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INCOME TAX MODELING WITH COMPARATIVE ELEMENTS: A CASE STUDY OF ARMENIA AND BELARUS

This research discusses methods for estimating tax revenues to the state budget using mathematical modeling and forecasting tools. Relevant economic and mathematical calculations have shown that the volume of tax revenues can be considered as a mathematical expectation of the volume of tax collected as a result of the application of tax legislation. The impact of changes in certain tax rates on the volume of tax revenues is considered.

Income is usually considered a deterministic quantity. However, it is also possible to consider income a random quantity distributed according to some law and represent it with a probability distribution law, which is a mathematical model characterizing the structure of income. And if in that model the average income and/or its dispersion change over time, then we can obtain a dynamic model of the income structure, which makes it possible to solve a variety of problems and make predictions. The article discusses the forecast of tax revenues of the state budget, showing that the volume of tax revenues can be represented as a mathematical expectation of revenues arising from the tax law.

As a result, with new taxation rates, new divisions of the tax base scale, and rate adjustments in coming years, the Republic of Armenia implemented a new income tax on January 1, 2021, instead of the former income tax rates. The implementation of the new

tax law had a substantial impact on state budget revenue quantities, which could only be accurately assessed and forecast by mathematical modeling and study.

For comparison, the distribution of income in the Republic of Belarus, the impact of changes in income tax rates, and a forecast of the volume of income to the state budget from the income tax were also analyzed.

Belarus was selected as a comparative country due to its similar economic background and the availability of detailed and diverse statistical data relevant to income taxation and modeling.

Keywords: *budget, taxes, revenues, decile groups, dynamic model.*
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INTRODUCTION. The Republic of Armenia has a unified tax system, which is the entirety of tax relations: the definition, calculation, payment, accounting of taxes and fees, and in some cases specified by the tax legislation - collection, refund of taxes and fees, establishment of tax privileges, fixing the powers and responsibilities of taxpayers, tax and authorized bodies, implementation of tax control, application of liability for violation of the provisions of relevant laws, ensuring the fulfillment of tax obligations, as well as resolution of tax disputes.

Tax relations in the Republic of Armenia are regulated by the Constitution, international treaties ratified by the Republic of Armenia, the Law "On Taxes", the state "Profit Tax, Income Tax, Excise Tax and Value Added Tax" and local "Property Tax, Land Tax and Hotel Tax" taxes and payments laws of the Republic of Armenia, as well as by sub-legislative normative legal acts adopted on their basis and to ensure their implementation. Provisions regulating tax relations are also established by the RA Code on Administrative Offenses, the RA Law on "Fundamentals of Administration and Administrative Proceedings", the RA Criminal and the RA Criminal Procedure Codes, the RA Law on "Bankruptcy", the RA Law on "Tax Service" and "Operational and Investigative Activities", and the RA Law on Supervisory Bodies.

The tax system is one of the most important components of the economy of any country, including the Republic of Belarus, which we considered for comparison. It can be described as a "self-regulating" system that is constantly in motion in a changing economic and political situation. The tax system of many countries is a powerful and branched structure. Therefore, in this regard, the goal of the research - the assessment of tax revenues of the state budget using mathematical modeling and forecasting tools - is relevant. Although the core objective of the study is income tax modeling, comparative elements related to Armenia and Belarus are integrated to support and contextualize the modeling outcomes. Considering the volume of tax revenues as a mathematical expectation of the volume of tax collected as a result of the application of tax law is a new approach, and makes it possible to observe the impact of changes in certain tax rates on the volume of tax revenues.

LITERATURE REVIEW. As long as there has been human society, inequality has been a concern. It has always gone hand in hand with the way the market mechanism operates. Although market distribution addresses the issue of efficiency, it inevitably makes inequality worse. This leads to the emergence of a distinct group of people in society who are unable to follow the norms established by the market; specifically, they are those who have fallen behind the efficient market. In contemporary civilizations, the "left behind" must be protected in order to make up for the injustice caused by the market. By donating a portion of its goods to the government for additional redistribution, society assumes a moral commitment to safeguard the interests of this population group.

