fact, the population assesses its standard of living not by the average rate of income growth, but by the growth in the possibilities of meeting their needs at the expense of the income received. To
some extent, “purchasing power” of population incomes in a particular region can be determined by the ratio of average income and the minimum subsistence level \[6\].

If we compare population incomes in the Arctic region with the minimum subsistence level, then we will note that, despite incomes growth, the living standard of the population in the Arctic regions are approaching the Russian average, although it would seem that income should be higher than the Russian average due to the fact that northern allowances are included in population income in the Arctic regions (figure 2).

\[
\begin{array}{|c|c|c|c|c|c|c|c|}
\hline
\text{Year} & \text{Russian Federation} & \text{Murmansk Region} & \text{Nenets Autonomous Okrug} & \text{Yamalo-Nenets Autonomous Okrug} & \text{Chukotka Autonomous Okrug} \\
\hline
2010 & 0.3 & 0.35 & 0.32 & 0.31 & 0.33 \\
2011 & 0.31 & 0.36 & 0.33 & 0.32 & 0.34 \\
2012 & 0.32 & 0.37 & 0.34 & 0.33 & 0.35 \\
2013 & 0.33 & 0.38 & 0.35 & 0.34 & 0.36 \\
2014 & 0.34 & 0.39 & 0.36 & 0.35 & 0.37 \\
2015 & 0.35 & 0.4 & 0.37 & 0.36 & 0.38 \\
2016 & 0.36 & 0.41 & 0.38 & 0.37 & 0.39 \\
2017 & 0.37 & 0.42 & 0.39 & 0.38 & 0.4 \\
\hline
\end{array}
\]

Source: author's calculation based on data of Rosstat \[5\]

Figure 2. The ratio of average per capita cash income and the population subsistence minimum in the Arctic regions, rub.

It should be noted that during the period under review, the share of subsistence minimum in population incomes is increased, which gives ground to conclude that living standard and welfare of the population are declined. The maximum share of subsistence minimum in incomes is characterized for the Murmansk region and is 40 percent, while the population incomes in this region are just above than the Russian average. In addition, the increase of tax burden on the population is a negative factor. This is particularly evident in the Arctic regions (figure 3).

\[
\begin{array}{|c|c|c|c|c|c|c|}
\hline
\text{Region} & \text{2010} & \text{2017} \\
\hline
\text{Murmansk Region} & 0.15 & 0.2 \\
\text{Nenets Autonomous Okrug} & 0.16 & 0.2 \\
\text{Yamalo-Nenets Autonomous Okrug} & 0.17 & 0.22 \\
\text{Chukotka Autonomous Okrug} & 0.18 & 0.23 \\
\text{Russian Federation} & 0.14 & 0.15 \\
\hline
\end{array}
\]

Source: author's calculation based on data of Federal Tax Service \[7\]

Figure 3. The actual level of tax burden, %

According to the Federal Law of 24 October 1997 “On the subsistence minimum in the Russian Federation”, the subsistence minimum is the valuation of the consumer basket in
value terms, as well as mandatory payments and charges. Possible combinations subsistence minimum, population income and tax liabilities are shown graphically in the figure below (figure 4).

The tax base for the calculation income taxes, on which directly proportional depend the amount of tax, is the total amount of income received by the taxpayer. At the same time, the income structure is disregarded to calculate taxes; this may result in a situation when the amount of tax liabilities of a taxpayer will be higher than his personal income (situation 3, figure 4).

\[ TB_{\text{max}} = I - SM \]  \hspace{1cm} (1)

where \( TB_{\text{max}} \) - maximum amount of monthly tax payments with minimum consumer expenses, rub.;
\( I \) - monthly income, rub.;
\( SM \) - monthly subsistence minimum, rub.

\[ TB_{\text{max}}' = \frac{I - SM}{I} = 1 - \frac{SM}{I} \]  \hspace{1cm} (2)

where \( TB_{\text{max}}' \) - maximum possible amount of the tax burden, with regional subsistence minimum.

In this case, the decision to stop work for an individual is sound. In the Arctic regions the likelihood of second or third situation increases considerably due to the high cost of living. Therefore, in order to reduce the emerging regional imbalances in the income distribution, it is especially important to determine the limit for tax rate in comparison with the own income of person residing in the defined territory of a country.

Based on the methodological author's approach, we will correct the actual person tax burden in the context of the living cost in his place of living, by complementing the formula of determining the tax burden [9] with an indicator of the subsistence minimum:

Bellow empirical illustration of this approach is considered on the example of the Arctic regions (figure 5).
Thus, the analysis showed that welfare level of the population in the Russian Arctic regions is decreasing and approaching Russian average. At the same time, the actual tax burden is significantly higher than Russian average. If the subsistence minimum is used to calculate taxes, the tax burden level for the population of the Arctic will be about Russian average. Therefore, the adjustment of the tax burden will allow for leveling inter-regional imbalances caused by different levels of living cost of population in a particular region.

3. Savings in the income structure of the population.

There is growing interest in population savings as an internal reserve for the economic development of regions in light of recent political events taking place in the world community. This is due, firstly, to the integration of Russia into the world economy through the export of natural resources, and, accordingly, its dependence on the cyclical nature of world commodity markets, as well as geopolitical tensions that arose in March 2014 and caused economic sanctions. Secondly, it is caused by the volatility of oil prices, which determined deterioration in foreign trade conditions for Russia [10-11].