As the societal representative, the state allocates the wealth of the wealthier population to those who have been "abandoned" by the market.

Thus, the government pursues a policy of income redistribution, the state and society in the process of income redistribution face a choice: to maintain economic efficiency and unfairly exclude some members of society from the process of social production, or to maintain social justice by sacrificing economic efficiency (Zhurbenko, 2021, p. 6). The listed distribution issues were considered in the works of Turgot, Keynes, Smith, and Ricardo. Marx and Engels studied distribution relations from the perspective of the labor theory of value. Later, Western economists analyzed distribution from the perspective of the theory of marginal efficiency (Clark, Pigou). The differentiation of the income level of the population and the determination of criteria, the influence of various factors on it were analyzed by Marshall, Pareto, Euken, Friedman, Modigliani, Gini, and Sena. More recent analyses of tax policy in Armenia and Belarus also highlight ongoing reforms and modeling needs, particularly in the context of income tax forecasting (OECD, 2022; IMF, 2021). In the Armenian context, it has been noted that the current Tax Code requires changes to improve national prosperity and the effectiveness of policymaking. Open discussions on such issues, with the participation of all interested parties, are considered both important and useful (Muradyan, 2019). Finding solutions to the problems of justice and inequality, and social problems was combined with the clarification of the role of the state in the management of socio-economic processes, which was reflected in the works of Rawls, Bentham, Mills, Keynes, and Erhard. In the USSR, intensive study of the above-mentioned problems and the differentiation of income of the population began in the late 1950s of the 20th century. Among the authors who have studied the multifaceted nature of this problem, its relevance to various aspects of economic activity, and its impact on economic equality and efficiency are Bondarenko, Bobkov, Gorodetskaya, Gryaznov, Guchmazova, Dvorakova, Dolgushkin, Eremenko, Ignatyuk, Kashnikov, Kuznetsova, Makhmutov, Odintsova, Pudovkina, Rudchenko, Savvin, Tikhonov, Chernova, and Shalashnikov (Zhurbenko, 2021, pp. 6-7). Among the authors who have studied redistribution issues are Bazilev and Bazileva, Vlasenko, Bykova, Dolinina, Samokhvalova, Tapilina, Tikshaeva, Tuchina, Chepikova, Shvaiba, and others (Zhurbenko, 2021, p.7):

RESEARCH METHODOLOGY. Income as an economic indicator has been very well studied, but it has mainly been viewed as a deterministic quantity, that is, it only takes strictly certain values under certain conditions. However, in our opinion, the most realistic and, based on the research goals, more promising would be the approach according to which income can and should be viewed as a random quantity distributed with a certain regularity, and represented by the law of probability distribution, which is an economic-mathematical model characterizing the income structure. If in this model the average income and/or its dispersion change over time, then we will obtain a dynamic model of the income structure, through which it will be possible to solve various problems and make forecasts. To illustrate this modeling approach in a comparative context, the Republic of Belarus was chosen as the second case study. Belarus shares a post-Soviet transition background with Armenia, has implemented similar tax reforms, and provides access to detailed and diverse income-related statistical data. These features make it a suitable basis for generating comparative insights and strengthening the credibility of the modeling outcomes. The chosen methods were selected based on their compatibility with the research goal of income tax modeling and forecasting. Descriptive and statistical methods allow for identifying patterns and distributions, while probability-based modeling enables the representation of income as a random variable. The data used in this study are drawn from the official statistical databases of Armenia (Armstat) and Belarus (Belstat), which offer detailed income and tax indicators. The article's primary analysis techniques include descriptive, statistical, historical and logical, inductive, and deductive, as well as analysis and synthesis. We were directed by methodological principles that enable us to take into account the issues in the context of both public and international policy to address the challenges the research faces. Measurement, comparison, observation, synthesis, modeling, especially econometric modeling, and from the theoretical level methods: research and generalization, abstraction, idealization and formalization, induction and deduction, and others. The tools of financial mathematics, elements of dynamic programming, and probability theory, specifically distribution functions, distribution density functions, and risk management strategies, were applied. The primary indicators have been used for quantitative risk assessment and the least squares method.

ANALYSIS. In a socially oriented economy, where ensuring justice is one of the primary issues of economic policy, the tax system should also aim for social justice. The applied tax system must be fair for the entire society, reducing social stratification and inequality. In economics, two main systems for organizing personal income taxation have been developed: proportional and progressive tax scales. The goal of taxation is to increase the nation's budget revenues, which will then be redistributed for the creation of public goods, maintaining the social sphere, and providing direct social assistance.

The progressive tax scale implies the establishment of different tax rates for individuals with different income levels: the higher the income, the higher the tax rate. The proportional tax scale implies a single rate for taxpayers. In Belarus, a progressive tax scale was used until 2008. Depending on the annual income of an individual, rates of 9, 15, 20, 25, and 30 percent were used. The advantages of this tax system were: 1) ensuring a larger volume of budgetary funds; 2) implementation of vertical justice; 3) stimulation of the development of private initiative. The principle of vertical equity was applied because different tax rates were applied to individuals in different economic situations, and the use of a progressive income tax scale allows for the accumulation of larger amounts of funds in the budget and their subsequent distribution. By establishing a relationship between an individual entrepreneur's income and the income tax rate, the tax burden is reduced for those economic entities whose income at the start of their professional activity is insufficient to make the deductions provided by the state.

In 2009, a reform of the income tax system was implemented in the Republic of Belarus, as a result of which a general rate of 12% was established for personal income.

The main reason for switching to such a taxation system was the shortcomings that progressive taxation contained: 1) reduction of work incentives, 2) the need to submit independent income reports.

The use of "gray" wage schemes, or receiving wages "in an envelope", was used by employers who wanted to reduce costs for both the company and employees due to a lower tax base, part of which is received "in an envelope": the employee pays fewer deductions to the state, and the employer pays fewer pension and social security contributions. Receiving higher incomes becomes a reason for the transition to a higher level of taxation and an increase in the tax burden for both the employee and the employer, which negatively affects the incentives to increase the efficiency of work and entrepreneurial activity. The application of differentiated tax rates has obliged taxpayers to independently report to tax authorities, which increases the transaction costs of individuals due to visits to tax authorities, consultations with specialists on tax issues (in case of lack of understanding of tax payments), and administrative penalties in case of violation of calculations and payment deadlines. The application of progressive taxation, however, can only theoretically provide large revenues; in practice, when progressive taxation was applied in Belarus in 2000-2008, budget revenues, which consisted of income tax, were significantly reduced, from 14% in 2000 to 6.4% in 2008. According to Samokhvalova, “with tax rates of 9%, 15%, 20%, 25% and 30%, the majority of income tax revenues were provided by groups of the population whose income was taxed at rates of 9 and 15%, while people with salaries 3-4 times higher than the average provided only 9.1% of income (Samokhvalova, 2009, p. 51). This meant that high tax rates in practice only encouraged tax evasion and the transfer of the economy into the "gray" zone. The

transition to a proportional tax scale has several advantages: this income tax rate is the easiest to apply, it eliminates the problem of the inevitable constant growth of the amount of tax paid from the beginning to the end of the year, as was the case with the five-tier tax system. The introduction of a single rate helps to bring the economy out of the "gray" zone and legalize income. The transition to a flat tax scale was partly dictated by the success of tax reforms in the Russian Federation, where in 2001 the progressive personal income tax scale was replaced by a flat rate of 13%. It should be understood that the poor will not benefit if, as a result of a progressive system, investments, industrial output, and the number of jobs decrease (Muradyan, 2019). As researchers note, the following year, after the introduction of a single 13% income tax rate in the Russian Federation, mainly as a result of income legalization, incomes increased by 46% in nominal terms and by 26% in real terms. Russian researchers Yu. Tikhonov and O. Pudovkina note that the “flat” scale does indeed facilitate tax collection, but the declared extreme difficulties of collecting taxes at progressive rates seem imaginary.” As an example, they cited the experience of China, where, with a large population and, consequently, a huge number of potential taxpayers, a seven-tier progressive income tax system is applied. The minimum tax rate was set at 3%, and the maximum at 45%. This ensured stable economic growth even during the global economic crisis (Tikhonov & Pudovkina, 2016).