The high level of income is not a sufficient reason to assert that population of the region has advantages in terms of opportunities to savings. According to the data presented in Table 1, since 2010 it is possible to observe a general tendency to reduce the share of population savings in the structure of disposable income in Russia as a whole and in two Arctic regions (Murmansk Region, Nenets Autonomous Okrug). There are fluctuations in the volume of savings in Chukotka and Yamalo-Nenets Autonomous Okrugs, which may be caused, firstly, by the uncertainty of the population in the constancy of expected income, and secondly, by differences in perceptions of welfare level. In the Arctic regions, an overestimated level of tax burden is the additional deterrent to savings.

Table 1. Saving* and incomes growth of population, %

|                          | 2010    | 2011    | 2012    | 2013    | 2014    | 2015    | 2016    |
|--------------------------|---------|---------|---------|---------|---------|---------|---------|
| Russian Federation       |         |         |         |         |         |         |         |
| Incomes growth           | 112.4   | 109.6   | 111.7   | 111.7   | 107.1   | 109.7   | 100.9   |
| Saving                   | 20.7    | 16.2    | 14.7    | 14.7    | 12.9    | 18.1    | 15.7    |
| Murmansk Region          |         |         |         |         |         |         |         |
| Incomes growth           | 113.7   | 105.2   | 114.3   | 113.8   | 103.8   | 107.9   | 98.0    |
| Saving                   | 22.5    | 18.4    | 18.6    | 18.9    | 14.7    | 18.7    | 15.2    |
| Chukotka Autonomous Okrug|         |         |         |         |         |         |         |
| Incomes growth           | 108.7   | 112.9   | 112.7   | 108.6   | 108.8   | 107.6   | 103.7   |
| Saving                   | 41.8    | 44.3    | 47.4    | 50.0    | 54.0    | 54.4    | 52.7    |
| Yamalo- Nenets Autonomous Okrug |     |         |         |         |         |         |         |
| Incomes growth           | 109.7   | 107.9   | 112.4   | 110.4   | 105.5   | 109.0   | 101.1   |
| Saving                   | 35.3    | 35.7    | 34.6    | 36.2    | 36.7    | 40.8    | 41.7    |
| Nenets Autonomous Okrug  |         |         |         |         |         |         |         |
| Incomes growth           | 107.2   | 104.5   | 114.1   | 106.3   | 100.3   | 106.6   | 98.7    |
| Saving                   | 60.2    | 57.5    | 57.4    | 56.5    | 51.4    | 51.9    | 50.6    |

Note: Savings are calculated in the income structure

Source: data of the Federal State Statistics Service [5]

Nevertheless, despite unstable trend, savings occur every year (2010-2016), which provides a basis for evaluating this resource as a source for regional development.
4. The impact of tax burden on savings and living standards of population

The living standard has a significant impact on savings. It broadly, the relationship between living standard and the dynamics of population’s savings is manifested in the fact that the growth of the population’s savings indicates an increase in living standard (primarily as a result of rising incomes of the population), the opportunity to accumulate part of the income in order to purchase expensive goods or services, also the desire to invest part of the income. The increase of population savings in organized forms indicates the political and economic stabilization of society, the growing confidence in the country's financial institutions. This, in turn, demonstrates about improving the quality and living standard of the population.

Consider the relationship between savings level and living standard of individual using regressive and correlation analysis methods. The analysis of the relationship between these indicators is carried out on the authors' computations based on data in table 2 (using the “Regression” tool in the “Data Analysis” package of MS Excel).

| Region                                      | Living standard of individual* / Incomes | Saving /Income |
|---------------------------------------------|-----------------------------------------|----------------|
| Russian Federation                          | 0.34                                    | 0.16           |
| Murmansk Region                             | 0.39                                    | 0.15           |
| Nenets Autonomous Okrug                     | 0.29                                    | 0.51           |
| Yamalo- Nenets Autonomous Okrug             | 0.24                                    | 0.42           |
| Chukotka Autonomous Okrug                   | 0.29                                    | 0.53           |

Note: * To assess living standard of individual, the ratio of the subsistence minimum to the income level of the individual was used

Source: authors' calculations according to the Federal State Statistics Service [5]

A graphical interpretation of the regression analysis results is presented in Figure 6. Each point on Figure 6 describes the relationship between the living standard and population savings in the Arctic regions. The coefficient of determination $R^2$ was used as a statistical indicator for constructing regression dependence. In our example, $R^2$ is 0.655 or 66 per cent. It means that estimated parameters of the model explain the relationship between the parameters of the regression by 66 per cent. Therefore, we can conclude that there is a dependency between the analyzed parameters.

Figure 6 shows that the regression coefficient $X_1$ is -2.61477. Minus sign (-) before the coefficient indicates an inversely proportional dependence of the variable on the resulting factor, that is, if the share of the subsistence minimum in total income increases, the level of population savings will decrease. Thus, the factor $X_1$ is significant in the regression equation.
Thus, according to the results of regression analysis, there was a close relationship between savings and the living standard of population. Indirectly, using the author's methodical approach, the link between the tax burden and the level of population savings has been proved. In the Arctic regions, the synchronicity phenomenon of trends of the analyzed indicators was manifested in the fact that tax burden increasing occurs simultaneously with savings increasing and reducing of the general standard of population living. Therefore, to develop a set of state regulation measures, it is necessary to consider these important factors and interrelations that allow, on the one hand, taking into account the specifics of the region, and on the other, to increase the population’s possibility to form the saving. Addressing regional specifics, we suggest using the subsistence minimum as a non-taxable minimum for forming the tax base. Thereby it ensures a socially equitable redistribution of income between different segments of the population and leveling the difference in living of population in certain territories.

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