But the “flat” scale slows down the development of the social sphere, as it increases the gap between affluence in the private sector and poverty in the public sector. This is because the single tax corresponds to the principle of horizontal, not vertical equality. Thus, groups of citizens with different incomes bring the same share of their income to the budget. The tax rate for the poor population was too high, and for the rich, insufficient. Since 2009, the growth of the budget revenues of the Republic of Belarus has been associated with the legalization of income that was previously hidden due to high progressive tax rates. As the accumulated hidden funds were brought out of the shadows by 2014, the growth of the share of income tax revenues in the structure of tax revenues in the budget also began to slow down significantly, which indicates that the applied single income tax rate has ceased to be effective. Due to the reduction of budget revenues from income tax, in 2015, the flat rate of income tax was increased to 13%. The budget of the Republic of Armenia, which is largely formed from tax deductions of economic entities themselves, determines the ability of the state to ensure fair redistribution, where distribution based on the market mechanism has given priority to efficiency. Depending on what the object of taxation is and what expenses are financed by taxes, both the motivation and efficiency of economic entities change (Eremenko, 2016). When a higher tax burden falls on wealthier groups of individuals and the taxes taken from them are used to stimulate the economy, the population with middle and lower incomes also benefits, as economic development helps to increase their well-being. Returning to the progressive taxation scale is one way to increase the budget's potential for

redistributing income in the BS. The national economy does not receive a share of income and capital because high-income earners are encouraged to invest in the economies of more developed nations by inadequate taxation.

Setting tax rates that won't incentivize the rich to avoid paying taxes is essential to maximizing their efficacy. Hence, rates from 0% to 25% can be set while keeping the five-level scale in place. The limits of the applied rates will be connected to an indicator that taxpayers can comprehend, such as the minimum wage or the subsistence level. Through better tax administration, such as through the use of contemporary information technologies and computerized income and tax computation accounting, many tax collections can be accomplished. To ensure the engagement of the individual in the redistribution process, it is important to pass some part of the responsibility for paying taxes to the taxpayer: when a person pays the tax personally, he is interested in its optimal use.

To stimulate tax payments, it is necessary to ensure the transparency of the tax system. When taxpayers see how and where the taxes they pay are spent, they will be interested in paying them. Based on the analysis of the results of the distribution policy in Belarus, it was found that the flat income tax scale and the 12% single rate, which began to be applied in 2009, have shown their effectiveness, as they made it possible to partially legalize previously hidden large incomes. However, this does not comply with the principle of vertical justice. To ensure the efficiency of distribution in the future, it is necessary to move to progressive taxation under certain conditions, namely, to set effective tax rates taking into account the solvency of the population, to determine the limits of the applied rates at the level of indicators understandable to the population, and to automate the tax calculation process, to shift part of the responsibility for paying income tax from the employer to the income recipient, and to ensure the transparency of the tax system (Zhurbenko, 2021, p. 60). In the Republic of Belarus, incomes have been divided into 15 unequal parts for some years,[1] the structure of consumer spending in 10% groups of households in 2017 (as the expenditure of households of the corresponding group in total consumer spending).[2]

In the Republic of Armenia, from January 1, 2013, instead of the previous income tax rates, a new income tax with new tax rates and new divisions of the tax base scale began to operate. The introduction of the new tax law significantly affected the volumes of state budget revenues, the accurate assessment and forecast of which is possible through their mathematical modeling and research.

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[1] Actual values are calculated based on data from the National Statistical Committee of the Republic of Belarus, *Distribution of the population by the level of per capita disposable resources* (n.d.), https://www.belstat.gov.by/ofitsialnaya-statistika/makroekonomika-i-okruzhayushchaya-sreda /uroven-zhizni-naseleniya/operativnye-dannye/raspredelenie-naseleniya-po-urovnyu-srednedushevykh-raspolagaemykh-resursov/. The forecasted values are based on our model estimation.

[2] Actual values are calculated based on data from the National Statistical Committee of Belarus, *Belarus, and Russia: Statistical collection* (2018, p. 58), https://www.belstat.gov.by/upload/iblock/3d8/3d871f46f8d40962492cbc4dccca17d9.pdf. The forecasted values are based on our model estimation.

As it is known, the income tax rate from January 1, 2021, by the Tax Code of the Republic of Armenia, has been set at 22%, from January 1, 2022, at 21%, and from January 1, 2023, until now at 20%. For employees of companies with IT sector certificates that benefit from tax privileges, the income tax has been set at 10%.[3] According to the RA Law "On Funded Pensions" for participants of the mandatory funded pension system, social payments are made in the following amounts: 5% of the salary, if the monthly salary does not exceed 500,000 drams, 10% of the salary and the difference between 25,000 drams, if the monthly salary exceeds 500,000 drams, 87,500 drams from the salary in case it exceeds 1,125,000 drams. According to the RA Law "On Compensation for Damage Caused to the Life or Health of Servicemen During the Defense of the Republic of Armenia", stamp payments to the Servicemen's Insurance Fund are made at the following rates: for a calculation base of up to 100,000 AMD: 1500 AMD, for a calculation base of 100,001 to 200,000 AMD: 3000 AMD, for a calculation base of 200,001 to 500,000 AMD: 5500 AMD, for a calculation base of 500,001 to 1,000,000 AMD: 8500 AMD, for a calculation base of 100,0001 AMD and more: 15,000 AMD.[4]

To estimate tax revenues of the state budget, carry out its mathematical modeling and forecasting, consider income as a random variable distributed by some law and represent it by the law of probability distribution, and to build a mathematical model of the income structure, the official data published by the National Statistics Service on the structure of income of the population in the Republic of Belarus in the 3rd quarter of 2018 (Fig. 1) were studied, based on which, as a result of appropriate processing, the decile histogram of the income of the population in the Republic of Belarus in the 3rd quarter of 2018 (Figure 1) was constructed, as well as the continuous law of probability distribution density was constructed.

The distribution of salaries by decile group in the Republic of Belarus in 2018 is presented in Table 1.

Table 1

Distribution of salaries by decile groups in the Republic of Belarus in 2018

decile groups	<200,0	200,1-250,0	250,1-300,0	300.1-350,0	350,1-400,0	400,1-500,0	500,1-600,0	600,1-700,0	700,1-800,0	>800,1
m_j %	3,8	6,7	8,2	10,6	11,6	20.5	13,7	7,6	6,1	11,2

As a result of the test using the Pirson criterion, it was substantiated that in the 3rd quarter of 2018, the income of the population can also be represented as

[3] Actual values are calculated based on data from Petekamutner.am, *Tax rates starting from 2023* (n.d.), https://www.petekamutner.am/Content.aspx?itn=tsTIIncomeTaxCurrent. The forecasted values are based on our model estimation.

[4] Actual values are calculated based on data from Hamk.am (2023), *Tax rates starting from 2023*, https://hamk.am/2023t-hunvari-1-its-ashkhatavardzits-vcharvokh-harkeri-chapery. The forecasted values are based on our model estimation.

random variables distributed according to Rayleigh's law (Nalchadjyan et al., 170-173). For the 2017-2022 BS, not wages, but the total volume of resources at disposal is already considered, and not in deciles, but in 20% quantile groups.[5] This, of course, significantly complicates the comparison.

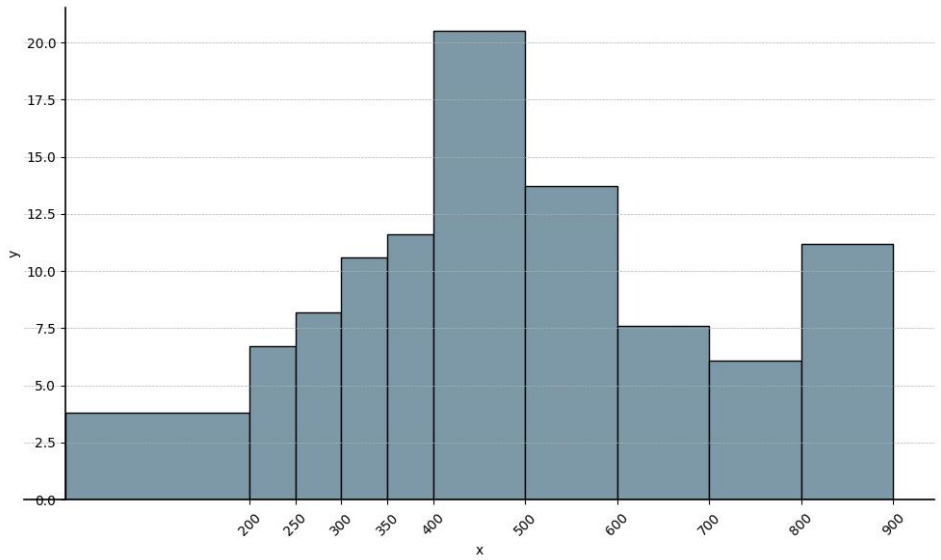

Figure 1. ***Histogram of income structure in the Republic of Belarus in the 3rd quarter of 2018, by decile groups.***[6]

The double-peaked probability density function, constructed as the sum of the density functions of two normal distributions, each multiplied by the specific weights of the corresponding fractions, will have the following form, which is called the density function of the heavy-tailed normal distribution.

$$f(x) = 0{,}9\frac{1}{87*\sqrt{2\pi}}e^{\frac{-(t-511)^2}{2*87^2}} + 0{,}1\frac{1}{30*\sqrt{2\pi}}e^{\frac{-(t-850)^2}{2*30^2}} \quad (1)$$

where 0.9 and 0.1 are the shares of the bottom 90% and the top 10% of the population, respectively, in the total population, 87 and 30 are the standard deviations of the incomes of these shares, 511 and 850 are the arithmetic average values of the earnings per share, respectively.

It is necessary to study, for example, the movement of average incomes over the 10 years preceding 2018, 2009-2018, and build a $m(t)$ model of its movement, as well as a $\sigma(t)$model of the mean square deviation of incomes, and then, by inserting them into a static model of the income structure, obtain a dynamic model

[5] Actual values are calculated based on data from National Statistical Committee of Belarus, *Statistical data on income distribution* (n.d., p. 54). https://www.belstat.gov.by/upload/iblock/747/h2d3js5a6ro9svs5xv2zi0fb8ov7o41i.pdf. This data was used in our model.

[6] The data are based on our calculations.

of the income structure. A similar algorithm can be used to analyze the problem under consideration for the Republic of Armenia, where the income distribution can be represented, for example, by the Rayleigh distribution density function (1*), taking the data in Table 2 as a basis:

$$g11(x) := \frac{x \cdot e^{\frac{-x^2}{2 \cdot 54^2}}}{54^2} \qquad (1^*)$$

Table 2

Armenia: Subjective (by consumption aggregate decile groups) estimates of living standards (in % in each decile group), 2020 [7]

Consumption aggregate decile groups	*Extremely poor*	*Poor*	*Below average*	*Avarage*	*Above average*	*Wealthy*
Total	**0.8**	**9.7**	**40.3**	**46.4**	**2.8**	**0.0**
Including						
First decil	4.5	21.7	47.9	25.6	0.3	0.0
2	1.4	16.6	39.4	41.9	0.7	
3	1.1	9.4	42.9	45.5	1.1	
4	0.2	12.4	43.8	41.8	1.8	
5	0.8	9.8	41.4	46.2	21.7	0.1
6	0.0	9.9	44.8	42.0	3.3	
7	0.8	7.1	39.9	50.0	2.2	
8	0.3	6.7	39.4	51.0	2.6	
9	0.2	5.7	37.8	52.6	3.7	
10th decil	0.0	5.2	32.0	55.0	7.7	0.1

Note: *Consumption is calculated on an adult consumption equivalent basis.*

It should be noted that the subjective assessment of overall poverty is lower than the objective one. In 2020, 9.7% of the population considered themselves poor (excluding the extremely poor). At the same time, 0.8% of the population considered themselves extremely poor, which is close to the indicator of the population assessed as extremely poor based on the equivalent consumption per adult, 0.7%. Interestingly, the share of the population assessing their standard of living above average was 2.8%, and almost no one considered themselves rich.[8]

The trend in average income in the Republic of Armenia over the years is presented in Table 3.

[7] Actual values are calculated based on the data from the National Statistical Service of Armenia, *Subjective assessment of poverty in 2020* (2020, p. 114). https://armstat.am/file/article/poverty_2021_a_5.pdf. These data were used in our model.

[8] Actual values are calculated based on the data from the Republic of Armenia, *Subjective assessment of poverty in 2020* (2020, p. 114). https://armstat.am/file/article/poverty_2021_a_5.pdf. This data was used in our model.

Table 3

The trend in average income in the Republic of Armenia over the years

m	*40,6*	*51,75*	*60,54*	*71,1*	*80,19*	*92,86*	*114,84*	*117,31*
t	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*

$$m(t) = 10{,}205t - 0{,}16 \quad (2)$$

Based on the data in Table 3, a linear (3) model of the mean square deviation of income was also constructed:

$$\sigma(t) = 5{,}001t + 11{,}959 \quad (3)$$

By inserting (2) and (3) into the static (1) model of income structure, we obtain the dynamic (4) model of income structure.

$$f(x,t) = 0{,}85 \cdot x \cdot e^{\frac{-x^2}{2\cdot}} \quad (4)$$

where the coefficients 0.85 and 0.15 mean that 85% of the population in the Republic of Armenia received an income of up to 120 thousand drams, and the incomes of 15% of employees exceeded this limit. The movement of this model over time is shown in Figure 2.

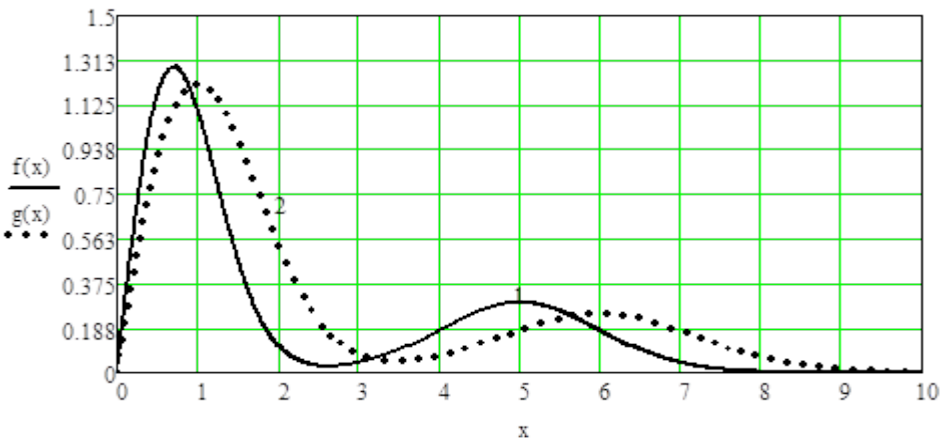

Figure 2. ***The evolution of the wage structure in the Republic of Armenia over time.***

Previously, the mathematical description of the income tax looked like this.

$$C(x) = \begin{cases} 0{,}244x0 \le x \le 120 \\ 0{,}26x - 0{,}192120 < x \le 2000 \\ 0{,}36x - 200{,}192x > 2000 \end{cases} \quad (5)$$

The following integral model for estimating the amount of income tax for a single taxpayer has been constructed (Kobzar, A. I., 2006; Aivazyan, S. A., 1985).

$$I(t) = \int_0^{\infty} C(x) \cdot f(x,t)dx, \quad (6)$$

where $t -$ is the number of years under consideration. Model (6) is the average value of the tax law, the economic interpretation of which is the amount of tax transferred to the state budget per employee each month.

The integral (6) model was studied in the Mathcad-14 software package (Okhorzin, V. A., 2008) environment, and the state budget revenues were

estimated and forecasted. The results of the model studies are presented in Table 4, which shows that the state budget revenues from income tax per employee in the first accounting year 2013, should have amounted to about 31,453 thousand drams per month, and in subsequent years should have gradually increased in average by 2248.18 AMD by the following law.

$$x=2248,18 * t - 4494437 \quad (7)$$

Table 4

Monthly state budget revenues per employee [9, 10]

2013	31453
2014	33763
2015	36069
2016	38372
2017	38231
2018	37136
2019	39275
2020	40789
2021	44891
2022	49471
2023	53999
2024	56183

CONCLUSION. The tax system is one of the most important sectors of the country's domestic economy. The distribution of income in the Republic of Armenia and the Republic of Belarus, tax rates, and the effects and expediency of their changes are studied. It is shown that it is possible to consider income as a random variable, to represent it by the law of probability distribution, that is, to characterize the income structure with a mathematical model. If the average income and/or its dispersion in the model change over time, then we will have a dynamic model of the income structure for solving various problems and making forecasts. The forecast of budget tax revenues is analyzed as a mathematical expectation of the tax law.

During 1995-1998, the fiscal and budgetary system took on a complete form, systematic economic reforms were deepened, banking legislation was expanded and completed, etc. With the help of private transfers from overseas, it was possible not only to halt the economic decline but also to ensure some economic growth. From 1994 to 1998, real GDP increased by an average of 6% annually, and in 1998, it exceeded 7%. The probabilistic-integral models that were constructed make predictions not only about arbitrary changes in tax rates but also about the division of the tax base scale. If, during tax law reform, it becomes necessary to change only one tax rate, then by proposing a certain range of its

[9] Actual values are calculated based on the data from the National Statistical Service of Armenia, *Statistical data* (n.d.). https://armstat.am/am/?nid=12&id=08001. This data was used in our model.

[10] Actual values are calculated based on Arlis.am, *Legal documents and legislation* (n.d.). https://www.arlis.am/DocumentView.aspx?docid=131962. This law was used in our calculations.

change, we can estimate the potential magnitudes of budget revenues and construct the Laffer curve.

By simultaneously altering the numerical values of Laffer curves in specific steps within reasonable bounds, we have created Laffer "surfaces" that take into account a large number of tax law options, having "indifference curves" that distinguish those options for the tax law in which budget revenues remain unchanged. The suggested integral model also enables the study of the dependence of state budget revenues on simultaneous changes in two rates in the tax law. In the integral model, by changing the tax base scale divisions, we can effectively research new options for the law under consideration.

It is possible that there will be a need to simultaneously change the numerical values of one of the tax rates and any division of the scale within arbitrary ranges. Thus, a large number of new, previously unobserved and undiscussed options for the tax law will be studied.

While the primary emphasis was on modeling, the inclusion of Armenia and Belarus as case studies provided contextual insight and supported the validation of the model in two distinct yet comparable tax systems.

The results highlight the potential of mathematical and statistical methods in the process of tax policy design, particularly when reliable and detailed statistical data are available. The proposed integral model is general and can be used when solving problems of reforming any tax law, provided that the probability density law of the tax base has been previously determined by processing statistical data.

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